Module 01, Mathematics.

1.1 Arithmetic.

Question Number. 1. A car travels 24 miles in 45 minutes. What is its average speed?.

Option A. 32 mph.
Option B. 36 mph.
Option C. 18 mph.
Correct Answer is. 32 mph.
Explanation. 45 minutes = 3/4 hour. Speed = distance / time = 24/3/4 = 24 * 4/3 = 32.

Question Number. 2. Evaluate.

$$(6 - 2) - \frac{(6 - 9)}{-3 + (-3)}$$

Yes
Option A. 4 ½.
Option B. 3 ½.
Option C. 4.
Correct Answer is. 3 ½.
Explanation.

Question Number. 3. 15.4/2 - 2*(6.2 - 15.6).
Option A. 11.1.
Option B. 26.5.
Option C. -11.1.
Correct Answer is. 26.5.
Explanation. 7.7-2(-9.4)7.7-(-18.8)7.7 + 18.8= 26.5.

Question Number. 4. A cuboid has dimensions of 4 cm, 6 cm and 12 cm. What is its volume?.
Option A. 0.028 m^3.
Option B. 2.88 m^3.
Option C. 0.000288 m^3.
Correct Answer is. 2.88 m^3.
Explanation. 4 * 6 * 12 = 288, then convert the cm to metres (divide 288 by 100, 3 times).

Question Number. 5. What is a scalene triange?.
Option A. 2 sides unequal.
Option B. All 3 sides unequal.
Option C. 2 sides equal.
Correct Answer is. All 3 sides unequal.
Explanation.

Question Number. 6. Work out the following sum: 4 {2 (5-1) -3} + 8.
Option A. 28
Option B. 37.
Option C. 54.
Correct Answer is. 28
Explanation. Start at the inner brackets first, and then work outwards.

Question Number. 7. A rectangle is 11cm x 120cm. What is its area in m^2?.
Option A. 0.132.
Option B. 1320.
Option C. 13.2.
Correct Answer is. 0.132.
Explanation. 100cm in 1m, so divide 1320 by 100 twice (since it is area).

Question Number. 8. The surface area of a cone whose height is 10 cm and diameter is 8 cm is.
Option A. 40π cm^2.

Option B. 120π cm^2.

Option C. 80π cm2.

Correct Answer is. 40π cm^2.

Explanation.   Surface area of a cone = $\pi * r * l$ = $\pi \times 8/2 * 10 = 40\pi$.

Question Number.   9.   4 3/8 – 2 1/4 + 1/8 =.

Option A.   2.25

Option B.   2.5.

Option C.   2 1/8

Correct Answer is.   2 1/4

Explanation.   Work out the whole numbers separate to the fractions.Remember that 1/4 is 2/8.

Question Number.   10.   11/16 + 5/8 =.

Option A.   55/128.

Option B.   21/16.

Option C.   10/11.

Correct Answer is.   21/16.

Explanation.   5/8 = 10/16. 11/16 + 10/16 = 21/16.

Question Number.   11.   3/4 multiplied by 0.82 is equal to.

Option A.   1.23.

Option B.   0.615.

Option C.   2.46.

Correct Answer is.   0.615.

Explanation.   3/4 = 0.75. Approximate, 0.8 * 0.75 must be less than 0.75.

Question Number.   12.   7/6 can be expressed as.

Option A.   1.166.

Option B.   2.6.

Option C.   1.6.

Correct Answer is.   1.166.

Explanation.   6/6 would be 1. So 7/6 is just slightly bigger than 1.

Question Number.   13.   The ratio of 6:5 can be expressed as.

Option A.   24:20.

Option B.   20:25.

Option C.   10:16.

Correct Answer is.   24:20.

Explanation.   6:5, multiply each by 4.

Question Number.   14. 14^3 can be expressed as.

Option A.   14 * 14 * 14.

Option B. $14 x^3$.

Option C.   14 + 14 + 14.

Correct Answer is.   14 * 14 * 14.

Explanation.   Power' means the number 'times' itself.

Question Number.   15.   0.0000413 can be written as.

Option A. 0.413×10^{-7}.

Option B. 413×10^{-7}.

Option C. 4.13×10^{-7}.

Correct Answer is. 413×10^{-7}.

Explanation. 10^{-7} means move the decimal place 7 places to the left. Try it on each answer and see what comes out.

Question Number.   16.   5/8 + 3/4 =.

Option A.   11/4.

Option B.   8/8.

Option C.   11/8.

Correct Answer is.   11/8.

Explanation.   5/8 + 3/4 = 5/8 + 6/8 (LCD = 8) = 11/8.

Question Number. 17. The Lowest Common Denominator for the problem below is 1/6 + 1/5 + 1/17 + 1/2.

Option A. 510.

Option B. 1020.

Option C. 17.

Correct Answer is. 510.

Explanation. The LCD is the lowest of the answers which all the denominators can be divided into.

Question Number. 18. The formula for calculating the area of a right angled triangle is.

Option A. ½ height + base.

Option B. ½ (base * height).

Option C. ½ base / height.

Correct Answer is. ½ (base * height).

Explanation. Area of 'any' triangle is 1/2 base x height. Can also be written 1/2 (base * height).

Question Number. 19. The area of a circle whose circumference is given as 12cm is approximately.

Option A. 3.8 sq.cm.

Option B. 11.3 sq.cm.

Option C. 38 sq cm.

Correct Answer is. 11.3 sq.cm.

Explanation. Area = Circumference squared / 4π = 144 / (4 * 3.14) =.

Question Number. 20. Area of a right circular cone of base radius r, and height l, is.

Option A. 2/3 (π * r * l).

Option B. (π * r * l) + 2π * r * r.

Option C. π * r * l.

Correct Answer is. π * r * l.

Explanation. Area of a cone is π * r * l.

Question Number. 21. Determine (+ 3)-(- 4).

Option A. -1.

Option B. -7.

Option C. +7.

Correct Answer is. +7.

Explanation. A minus number, when subtracted, becomes a plus (a minus and a minus makes a plus).

Question Number. 22. To convert imperial gallons to litres, multiply by.

Option A. 4.5.

Option B. 5.4.

Option C. 4.7.

Correct Answer is. 4.5.

Explanation. There are 4.54 litres in 1 British (Imperial) gallon.

Question Number. 23. Express 9/20 as a percentage.

Option A. 45%.

Option B. 40%.

Option C. 47%.

Correct Answer is. 45%.

Explanation. Multiply the top and bottom to make the denominator into 100 (*5 in this case). Then the numerator is the percentage.

Question Number. 24. To find the area of a circle, multiply.

Option A. twice the radius by π.

Option B. the square of the circumference by the radius.

Option C. the square of the radius by π.

Correct Answer is. the square of the radius by π.

Explanation. Area = π * $radius^2$.

Question Number. 25. How many centimetres is in an inch?.
Option A. 25.4.
Option B. 2.54.
Option C. 0.254.
Correct Answer is. 2.54.
Explanation. 1 inch = 2.54 cm.

Question Number. 26. Find the lowest common multiple of 6; 7; 8.
Option A. 84.
Option B. 336.
Option C. 168.
Correct Answer is. 168.
Explanation. The LCM is the lowest number that all 3 can be divided into.

Question Number. 27. What torque loading would you apply to a nut if the force is 50 lbs, exerted 2 feet from its axis?.
Option A. 600 lbs.ft.
Option B. 100 lbs.ft.
Option C. 251 lbs.ft.
Correct Answer is. 100 lbs.ft.
Explanation. Torque = force x distance.

Question Number. 28. The formula for calculating the torque loading on a nut or bolt is.

Option A. Force used * lever length of the spanner.
Option B. Lever length of the spanner / Threads per inch.
Option C. Force used * diameter of the bolt.

Correct Answer is. Force used * lever length of the spanner.
Explanation. Torque = force * distance.

Question Number. 29. How is the area of a circle calculated? (r=radius, d=diameter).

Option A. $2 * 3.142 * r$.
Option B. $d^2 * 3.142$.
Option C. $r^2 * 3.142$.
Correct Answer is. $r^2 * 3.142$.
Explanation. Area = πr^2.

Question Number. 30. Determine the following : 9/4 + 5/12 + 5 1/8.
Option A. 2 25/24.
Option B. 4 1/12.
Option C. 4 1/24.
Correct Answer is. 4 1/24.
Explanation. LCD = 24 and 1 3/8 = 11/8. 54/24 + 10/24 + 33/24 = 97/24 = 4 1/24.

Question Number. 31. The specific torque loading for a bolt is 50 lbs.ins but an extension of 2 is needed to reach the bolt in addition to the 8 torque wrench. What will the actual reading?.

Option A. 60 lb.ins.
Option B. 54 lb.ins.
Option C. 40 lb.ins.
Correct Answer is. 40 lb.ins.
Explanation. New torque reading = desired torque x L/(x + L). 50 * 8/10 = 40 lb.ins.

Question Number. 32. Express the fraction 7/8 as a decimal.
Option A. 0.785.
Option B. 0.878.
Option C. 0.875.
Correct Answer is. 0.875.
Explanation. Use long division.

Question Number. 33. Determine 0.75 * 0.003.

Option A.   0.225.

Option B.   0.00225.

Option C.   0.0225.

Correct Answer is.   0.00225.

Explanation.   Easiest way is to multiply by 0.001 (0.75 * 0.001 = 0.00075) then multiply by 3. (75 * 3 = 225, so 0.00075 * 3 = 0.00225).

Question Number.   34.   Convert 162 knots to MPH.

Option A.   186 mph.

Option B.   176 mph.

Option C.   196 mph.

Correct Answer is.   186 mph.

Explanation.   1 knots = 1.15 mph, 162 * 1.15 = 186 mph.

Question Number.   35.   To convert inches to millimetres, it is necessary to.

Option A.   divide by 25.4.

Option B.   multiply by 25.4.

Option C.   multiply by 2.54.

Correct Answer is.   multiply by 25.4.

Explanation.   There are 25.4 mm in 1 inch.

Question Number.   36.   3/4 * 82 =.

Option A.   123.

Option B.   61.5.

Option C.   81.5.

Correct Answer is.   61.5.

Explanation.   Estimate 3/4 of 82.

Question Number.   37.   A circular patch is held together by seven equally spaced rivets. What is their angular spacing?.

Option A.   51.50°.

Option B.   52°.

Option C.   51.43°.

Correct Answer is.   51.43°.

Explanation.   360/7 = 51.43 degrees.

Question Number.   38.   Add together; 3/4, 5/16, 7/8 and 0.375.

Option A.   2 5/16.

Option B.   2 1/8.

Option C.   2 1/4.

Correct Answer is.   2 5/16.

Explanation.   0.375 = 3/8. 3/4 + 5/16 + 7/8 + 3/8 (LCD = 16) 12/16 + 5/16 + 14/16 + 6/16 = 37/16 = 2 5/16.

Question Number.   39.   To convert pounds of fuel into kilograms, it is necessary to.

Option A.   divide by 0.4536.

Option B.   multiply by 4536.

Option C.   multiply by 0.4536.

Correct Answer is.   multiply by 0.4536.

Explanation.   2.2 lb = 1 kg. 1lb = 0.4536 kg.

Question Number.   40.   If resin to hardener is used in the ratio of 1000:45, how much hardener is used with 60 grams of resin?.

Option A.   145 grams.

Option B.   47 grams.

Option C.   2.7 grams.

Correct Answer is.   2.7 grams.

Explanation.   Ratio of hardener to resin is 45:1000, or 0.45:10. For 60 gms of resin, use 0.45 * 6 hardener = 2.7 gms.

Question Number.   41.   Determine the following 11/16 + 5/8.

Option A.   11/10.

Option B.   55/128.

Option C.   15/16.

Correct Answer is.   15/16.

Explanation.   11/16 + 5/8 (LCD = 16) 11/16 + 10/16 = 21/16 = 1 5/16.

Question Number. 42. 6 mm is equal to.

Option A. 0.625 inches.
Option B. 0.236 inches.
Option C. 0.375 inches.
Correct Answer is. 0.236 inches.
Explanation. 6mm is approximately 1/4 inch = 0.25 inch.

Question Number. 43. Weight is equal to.

Option A. volume * gravity.
Option B. mass * acceleration.
Option C. mass * gravity.
Correct Answer is. mass * gravity.
Explanation. Weight = mass * gravity.

Question Number. 44. 8 + 4[5 * 2 (5-9/3)] =.
Option A. Eighty Eight.
Option B. Twelve.
Option C. Forty Eight.
Correct Answer is. Eighty Eight.
Explanation. Work from the inner brackets - outwards.

Question Number. 45. To convert gallons to litres.
Option A. multiply by 4.55.
Option B. multiply by 0.00455.
Option C. multiply by 0.568.
Correct Answer is. multiply by 4.55.
Explanation. 1 gallon = 4.55 litres.

Question Number. 46. A cylinder has a diameter of 20 cm and a length of 20 cm, what is its volume?.
Option A. 1240 cm^3.

Option B. 6200 cm^3
Option C. 400 cm^3.
Correct Answer is. 6200 cm^3.
Explanation. Volume of a cylinder = π * r2 * length of cylinder = π * 100 * 20 = 3.1 * 100 * 20 = 6200.

Question Number. 47. 31/8 – 11/5 =.

Option A. 23/40.
Option B. 13/40.
Option C. 137/40.
Correct Answer is. 137/40.
Explanation. Handle the whole numbers and the fractions separately. So 3-1 = 2. 1/8-1/5 = 5/40-8/40 = -3/40. 2 + (-3/40) = 2 37/40.

Question Number. 48. What is the formula for calculating the curved area of a cone?.

Option A. π * radius2 * height.
Option B. π * radius * height.
Option C. 2/3 * π * radius * height.
Correct Answer is. π * radius * height.
Explanation. π * radius * height.

Question Number. 49. Determine 10 * 23 + 10 * 25.
Option A. 520.
Option B. 32,008,000.
Option C. 400.
Correct Answer is. 400.
Explanation. Work out the contents of the brackets in this:- (10 * 2*2*2) + (10 * 2*2*2*2*2).

Question Number. 50. One radian is equal to.
Option A. 90°.
Option B. 75°.

Option C.   57.5°.

Correct Answer is.   57.5°.

Explanation.   There are 2π radians in one complete circle (360°). So one radian is 360/6.28 = 57.5°.

Question Number.   51.   The surface area of a cylinder of diameter 10 cm and height 10 cm, is.

Option A.   80π.

Option B.   50π.

Option C.   100π.

Correct Answer is.   100π.

Explanation.   Area = circumference x height = π * d * h = 10 * 10 * π.

Question Number.   52.   A parallelogram has a base 120cm and height 11 cm. What is the area?.
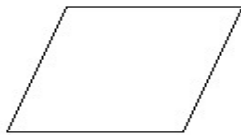
Option A.   0.0132 m^2.

Option B.   1.32 m^2.

Option C.   1.32 m^2.

Correct Answer is.   0.132 m2.

Explanation.   Area of a parallelogram = base x height = 1.2 m * 0.11 m = 0.1322.

Question Number.   53.   The area of this shape is calculated by.

Option A.   Perimeter squared.
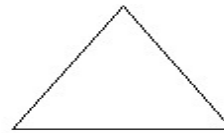
Option B.   ½ Base * Height.

Option C.   Base * Height.

Correct Answer is.   Base * Height.

Explanation.   It does not matter which way around the base and the height go when they are multiplied together.

Question Number.   54.   The area of the shape is calculated by.

Option A.   ½ height * base.

Option B.   ½ base * ½ height.

Option C.   ½ base * ½ height.

Correct Answer is.   ½ height * base.

Explanation.   Nil

Question Number.   55.   The area of the curved surface area of a cone is (where r = radius; h = vertical height and l = slant height).

Option A.   πrh.

Option B.   πr^2h.

Option C.   1/3πr^2h.

Correct Answer is.   πrh.

Explanation.

Question Number.   56.   What is the volume of a cuboid?.

Option A.   height * length * width.

Option B.   height * ½ base * height.

Option C.   height * ½ base * length.

Correct Answer is.   height * length * width.

Explanation.

Question Number. 57. (4-6)-(9/-3) + (-3) =.

Option A. -2.

Option B. 4.5.

Option C. 4.

Correct Answer is. -2.

Explanation. 4-6-(-3)-3   4-6 + 3-3 = -2.

Question Number. 58. An aircraft travels 2150 nautical miles in 2 hours 30 minutes. What is the average speed of the aircraft?.

Option A. 550 knots.

Option B. 600 knots.

Option C. 860 knots.

Correct Answer is. 860 knots.

Explanation. Knots = nautical miles per hour. 2150 / 2.5 = 860 knots.

Question Number. 59. What is the surface area of a cylinder whose diameter is 20cm and height of 15 cm?.

Option A. 300π.

Option B. 942π.

Option C. 350π.

Correct Answer is. 300π.

Explanation. Surface area = π * diameter * height = π * 20 * 15 = 300π.

Question Number. 60. Four percent of 0.01 is.

Option A. 0.0004.

Option B. 0.004.

Option C. 0.04.

Correct Answer is. 0.0004.

Explanation. 4% means 4/100. So 4/100 of 0.01 = 0.04/100 = 0.0004.

Question Number. 61. (6 + 2)2 * 2 (2 * 45) =.

Option A. 218.

Option B. 38.

Option C. 128.

Correct Answer is. 38.

Explanation. (6 + 2)2 = 64. *2 = 128. 2*45 = 90. 128-90 = 38.

Question Number. 62. 17 degrees 49 minutes and 10 seconds added to 22 degrees 22 minutes and 59 seconds, equals.

Option A. 40 degrees 11 minutes and 69 seconds.

Option B. 40 degrees 12 minutes and 9 seconds.

Option C. 39 degrees 11 minutes and 9 seconds.

Correct Answer is. 40 degrees 12 minutes and 9 seconds.

Explanation. Add them both together in 3 columns (degrees, minutes, seconds). When each addition goes over 59, add 1 to the next column.

Question Number. 63. The diameter of a cylinder is 200 cm and the height is 20 cm, what is the volume?.

Option A. 628000 cm^3.

Option B. 62800 cm^3.

Option C. 8000 cm^3.

Correct Answer is. 628000 cm^3.

Explanation. Volume = π * radius-squared (base area) * height. 3.14 * 100 * 100 * 20 = 628,000.

Question Number. 64. The comparison of the power input to the power output of an inverter is expressed as a.

Option A. ratio.

Option B. gain.

Option C. loss.

Correct Answer is. ratio.

Explanation. A 'ratio' is a comparison of any two values.

Question Number. 65. The ratio of 6:4 can also be expressed as.

Option A. 64%.

Option B. 66%.

Option C. 150%.

Correct Answer is. 150%.

Explanation. 6:4 means 6/4 = 3/2 = 150%.

Question Number. 66. 200 kilovolts can be expressed as.

Option A. 2 * 103 volts.

Option B. 2 * 105 volts.

Option C. 2 * 10-4 volts.

Correct Answer is. 2 * 105 volts.

Explanation. 200 kV = 200 * 1000 = 200,000 = 2 * 10 to the power of 5 (i.e. 2 with 5 zeros).

Question Number. 67. What is the surface area of a cone if the base is 8cm diameter and the height is 10cm?.

Option A. 40π.

Option B. 80π.

Option C. 120π.

Correct Answer is. 40π.

Explanation. Surface area of a cone = π * r * l = π * 8/2 * 10 = 40π.

Question Number. 68. What is the area of a rectangle when its height is 11cm and the width 120cm?.

Option A. 0.132 m^2.

Option B. 1.32 m^2.

Option C. 1320 m^2.

Correct Answer is. 0.132 m^2.

Explanation. Area of a rectangle = 11 * 120 cm = 1320 square cm. To convert to square metres

divide by 10,000 (since there are 100 cm in each of the sides i.e. 100 * 100).

Question Number. 69. 4 3/8 – 2 ¼ + 1/5 =.

Option A. 2 1/4.

Option B. 2 13/40.

Option C. 3 3/10.

Correct Answer is. 2 13/40.

Explanation. Work out the whole numbers and the fractions separately. 4-2 = 2. 3/8-1/4 + 1/5 = 15/40-10/40 + 8/40 (LCD = 40) = 13/40. Now recombine the wholw numbers and the fractions, so 2 + 13/40 = 2 13/40.

Question Number. 70. 4*(4 *(4 – 1) –1) – 1 =.

Option A. 31.

Option B. 15.

Option C. 43.

Correct Answer is. 43.

Explanation. Rule 1: Work the innermost brackets first. Rule 2: After calculating the contents of a bracket, use the multiplier (or divider) before the adder or subtractor.

Question Number. 71. Which number is the lowest common factor of 36, 66 and 126?.

Option A. 23.

Option B. 12.

Option C. 6.

Correct Answer is. 6.

Explanation. The common factor is the number which can be divided into all 3 without the answer being a fraction.

Question Number. 72. What is 3% of 0.001?.

Option A. 0.00003.

Option B.   0.003.

Option C.   0.3.

Correct Answer is.   0.00003.

Explanation.   3% of 0.001 means 3/100 * 0.001 = 0.003/100 = 0.00003.

Question Number.   73.   11/16 divided by 5/8 is.

Option A.   55/128.

Option B.   11/10.

Option C.   10/11.

Correct Answer is.   11/10.

Explanation.   11/16 divided by 5/8 is the same as 11/16 * 8/5 = 11/2 * 1/5 (after cross cancelling) = 11/10.

Question Number.   74.   An aircraft uses 1680 gallons of fuel, the left tank uses 45%, the right tank uses 32.5%, how much was used by the centre tank?.

Option A.   210 gallons.

Option B.   21 gallons.

Option C.   378 gallons.

Correct Answer is.   378 gallons.

Explanation.   100%-(45% + 32.5%) = 22.5%. 22.5% is just less than 1/4. Now estimate 1/4 of 1680 - do not calculate.

Question Number.   75.   What is the fraction 1/7 in decimal?.

Option A.   0.14295.

Option B.   0.14286.

Option C.   1.429.

Correct Answer is.   0.14286.

Explanation.   Use the long division technique.

Question Number.   76.   The supplement of 13 degrees is.

Option A.   243.

Option B.   76.

Option C.   167.

Correct Answer is.   167.

Explanation.   Supplementary angles add up to 180 degrees. Complementary angles add up to 90 degrees.

Question Number.   77.   What is the area of a ring with an outer diameter of 90 inches and an inner diameter of 80 inches?.

Option A. 325π.

Option B. 435π.

Option C. 425π.

Correct Answer is. 425π.

Explanation.   Radii are 45 and 40. (452-402) = 2025-1600 = 425. Area = πr^2.

Question Number.   78.   What is the area of the shape shown, in centimeters?.
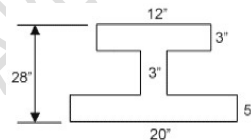

Option A.   1000.

Option B.   1225.

Option C.   1130.

Correct Answer is.   1225.

Explanation.   12 * 3 = 36, 20 * 5 = 100, (28-8) * 3 = 60. 36 + 100 + 60 = 196. There are approx. 2.5 cm in 1 inch, so multiply 196 by 2.5 twice (because it is area).

Question Number.   79.   What is the area of a rectangle with base 160cm and height 12cm?.

Option A. $0.0192 \, m^2$.

Option B. 0.192 m².

Option C. 0.00192 m².

Correct Answer is. 0.192 m².

Explanation. Area = base * height. To convert to metres divide by 100 twice (because it is area).

Question Number. 80. Calculate the area of the shape shown:.
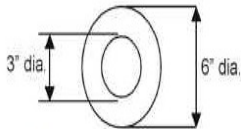
Option A. 6.75π.

Option B. 6.75π.

Option C. 17.5π.

Correct Answer is. 6.75π.

Explanation. R1 = 1.5, R2 = 3. Area = π *(R22-R12) = π * (9-2.25) = π * 6.75.

Question Number. 81. An aircraft flies 1350nm in 2 hrs 15 minutes. What is the average speed?.

Option A. 850kts.

Option B. 600kts.

Option C. 650kts.

Correct Answer is. 600kts.

Explanation. 1 knot = 1 nm/hour. 1350/2.25 = 600 kts.

Question Number. 82. What is the supplement of 13 degrees 13 minutes 13 seconds?.

Option A. 167 degrees 46 minutes 47 seconds.

Option B. 266 degrees 87 minutes 87 seconds.

Option C. 166 degree 46 minutes 47 seconds.

Correct Answer is. 166 degree 46 minutes 47 seconds.

Explanation. Supplementary angles add up to 180 degrees. Subtract 13 degrees from 180 degrees you get 167 degrees. But it is slightly more han 13 degrees, so answer must be slightly less than 167 degrees - hardly any calculation required!.

Question Number. 83. Determine 15.4/2-2(6.2-15.6).

Option A. 11.1.

Option B. 4.5.

Option C. 26.5.

Correct Answer is. 26.5.

Explanation. Start with brackets. Write down step by step. Remember that a minus number subtracted becomes a plus.

Question Number. 84. Calculate the area of the shape shown.
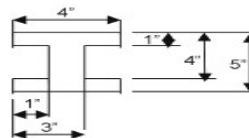
Option A. 12 sq.ins.

Option B. 16 sq.ins.

Option C. 14 sq.ins.

Correct Answer is. 14 sq.ins.

Explanation. 4 * 1 = 4 for top bit, 4 * 1 = 4 for bottom bit, 3 * 2 for centre bit. Add all 3 areas together =.

Question Number. 85. A mound of soil is piled up into a cone of base diameter 1.8m and height 0.6 m. What is the volume of soil?.

Option A. 0.5 m^3.
Option B. 1.0 m^3.
Option C. 1.5 m^3.
Correct Answer is. 0.5 m^3.
Explanation. Volume of a cone = 1/3 * base area * height. Base are = πr^2 = 3 * 0.9 * 0.9 = 2.4. 1/3 * 2.4 * 0.6 = 0.5.

Question Number. 86. What is the area of the shape below?.
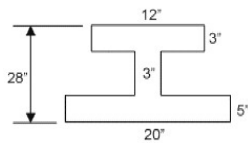
Option A. 220 square inches.
Option B. 196 square inches.
Option C. 200 square inches.
Correct Answer is. 196 square inches.
Explanation. (12 * 3) + (20 * 5) + ((28-3-5) * 3) = 196.

Question Number. 87. What is 1 radian in degrees?.
Option A. 57°.
Option B. 270°.
Option C. 66°.
Correct Answer is. 57°.
Explanation. 2π radians is 360°. So 1 radian = 360/6.3 = 57°.

Question Number. 88. (5^2 x 5^3)^2 is.

Option A. 5^7 .
Option B. 5$^{12.}$
Option C. 5$^{10.}$
Correct Answer is. 5$^{10.}$
Explanation. Add the powers when the bases are multiplied. Multiply the powers when a power is raised a further power. So 2 + 3 = 5. 5 * 2 = 10.

Question Number. 89. What is 30% of 0.01?.
Option A. 0.03.
Option B. 0.003.
Option C. 0.0003.
Correct Answer is. 0.003.
Explanation. 30/100 * 0.01 = 3/10 * 0.01.

Question Number. 90. Evaluate 15.4/2-2(4.6-15.7).
Option A. 26.5.
Option B. 29.9.
Option C. -14.5.
Correct Answer is. 29.9.
Explanation. 7.7-2(-11.1), 7.7 + 22.2, 29.9.

Question Number. 91. How many radians are in 360°?.
Option A. 2π.
Option B. 6π.
Option C. 4π.
Correct Answer is. 2π.
Explanation. 360° = 2π radians.

Question Number. 92. What is the area (including the ends) of a cylinder diameter 10 cm and 10 cm in height?.
Option A. 50π.

Option B.   150π.

Option C.   100π.

Correct Answer is.   150π.

Explanation.   π * dia. x height + 2 * π * radius-squared. 100π + 50π = 150π (assuming they want the areas of the ends included).

Question Number.   93.   What is the highest factor of 153?.

Option A.   6.

Option B.   3.

Option C.   9.

Correct Answer is.   9.

Explanation.   The 'factor' is the number which will divide into it (without making a fraction).

Question Number.   94.   Convert into decimal the fraction 5/8 of 60.

Option A.   40.

Option B.   37.5.

Option C.   37.

Correct Answer is.   37.5.

Explanation.   5/8 * 60 = 5/2 * 15 = 75/2 = 37.5.

Question Number.   95.   An aeroplane has 1800 gallons of fuel on board. 35% in the left wing 42.5% in the right wing how much fuel is in the centre tank?.

Option A.   405 gallons.

Option B.   545 gallons.

Option C.   183 gallons.

Correct Answer is.   405 gallons.

Explanation.   100-77.5 = 22.5. 22.5/100 * 1800 = 22.5 * 18 = 405.

Question Number.   96.   In the common fraction 2/5, the number 5 is known as.

Option A.   the quotient.

Option B.   the numerator.

Option C.   the denominator.

Correct Answer is.   the denominator.

Explanation.   The number underneath is the denominator. The number on top is the numerator.

Question Number.   97.   If 42% = 15,000, what is 100%?.

Option A.   21,300.

Option B.   35,714.

Option C.   6,300.

Correct Answer is.   35,714.

Explanation.   Must be just over double 15000.

Question Number.   98.   What is 12.75 * 26.1 to two significant figures?.

Option A.   332.775.

Option B.   332.78.

Option C.   330.

Correct Answer is.   330.

Explanation.   No calculation required. Just pick the answer with the 2 most significant bits, all the rest are zeros.

Question Number.   99.   The fraction 17/11 is classed as.

Option A.   a mixed fraction.

Option B.   an improper fraction.

Option C.   a proper fraction.

Correct Answer is.   an improper fraction.

Explanation.   Improper fraction is one where the numerator is bigger than the denominator.

Question Number.   100.   To convert 1 inch to centimetres.

Option A.   divide by 2.54.

Option B.   multiply by 2.54.

Option C.   divide by 25.4.

Correct Answer is.   multiply by 2.54.

Explanation. There are 2.54 cm in one inch.

Question Number. 101. 0.000006 volts can be written as.

Option A. 60 nanovolts.

Option B. 6 microvolts.

Option C. 6 millivolts.

Correct Answer is. 6 microvolts.

Explanation. Move decimal place 6 places to right to get it to 6.0. 6 decimal places is 'micro'.

Question Number. 102. The median of the values 20, 28, 17, 34, 40, 11, 34, 26 is.

Option A. 34.0.

Option B. 27.0.

Option C. 26.25.

Correct Answer is. 27.0.

Explanation. Median means 'in the middle'. Put them in order lowest to highest. Find the middle number, or middle two numbers. 26 and 28 in this case. The median is half way between these to numbers.

Question Number. 103. The mode of the following 28, 17, 34, 28, 34, 35, 28, 40 is.

Option A. 28.0.

Option B. 30.5.

Option C. 31.0.

Correct Answer is. 28.0.

Explanation. Mode means 'the one which occurs most often'. In this case = 28.

Question Number. 104. 0.004 amperes can be written as.

Option A. 0.4mA.

Option B. 4kA.

Option C. 4mA.

Correct Answer is. 4mA.

Explanation. Move the decimal places 3 places to make it 4.0 Three decimal places is 'milliAmps' (mA).

Question Number. 105. A sphere with a radius of 2 cm has a surface area of.

Option A. 16π cm^2.

Option B. 64π cm^2.

Option C. 8π cm^2.

Correct Answer is. 16π cm^2.

Explanation. Area of a sphere is $4\pi r^2$ $4*\pi*2*2$ = 16π.

Question Number. 106. The sum of an odd and an even number is.

Option A. sometimes odd, sometimes even.

Option B. always odd.

Option C. always even.

Correct Answer is. always odd.

Explanation. Odd + odd = even. Even + even = even. Odd + even = odd.

Question Number. 107. A copper pipe has a radius of 7/32 inch. What is this in decimal?.

Option A. 0.28125.

Option B. 0.15625.

Option C. 0.21875.

Correct Answer is. 0.21875.

Explanation. Quickest way is to remember that 1/32 = 0.03125, and multiply it by 7.

Question Number. 108. Millibar is the unit of.

Option A. temperature.

Option B. pressure.

Option C. density.

Correct Answer is. pressure.

Explanation. Millibars is pressure.

Question Number. 109. A ball rolls down a hill initially at 60 ft/s. It slows down at a rate of 5 ft/s^2 for 7 seconds. What will its final speed be?.

Option A. 15 ft/s.
Option B. 35 ft/s.
Option C. 25 ft/s.
Correct Answer is. 25 ft/s.
Explanation. 5 ft/s2 for 7 seconds = 35 ft/s deceleration. 60-35 = 25 ft/s final velocity.

Question Number. 110. A dial gauge is calibrated to an accuracy of 0.001 inch, when using the dial gauge, you should.
Option A. round off the answer to calibrated value.
Option B. read the true value to 4 decimal places.
Option C. read five significant figures.
Correct Answer is. round off the answer to calibrated value.
Explanation. Round the reading to the accuracy it can read (3 decimals in this case).

Question Number. 111. In a flight control system, the control cable is allowed an elongation of 3% due to wear. The length from the manufacturer is 78cm, what is its maximum used length?.
Option A. 80.34 cm.
Option B. 78.34 cm.
Option C. 2.34 cm.
Correct Answer is. 80.34 cm.
Explanation. 3/100 * 78 = 2.34 78 + 2.34 = 80.34.

Question Number. 112. You have made 20% profit. Your balance is now £900. What was your pre-profit balance?.

Option A. £700.
Option B. £800.
Option C. £750.
Correct Answer is. £750.
Explanation. + 20/100 = 900, 100/100 + 20/100 = 900, 120/100 = 900, transpose for.

Question Number. 113. One of the square roots of a positive number is positive. What is the other one?.
Option A. positive or negative.
Option B. negative.
Option C. positive.
Correct Answer is. negative.
Explanation. Example - Square root of 4 is either 2 (since 2*2=+4), or -2 (since-2*-2=+4).

Question Number. 114. A cylinder has a radius of 20cm and a length of 40cm. What is its volume? (Take π as 3.1).
Option A. 49600cm^3.
Option B. 50270cm^3.
Option C. 800cm^3.
Correct Answer is. 49600cm^3.
Explanation. Base Area = π * r^2 = 3.1 * 20 * 20 = 49600.

Question Number. 115. Can you take the cube root of a negative number?.
Option A. No.
Option B. Yes.
Option C. Only certain numbers.
Correct Answer is. Yes.
Explanation. You can take the cube root, but not the square root.

Question Number. 116. The process of removing roots from the denominator of fractions is called what?.
Option A. Rationalizing the denominator.

Option B.   Squaring the denominator.

Option C.   Derooting the denominator.

Correct Answer is.   Rationalizing the denominator.

Explanation.   Nil

http://www.wtamu.edu/academic/anns/mps/math/mathlab/int_algebra/int_alg_tut41_rationalize.htm.

Question Number.   117.   Find the curved surface area of a cylinder diameter 20cm and length 10cm.

Option A.   1256 cm^2.

Option B.   2512 cm^2.

Option C.   400 cm^2.

Correct Answer is.   1256 cm^2.

Explanation.   Area = π * d * h = 3.14 * 20 * 10 = 628. Multiply by 2 (because there is inside and outside) = 1256.

Question Number.   118.   The conversion factor of litres to pints is.

Option A.   2.2.

Option B.   1.76.

Option C.   0.57.

Correct Answer is.   1.76.

Explanation.   Nil

http://www.thetipsbank.com/convert.htm.

Question Number.   119.   The volume of a pyramid is _____ times b times h.

Option A.   1/4.

Option B.   1/3.

Option C.   1/2.

Correct Answer is.   1/3.

Explanation.   Nil

http://www.aaaknow.com/geo79_x6.htm.

Question Number.   120.   What is the square root of 0.0289?.

Option A.   0.17.

Option B.   1.017.

Option C.   1.7.

Correct Answer is.   0.17.

Explanation.   Only a number less than 1 can give an even smaller number when squared.

Question Number.   121.   A car travelling at 72 km/hour is travelling at what speed?.

Option A.   30m/s.

Option B.   20m/s.

Option C.   10m/s.

Correct Answer is.   20m/s.

Explanation.   72 * 1000/3600 = 20.

Question Number.   122.   If you bought a TV set worth £30 after getting 15% discount. How much discount did you get?.

Option A.   £15.

Option B.   £5.

Option C.   £35.

Correct Answer is.   £5.

Explanation.   Approximate (10% of 30 + add half again) - Not strictly the correct method (as this finds 15% of final price, not the original price) but answers are far apart enough to permit.

Question Number.   123.   If you bought a second hand car worth £4500 after getting 15% discount. How much did the car cost originally?.

Option A.   £3800.

Option B.   £5300.

Option C.   £6000.

Correct Answer is.   £5300.

Explanation.   x-(x 15/100) = 4500 x-0.15x = 4500 0.85x = 4500 x = 4500/0.85 = 5300 (approx).

Question Number. 124. 31 * 91 * 23 * 52 =.

Option A. 3,373.

Option B. 33,739.

Option C. 3,373,916.

Correct Answer is. 3,373,916.

Explanation. Round off to 30, 90, 20 and 50, 3 * 9 * 2 * 5 = 270, 10 * 10 * 10 * 10 = 10,000, 270 * 10,000 = 2,700,000 Now choose the answer based on order of magnitude.

Question Number. 125. 1/5 + 2.5-6 =.

Option A. 3.3.

Option B. 2.0.

Option C. -3.3.

Correct Answer is. -3.3.

Explanation. 1/5 = 0.2 0.2+2.5 = 2.7, 2.7-6 = -3.3.

Question Number. 126. Express 173942 in standard form.

Option A. 17.3942 * 104.

Option B. 173.942 * 103.

Option C. 1.73942 * 105.

Correct Answer is. 1.73942 * 105.

Explanation. Standard form has the mantissa between 1 and 10.

Question Number. 127. The sum of an odd number + an odd number is a.

Option A. either odd or even.

Option B. odd number.

Option C. even number.

Correct Answer is. even number.

Explanation. NIL.

Question Number. 128. Express 750 milligrams in grams.

Option A. 0.0000075.

Option B. 0.075.

Option C. 0.75.

Correct Answer is. 0.75.

Explanation. 'milli' is divide by 1000.

Question Number. 129. There is 1800 pounds of fuel in an aircraft, 25% in the left tank and 45% in the right. How much fuel is in the centre tank?.

Option A. 810 pounds.

Option B. 450 pounds.

Option C. 540 pounds.

Correct Answer is. 540 pounds.

Explanation. 30% * 1800 = 540.

Question Number. 130. What is the supplement of an angle of 37°?.

Option A. 8°.

Option B. 53°.

Option C. 143°.

Correct Answer is. 143°.

Explanation. 180-37 = 143°.

Question Number. 131. To what power must 10 be raised to equal 100,000?.

Option A. 6.

Option B. 4.

Option C. 5.

Correct Answer is. 5.

Explanation. An easy way to tell the power of 10 to which a number has been raised is to count the number of places the decimal point would have to be moved to leave a number between 1 and 10. Remember the decimal point though not written will be after the unit, in this case the last 0.

Question Number. 132. Find the square root of 1600.

Option A.   80.

Option B.   40.

Option C.   800.

Correct Answer is.   40.

Explanation.   1600 = 16 * 100 √1600 = √16x√100 = 4x10 = 40.

Question Number.   133.   What is the ratio of 5 feet to 30 inches?.

Option A.   2 : 1.

Option B.   5 : 3.

Option C.   1 : 6.

Correct Answer is.   2 : 1.

Explanation.   In any ratio caculation the units must be the same. 5 feet is equal to 60 inches. Ratio of 60 : 30 or 60/30 is 2 : 1.

Question Number.   134.   Evaluate 5[3 + 6(7-4)-2].

Option A.   31.

Option B.   395.

Option C.   95.

Correct Answer is.   95.

Explanation.   First work out the inner brackets: 7-4=3, then multiply by 6: 6*3=18, Next the outer brackets : 3+18-2=19, Finally multiply by 5: 5*19=95.

Question Number.   135.   Find the value of 3[5-2(4-7)].

Option A.   9.

Option B.   -3.

Option C.   33.

Correct Answer is.   33.

Explanation.   First work out the inner brackets: 4-7=-3, then multiply by -2: -2x-3 = 6, Remember that -x-=+, Next the outer brackets: 5+6=11, finally multiply by the 3: 3*11=33.

Question Number.   136.   What is the cube root of -64?.

Option A.   4.

Option B.   -8.

Option C.   -4.

Correct Answer is.   -4.

Explanation.   The cube root of a number is the number which when multiplied by itself 3 times gives the number. In this example -4x-4x-4=-64 hence the answer is -4.

Question Number.   137.   What is the cube root of 8^2.

Option A.   2.

Option B.   4.

Option C.   8.

Correct Answer is.   4.

Explanation. 8^2 = 64, cube root of 64 is 4 as 4x4x4=64.

Question Number.   138.   An engine of 96 horsepower is running at 75% power. What horsepower is being developed?.

Option A.   72.

Option B.   168.

Option C.   62.

Correct Answer is.   72.

Explanation.   75% = 75/100 =3/4, 3/4x96=3x24=72.

Question Number.   139.   A blueprint shows a hole of 0.3751 to be drilled. What fraction size drill bit is most nearly equal?.

Option A.   5/16.

Option B.   3/8.

Option C.   3/16.

Correct Answer is.   3/8.

Explanation.   3/16 = 0.1875, 5/16 = 0.3125, 3/8 = 0.375, 3/8 drill is the nearest.

Question Number. 140. 120 out of 125 bolts produced are of an acceptable tolerance. What percentage of the bolts are not acceptable?.

Option A. 5%.
Option B. 4%.
Option C. 25%.
Correct Answer is. 4%.
Explanation. Acceptable bolts 120/125 = 24/25, as a percentage this is 24/25 * 100 = 96%, Unacceptable bolts are 100%-96% = 4%.

Question Number. 141. Evaluate 1/4 + 3/8-1/2.
Option A. 1/8.
Option B. 1/14.
Option C. 1/2.
Correct Answer is. 1/8.
Explanation. Change all the fractions to a common denominator ¼ becomes 2/8, 3/8 remains same, ½ becomes 4/8. Now solve them by adding top Numerators SO answer is 1/8.

Question Number. 142. 3 3/4 + 4 2/3 =.

Option A. 8 5/12.
Option B. 7 5/12.
Option C. 7 5/7.
Correct Answer is. 8 5/12.
Explanation. add the whole numbers: 3+4 = 7, add the fraction 3/4 + 2/3 = 9/12 + 8/12 = 17/12 = 1 5/12, add on the 7: 8 5/12.

Question Number. 143. An aircraft travels 1400 nautical miles in 1 hour 45 minutes. What is the average speed of the aircraft?.
Option A. 750 knots.
Option B. 2450 knots.
Option C. 800 knots.
Correct Answer is. 800 knots.

Explanation. Average speed is found by dividing total distance by total time. 1400 / 1 3/4. This is done by dividing 1400 by 7/4 = 1400 * 4/7 = 200 * 4 = 800.

Question Number. 144. Evaluate 0.8 * 0.004.
Option A. 0.32.
Option B. 0.0032.
Option C. 0.032.
Correct Answer is. 0.0032.
Explanation. Count the digits to the right of the decimal points in both numbers (4), multiply the numbers without the points 8x4 = 32, put the decimal point so there are the same number (4) as in the question adding 0's as appropriate (0.0032).

Question Number. 145. Convert 10 inches to millimetres.
Option A. 2540 mm.
Option B. 254 mm.
Option C. 25.4 mm.
Correct Answer is. 254 mm.
Explanation. 1 inch = 2.54 cm =25.4 mm, 10 inches = 10 x 25.4 =254 mm.

Question Number. 146. What number is the highest common factor of 24, 84, 120?.

Option A. 8.
Option B. 12.
Option C. 24.
Correct Answer is. 12.
Explanation. 24=2*2*2*3, 84=2*2*3*7 HCF will be 2*2*3=12, 120=2*2*2*3*5.

Question Number. 147. 0.0000314 can be written as.
Option A. 3.14 x 10-5.

Option B.   3.14 x 105.

Option C.   3.14 x 10-4.

Correct Answer is.   3.14 x 10-5.

Explanation.   The negative power indicates a reciprocal. 10-5 = 1/10,000, The easy way to do this problem is to count the number of places you need to move the decimal point to leave you with a number between 1 and 10. In this case it is 5.

Question Number.   148.   What is the Lowest Common Multiple of 5; 12; 20.

Option A.   60.

Option B.   120.

Option C.   5.

Correct Answer is.   60.

Explanation.   The lowest common multiple is the lowest number each number will divide into exactly. In this case the required number is 60.

Question Number.   149.   Evaluate 1/4{(4-6)-(2-8)}.

Option A.   3/4.

Option B.   -2.

Option C.   1.

Correct Answer is.   1.

Explanation.   First work out the the two inner brackets: (4-6)=-2 and (2-8)=-6, then -(-6) = +6 followed by -2 +6 = 4 and finally 1/4 x 4 = 1.

Question Number.   150.   What is the average of the following numbers? 5, 13, 23, 12, 17.

Option A.   14.

Option B.   15.

Option C.   23.

Correct Answer is.   14.

Explanation.   The average(mean) of a set of numbers is the sum divided by the number of numbers. 5+13+23+12+17 = 70; 70 divided by 5 = 14.

Question Number.   151.   What is the volume of a rectangular tank 5m by 4 m by 150cm?.

Option A.   3000 cu.m.

Option B.   30 sq.m.

Option C.   30 cu.m.

Correct Answer is.   30 cu.m.

Explanation.   Volume of a cuboid is Length * Width * Height For this problem the dimensions are 5m * 4m * 1.5m = 30cu. m.

Question Number.   152.   What is the depth of a rectangular tank whose volume is 40 cu. m. and has a base 5m by 10m?.

Option A.   8m.

Option B.   80cm.

Option C.   0.08m.

Correct Answer is.   80cm.

Explanation.   V = L * W * H , The height will be found by dividing volume by length x width This will give an answer of 0.8m or 80cm.

Question Number.   153.   Convert 20 imperial gallons to litres.

Option A.   909.2 litres.

Option B.   9.092 litres.

Option C.   90.92 litres.

Correct Answer is.   90.92 litres.

Explanation.   1 gallon = 4.546 litres, 20 gallons = 20 x 4.546 = 90.92 litres.

Question Number.   154.   To find the area of a circle use the formula.

Option A. $2\pi d$.

Option B. πr^2.

Option C. $2\pi r$.

Correct Answer is. πr^2.

Explanation. $2\pi r$ or πd is the formula to find the area of a circle.

Question Number. 155. What is the circumference of the top of a cylindrical tank whose radius is 3 metres?.

Option A. 3π metres.

Option B. 6π metres.

Option C. 9π metres.

Correct Answer is. 6π metres.

Explanation. Circumference = 2πR.

Question Number. 156. 67.5 cu.m.

Option A. 67.5 cu.m.

Option B. 675,000 cu.cm.

Option C. 6.75 cu.m.

Correct Answer is. 6.75 cu.m.

Explanation. volume of a cylinder = $\pi*r^2 * h$ = 3 x $(0.75)^2$ xh, vol = $1.7x^4$ = 6.75 cu.m., Remember all units must be the same so 150cm is changed to 1.5 m.

Question Number. 157. What is the surface area of a cylindrical pipe of length 150 cm and diameter 5cm?.

Option A. 1500π sq.cm.

Option B. 750π sq.cm.

Option C. 3750π sq.cm.

Correct Answer is. 750π sq.cm.

Explanation. Surface Area of a cylinder = πd x L= π x 5 x 150 = 750π sq.cm.

Question Number. 158. Find the value of 5/8 of 4/5.

Option A. 1/2.

Option B. 3/4.

Option C. 25/32.

Correct Answer is. 1/2.

Explanation. 5/8 of 4/5 is the same as 5/8 x 4/5 by cancelling top and bottom of the fractions, 5's cancel leaving 4/8 =1/2.

Question Number. 159. What is the square root of 4 raised to the fifth power?.

Option A. 32.

Option B. 128.

Option C. 64.

Correct Answer is. 32.

Explanation. The square root of 4 is 2 two raised to the 5th power is 2*2*2*2*2 = 32.

Question Number. 160. -3[8-3(5+√9)-(7-9)].

Option A. 60.

Option B. -42.

Option C. 42.

Correct Answer is. 42.

Explanation. Work out the inside brackets first: 5 + √9 = 5 + 3 = 8, then -3 * 8 = -24, next 7-9 = -2, then 8-24 -(-2) = -14, finally -3 * -14 = 42.

Question Number. 161. Which of the fractions is equivalent to 0.075?.

Option A. 1/40.

Option B. 3/4.

Option C. 3/40.

Correct Answer is. 3/40.

Explanation. 3/4 = 0.75, 1/40 = 0.025, 3/40 = 0.075.

Question Number. 162. Express 3/8 as a percentage.

Option A. 3.75%.

Option B. 0.375%.

Option C. 37.5%.

Correct Answer is. 37.5%.

Explanation. T change a fraction to a percentage first find the equivalent decimal in this case it is 0.375., Then multiply by 100 to give 37.5%.

Question Number. 163. An aeroplane flies 1000 miles and uses 80 gallons of fuel. How much fuel will it use on a 2500 mile flight?.

Option A. 240 gallons.

Option B. 250 gallons.

Option C. 200 gallons.

Correct Answer is. 200 gallons.

Explanation. If an airplane uses 80 gallons to fly 1000 miles the fuel consumption is 1000 divided by 80 = 12.5 miles per gallon., The fuel used for a 2500 mile flight will be 2500 / 12.5 = 200 gallons.

Question Number. 164. A pinion gear with 16 teeth is driving a spur gear with 48 teeth at 120 RPM. Find the speed of the pinion gear.

Option A. 40 RPM.

Option B. 360 RPM.

Option C. 144 RPM.

Correct Answer is. 360 RPM.

Explanation. The speed ratio is the reciprocal of the gear ratio.The spur gear with 48 teeth is driven by a pinion gear of of 16 teeth. This gives a gear ratio of 48:16 = 3:1. This means the spur gear will turn at 1/3 of the speed of the pinion gear, and the pinion gear will turn at 3 times the speed of the spur gear. If the spur gear turns at a speed of 120 RPM the pinion turns at a speed of 360 RPM.

Question Number. 165. What is the piston displacement of a master cylinder with a 4cm diameter bore and a piston stroke of 10 cm?.

Option A. 8π cu.cm.

Option B. 40π cu.cm.

Option C. 160π cu.cm.

Correct Answer is. 40π cu.cm.

Explanation. The piston displacement of a master cylinder is found by multiplying the area of the piston head by its stroke. The area of the piston is $πR^2 = π x 2^2 = 4π$, Therefore the piston displacement will be 40π cu.cm.

Question Number. 166. The curved surface area of a right cone is.

Option A. 11/3 πRL.

Option B. πRL.

Option C. πR2 H.

Correct Answer is. πRL.

Explanation. Nil

http://www.tpub.com/content/doe/h1014v2/css/h1014v2_33.htm.

Question Number. 167. How many millimetres in an inch?.

Option A. 2.54.

Option B. 25.4.

Option C. 2540.

Correct Answer is. 25.4.

Explanation. Nil

Question Number. 168. Find the the area of a circular ring Whose outer diameter is 10 cm and inner diameter is 6 diameter?.
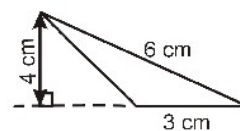
Option A. 64π sq. cm.

Option B. 16π sq. cm.

Option C. 4Π sq. cm.

Correct Answer is. 16π sq. cm.

Explanation. Area of a ring is $π (R^2-r^2)$ $A = π(5^2-3^2)$.

Question Number. 169. Find the area of the triangle shown.

Option A. $9 cm^2$.

Option B. $12 cm^2$.

Option C. $6 cm^2$.
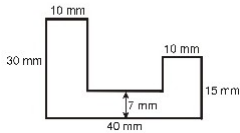
Correct Answer is. $6 cm^2$.

Explanation. A = 1/2bh where b = base, and h = height. In this case A = 1/2 * 3 4 = $6 cm^2$.

Explanation.   Area of a trapezium (called trapezoid in US) is A = 1/2(a+b)h. a and b are the two parallel sides., h is the perpendicular distance between them. A = 1/2(5+7)4 = 6*4 = 24 cm2.

Question Number.   170.   What is the area of the shape shown, in square cm?.
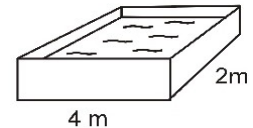

Option A.   5900.

Option B.   590.

Option C.   5.9.

Correct Answer is.   5.9.

Explanation.   Divide the shape into three rectangles. , (10 * 30) + (20 * 7) + (10 * 15) = 300+140+150 = 590 mm^2, 1 cm^2 = 10x10 = 100mm^2, so the answer is 590/100 = 5.9 cm^2.

Question Number.   171.   What is the area of the trapezium shown?.

Option A.   Area cannot be calculated from information given.

Option B.   27 cm^2.

Option C.   24 cm^2.

Correct Answer is.   24 cm^2.

Question Number.   172.   What is the depth of water in the tank shown if the volume of water

is 4000 litres?.

Option A.   80 cm.
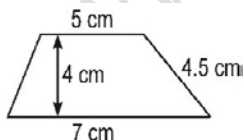
Option B.   5 m.

Option C.   50 cm.

Correct Answer is.   50 cm.

Explanation.   1 litre = 1000 cm^3, 4000 litres = 4,000,000 cm^3, Volume of water is 4m x 2m x depth, Change to cm 400 * 200 * depth = 4,000,000, Therefore, depth = 4,000,000/(400*200) = 400/8 = 50 cm.

Question Number.   173.   What is the area of the sector shown? Take π=3.14.
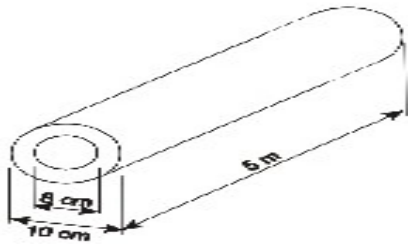
Option A.   50 cm.

Option B.   52 ⅓ cm.

Option C.   10.5 cm.

Correct Answer is.   52 ⅓ cm.

Explanation.   Area of a circle = πr^2, = 3.14 * 102 , = 314cm^2, Area of sector = 60/360 * 314 = 314/6 = 52 ⅓ cm^2.

Question Number.   174.   What is the volume of metal used in the pipe shown?.

Option A.   4500π cm^2.

Option B.   45π cm^2.

Option C.   18000π cm^2.

Correct Answer is.   4500π cm^2.

Explanation.   Work out the volume of the metal by subtracting the volume of the hole from the outside volume of the pipe., $\pi R^2 h - \pi r^2 h = \pi h(R^2 - r^2$), = $\pi x500x(5^2 - 4^2$).

Question Number.   175.   24/0 (twenty four divided by nothing) is.

Option A.   nothing.

Option B.   infinity.

Option C.   twenty four.

Correct Answer is.   infinity.

Explanation.   24/0 = infinity.

Question Number.   176.   If 20% of 120 is 24, what is 24% of 20?.

Option A.   4.8.

Option B.   28.

Option C.   18.

Correct Answer is.   4.8.

Explanation.   10% of 20 = 2, therefore 20% of 20 = 4, 4% of 10 = 0.4, therefore 4% of 20 = 0.8., 4 + 0.8 = 4.8.

Question Number.   177.   A shop keeper sold his car for £120. If this is 80% of the buying price, how much loss did he make?.

Option A.   £50.

Option B.   £150.

Option C.   £30.

Correct Answer is.   £30.

Explanation.   Buying price * 80/100 = 120, Buying price * 80 = 120 * 100, Buying price = 12000/80 = 150, 150-120 = £30.

Question Number.   178.   3 + 4-5(4-2) =.

Option A.   13.

Option B.   4.

Option C.   -3.

Correct Answer is.   -3.

Explanation.   3 + 4-5(4-2) = 7-5(2), 7–10   = -3.

1.2a Algebra.

Question Number.   1.   Solve the following equation: 5x = 3x + 2.
Option A.   3.
Option B.   5.
Option C.   1.
Correct Answer is.   1.
Explanation.   5x-3x = 2, 2x = 2, x = 1.

Question Number.   2.   Simplify the following (w + z)(x - y)(y - w) / (y - x)(w - y)(w + z).

Option A.   -1.
Option B.   0.
Option C.   +1.
Correct Answer is.   +1.
Explanation.   First cancel the (w+z) because they are the same. Then multiply out the top and bottom lines (remember the smiley face) and cancel what you can (everything cancels - leaving you with just 1/1=1).

Question Number.   3.   Given 43-x = 21, find the value of x.
Option A.   43-21.
Option B.   43/21.
Option C.   43+21.
Correct Answer is.   43-21.
Explanation.   43 = 21 + x 43-21 = x.

Question Number.   4.   Make L the subject of the formula 2pfL = x.
Option A.   L = 2pf.
Option B.   L = 2pf / x.
Option C.   L = x / 2pf.
Correct Answer is.   L = x / 2pf.
Explanation.   Divide the x by 2pf.

Question Number.   5.   Given that A = X+BY, what is Y equal to?.
Option A.   A-X add B.
Option B.   A-X divided by B.
Option C.   A-X minus B.
Correct Answer is.   A-X divided by B.
Explanation.   Basic transposition.

Question Number.   6.   If y/x = 4 and y = 5 then x =.
Option A.   20.
Option B.   4/5.
Option C.   1 ¼.
Correct Answer is.   1¼.

Explanation.   5/x = 4, x = 5/4 = 1 1/4.

Question Number.   7.   (x - 3)(x + 5)=.
Option A. x^2+2x.
Option B. $x^2+2x-15$.
Option C. x^2-15.
Correct Answer is. $x^2+2x-15$.
Explanation.   Multiply x by x and +5, then multiply -3 by x and +5. Then gather together all like terms.

Question Number.   8.   21=43- , is equal to.
Option A.   21-43.
Option B.   43+21.
Option C.   43-21.
Correct Answer is.   43-21.
Explanation.   21=43- , 21+ = 43, = 43-21.

Question Number.   9.   Evaluate. $2X^2Z^2(3X-Z^2) =$.
Option A. $6X^2z^2+3x-z^2$.
Option B. $6x^2z^2-2x^2 z^2$.
Option C. $6x^3z^2-2x^2z^4$.
Correct Answer is. $6x^3z^2-2x^2z^4$.
Explanation.   Multiply out the brackets and add the indices where necessary.

Question Number.   10.   (a * b)(a * b) =.
Option A. $a^2 + 2ab + b^2$.
Option B. a^2 b2.
Option C. $a^2 + b2$.
Correct Answer is. a^2 b^2.
Explanation.   Do a x (a-b) (i.e. expand that bracket), then do b x (a-b) (i.e. expand that bracket too). Then gather together like terms. You will find that ab and -ab cancel.

Question Number.   11.   If y/x = 4 and x = 5 then y =.
Option A.   1 ¼.
Option B.   20.
Option C.   4/5.
Correct Answer is.   20.
Explanation.   y/5 = 4. $y = 5x^4$ = 20.

Question Number.   12.   Determine x.

$$X = \sqrt{81} + \left(\frac{(-9) - 4}{8^2 + 12} \right)^2$$

Option A.   9.029.
Option B.   9.570.
Option C.   8.971.
Correct Answer is.   9.029.
Explanation.   Root of 81 is 9, so it must be 9.xxx (which rules out b). (Since the content of the brackets comes to a negative number, it is positive when it is squared).

Question Number.   13.   Find L in the following expression.

$$Q = \frac{1}{R} \sqrt{\frac{L}{C}}$$

Option A. $Q^2 C / R^2$.
Option B. $Q^2 C^2 / R$.
Option C. $Q^2 R^2 C$.
Correct Answer is. $Q^2 R^2 C$.
Explanation.   QxR to remove the R from RHS. Square both sides to remove the root from RHS. Multiply LHS by C to remove the C from RHS and you are left with L.

Question Number.   14.   The heat of a resistor is given by the equation $h = I^2 RT$. Find the current I.

Option A.   a) $\frac{\sqrt{h}}{RT}$.

Option B.   b) $\sqrt{\frac{h}{RT}}$.

Option C.   c) $\frac{h}{\sqrt{RT}}$.

Correct Answer is.   b) $\sqrt{\frac{h}{RT}}$.
Explanation.   h/RT Square root ALL.

Question Number.   15.   Factorise the following : $x^2 - x - 6 = 0$.
Option A.   (x-2)(x+3).
Option B.   (x-2)(x-3).
Option C.   (x+2)(x-3).
Correct Answer is.   (x+2)(x-3).
Explanation.   Choose 2 numbers where the sum = -1 (the coefficient of x) and the product (multiple) is -6 (the constant). Alternatively, multiply out the answers a, b, c until you get the question.

Question Number.   16.   Factorise the following : $4x^2 - 6x - 28 = 0$.
Option A.   (4x-14) (x+2).
Option B.   (2x+7) (x-2).
Option C. $(2x^2 + 7)$ (x + 2).
Correct Answer is.   (4x-14) (x + 2).
Explanation.   Expand each answer in turn until you get the question. Remember the smiley face.

Question Number.   17.   Solve for x in the equation: 3(x + 2) = 30 + 2(x-4).
Option A.   8.
Option B.   16.
Option C.   15.
Correct Answer is.   16.
Explanation.   Multiply out the bracket first. 3x + 6 = 30 + 2x-8. Then take all 'x' terms to left, and all 'non-x' terms to right. 3x-2x = 30-8-6 etc.

Question Number.   18.   2x = 4(x-3), Evaluate x.
Option A.   6.
Option B.   0.5.
Option C.   2.
Correct Answer is.   6.
Explanation.   Expand the bracket 2x = 4x-12, Take 4x to LHS 2x-4x = -12, -2x = -12, x = -12/-2 = 6.

Question Number.   19.   12x/2y + 14 = 50, When y = 2, solve for x.
Option A.   11.6.
Option B.   14.
Option C.   12.
Correct Answer is.   12.
Explanation.   12x/(2x2) = 50-14. 12x = 36 x 4. 12x = 144. x = 144/12 = 12.

Question Number.   20.   27y = 3 so y is equal to:.
Option A.   1/9.
Option B.   1/3.
Option C.   9/1.
Correct Answer is.   1/9.

Explanation.   3/27 = 1/9.

Question Number.   21.   Determine x in the following: (2x-1)(3x+2) = 0.
Option A.   1.5, 1.
Option B.   0.5, 3.
Option C.   -0.67, 0.5.
Correct Answer is.   -0.67, 0.5.
Explanation.   Two values of x, either 2x-1 = 0 (2x = 1, x = 1/2) or 3x + 2 = 0 (3x = -2, x=-2/3).

Question Number.   22.   (x + y + z)(x + y + z) =.
Option A.   2(x + y + z).
Option B.   2x + 2y +2z.
Option C. $(x + y + z)^2$.
Correct Answer is. $(x + y + z)^2$.
Explanation.   NIL.

Question Number.   23.   If x in an equation equals Ly + 7cb, define the formula for finding the subject y.
Option A.   x-7cb/L.
Option B.   x-7cb/L.
Option C.   x-L/7cb.
Correct Answer is.   x-7cb/L.
Explanation.   Subtract the 7cb (x-7cb) then divide all by L.

Question Number.   24.   64y = 64 what does y =.
Option A.   1.
Option B.   0.
Option C.   0.5.
Correct Answer is.   1.
Explanation.   Anything to the power of 1 is itself.

Question Number.   25.   Simplify 3a-2b +6a-3b-2a.
Option A.   7a-5b.
Option B.   7a +5b.
Option C.   7a +b.
Correct Answer is.   7a-5b.
Explanation.   Collect together like terms: 3a +6a-2a-2b-3b = 7a-5b.

Question Number.   26.   Simplify 3x-2xy-3y +5xy-2x +2y.
Option A.   x + 3xy-y.
Option B.   5x + 3xy-y.
Option C.   x-3xy + y.
Correct Answer is.   x + 3xy-y.
Explanation.   Collect together like terms: 3x-2x +5xy-2xy +2y-3y = x +3xy-y.

Question Number.   27.   Simplify 5(x-2y) + 3(2y-x).

Option A.   4x +4y.
Option B.   2x +4y.
Option C.   2x-4y.
Correct Answer is.   2x-4y.
Explanation.   Remove the brackets first: 5x-10y +6y-3x Collect like terms: 5x-3x +6y-10y = 2x-4y.

Question Number.   28.   simplify (a+b)(a-c)(b-c) divided by (b+a)(c-a)(c-b).
Option A.   -1.
Option B.   (a+b)(a-c)(b-c).
Option C.   1.
Correct Answer is.   1.
Explanation.   Because this is a series of multiplications on both top and bottom we can do the following: (a+b)/(b+a) = 1 (a-c)/(c-a) =(a-c)/-(a-c) = -1 (b-c)/-(b-c) = -1 hence the result is 1x-1x-1 =1.

Question Number.   29.   Make P the subject of the formula I =PRT/100.
Option A.   P = IRT/100.
Option B.   P = 100I/RT.
Option C.   P = 100RT/I.
Correct Answer is.   P = 100I/RT.
Explanation.   Multiply both sides by 100 then divide both sides by RT to get P =100I/RT.

Question Number.   30.   Make u the subject of the formula $v^2 = u^2 + 2as$.
Option A.   u = v-2as.
Option B.   u = $\sqrt{(v^2 -2as)}$.
Option C.   u = $\sqrt{(v^2 +2as)}$.
Correct Answer is.   u = $\sqrt{(v^2 -2as)}$.
Explanation.   u = $\sqrt{(v^2 -2as)}$.

Question Number.   31.   Remove the brackets and simplify: (x-y)(x-y).
Option A. $x^2 -2xy-y^2$.
Option B. $x^2 +y^2$.
Option C. $x^2 -2xy+y^2$.
Correct Answer is. $x^2 -2xy+y^2$.
Explanation.   Multiply both the x and the -y in the first bracket by both the x and -y in the second bracket. $X^2 -xy-yx + y^2$ $x^2 -2xy + y^2$ (remember -x- = + and yx is the same as xy).

Question Number.   32.   Evaluate $(3X^2 -6xy) / (x-2y)$.
Option A.   cannot be simplified further.
Option B.   3x-3y.
Option C.   3x.
Correct Answer is.   3x.
Explanation. $3x^2 -6xy=3x(x-2y)$ Dividing by x-2y leaves 3x.

Question Number.   33.   Evaluate (3a + 2b)(2a-3b).
Option A. $6a^2 -5ab-6b^2$.

Option B.   6a-5ab-6b.
Option C. $6a^2 + 5ab-6b^2$.
Correct Answer is. $6a^2 -5ab-6b^2$.
Explanation.   Multiply 3a(2a-3b) =$6a^2$ -9ab then multiply 2b(2a-3b) = 4ab-$6b^2$ collect like terms to give $6a^2$ -5ab-$6b^2$.

1.2b Algebra.

Question Number.   1.   Solve the following equations for x: 4x+8y=64 2x-8y=86.
Option A.   125.
Option B.   25.
Option C.   5.
Correct Answer is.   25.
Explanation.   Add like terms to eliminate y term. Thus 6x = 150, x = 25.

Question Number.   2.   11001+11001 =.
Option A.   502.
Option B.   5010.
Option C.   508.
Correct Answer is.   5010.
Explanation.   NIL.

Question Number.   3.   100000 in binary is what number in decimal?.
Option A.   32.
Option B.   16.
Option C.   64.
Correct Answer is.   32.
Explanation.   From the right (lsb) binary goes - ones, twos, fours, eights, sixteens, thirtytwos, sixtyfours etc.

Question Number.   4.   D in hexidecimal is what number in decimal?.
Option A.   17.
Option B.   13.
Option C.   8.
Correct Answer is.   13.
Explanation.   In hexidecimal, 10 is A, 11 is B, 12 is C, 13 is D, 14 is E and 15 is F.

Question Number.   5. $10101_2 + 11001_2 =$.
Option A. 46_{10}.
Option B. 46_8.
Option C. 46_2.
Correct Answer is. 46_{10}.
Explanation.   Add the two binary numbers then convert the result to decimal. Note: answer 'a' cannot be a binary number so is wrong by default.

Question Number.   6.   What is 738 in binary coded decimal?.
Option A.   1011110010.
Option B.   111100010.
Option C.   11100111000.
Correct Answer is.   11100111000.
Explanation.   Binary Coded Decimal is not the same as binary.

Question Number.   7. $(A+B)^4$ is $(A+B)^2$.
Option A. $(A+B)^6$.
Option B. $(A+B)^2$.
Option C. $A+B$.
Correct Answer is. $(A+B)^2$.
Explanation.   Subtract the indices.

Question Number.   8.   log 9-log 3=.
Option A.   log 6.
Option B.   log 3.
Option C.   log 9.
Correct Answer is.   log 3.
Explanation.   log 9 = log (3x3) = 2 log 3. 2 log 3-log 3 = log 3.

Question Number.   9.   What is y in the formula shown? a=(X+B)/y.
Option A. $(a + X) / B$.
Option B. $(X - B) /a$.
Option C. $(X +B)/ a$.
Correct Answer is. $(X +B)/ a$.
Explanation.   The A and y can be swapped in this situation.

Question Number.   10. 6^7 divided by 12^7 is equal to.
Option A.   1/2.
Option B.   1/20.
Option C.   1/128.
Correct Answer is.   1/128.
Explanation.   Cannot subtract the indices when the base is different. $12^7=2^7 x 6^7$. Now cancel the 6^7 top and bottom. $1/2^7 = 1/(2x2x2x2x2x2x2) = 1/128$.

Question Number.   11.   If 2x-8y=14 and 4x+8y=16; then x=.
Option A.   -1/2.
Option B.   5.
Option C.   3.
Correct Answer is.   5.
Explanation.   Add the x terms, add the y terms and add the numbers on the right of the equal sign. The y terms cancel so you are then left with a formula that can be solved for x.

Question Number.   12.   2x-3 = 4; x =.
Option A.   7.
Option B.   -3.

Option C.   3.50.
Correct Answer is.   3.50.
Explanation.   2x-3=4, 2x=4+3, 2x=7, x=7/2=3.5.

Question Number.   13. $V = (a+b) r^2$ Find a.
Option A. $V – r^2 – b$.
Option B. $(V – b)/ r^2$
Option C. $V / r^2 – b$.
Correct Answer is. $V / r^2 – b$.
Explanation.   Basic transposition.

Question Number.   14.   Make m the subject of the formula in y=mx+c.
Option A.   y-x/c.
Option B.   y-c/x.
Option C.   y+c/x.
Correct Answer is.   y-c/x.
Explanation.   Basic transposition.

Question Number.   15.   Make x the subject of the formula in y = mx+c.
Option A.   (y-c)/m.
Option B.   y-c/m.
Option C.   y-m/c.
Correct Answer is.   (y-c)/m.
Explanation.   Basic transposition.

Question Number.   16.   Make c the subject of the formula in y = mx+c.
Option A.   y-mx.
Option B.   mx-y.
Option C.   y+mx.
Correct Answer is.   y-mx.
Explanation.   Basic transposition.

Question Number.   17.   Octal is to the base of.
Option A.   2.
Option B.   16.
Option C.   8.
Correct Answer is.   8.
Explanation.   Octal is base 8 numbering system.

Question Number.   18.   101110 in binary is.
Option A.   46 base 8.
Option B.   46 base 2.
Option C.   46 base 10.
Correct Answer is. 46_{10}.
Explanation.   In binary, each term means 32, 16, 8, 4, 2, 1. Write down 101110 underneath and add up the numbers above the 1's.

Question Number.   19.   What is octal 13 in base 10?.
Option A.   11.
Option B.   5.
Option C.   4.
Correct Answer is.   11.
Explanation.   Octal numbering is 64, 8, 1 etc. So 13 is 1 x 8's, and 3 x 1's = 11.

Question Number.   20.   What type of equation is this? $ax^2 + bx + c = 0$.
Option A.   Quadratic equation.
Option B.   Polynomic equation.
Option C.   Gradient of the line.
Correct Answer is.   Quadratic equation.
Explanation.   Quadratic.

Question Number.   21.   What is $(X^2 \times X^3)^3$?.
Option A. X^{36}.
Option B. X^{15}.
Option C. X^{10}.
Correct Answer is. X^{15}.
Explanation. $X^2 * X^3 = X^5$ X^5 raised to the power 3 is X^{15}.

Question Number.   22.   Hexadecimal is base.
Option A.   16.
Option B.   8.
Option C.   2.
Correct Answer is.   16.
Explanation.   Hexadecimal is base 16.

Question Number.   23. $y = mx + c$ can also be written.
Option A. $x = y - c/m$.
Option B. $x = y/m + c$.
Option C. $x = y/m - c$.
Correct Answer is. $x = y - c/m$.
Explanation.   Basic transposition.

Question Number.   24. $(x+y)^2 \div (x + y)^8$ has a base and exponent of.
Option A. $(x+y)^{10}$.
Option B. $(x+y)^{-6}$.
Option C. $(x+y)^{1/4}$.
Correct Answer is. $(x+y)^{-6}$.
Explanation.   If the bases are the same, keep it the same, but subtract the indices (exponents) if dividing.(Add the indices if multiplying).

Question Number.   25.   Rewrite the following with a positive index: z pwr-2 and x pwr-3.

Option A. $(ZX^2)^2$; and $(X)^3$

Option B. $1/z^2$ and $1/x^3$.
Option C. $Z/22$; and $1/X$
Correct Answer is. $1/Z^2$ and $1/X^3$.
Explanation.   Invert the variable (e.g. $1/z$ and write the power with the opposite sign).

Question Number.   26. $10011_2 =$.
Option A. 29_2.
Option B. 19_{10}.
Option C. 35_{10}.
Correct Answer is. 19_{10}.
Explanation. $(1 * 16) + (0 * 8) + (0 * 4) + (1 * 2) + (1 * 1) = 19$.

Question Number.   27. $y = 2x + 4$, When $x = -1$, $y =$.
Option A.   4.
Option B.   2.
Option C.   0.5.
Correct Answer is.   2.
Explanation. $y=2(-1)+4=-2+4 =+2$.

Question Number.   28.   What is 011100001_2 in Octal?.
Option A.   341.
Option B.   324.
Option C.   452.
Correct Answer is.   341.
Explanation.   A binary number ending in 1 must be an odd number when converted to any base.

Question Number.   29.   BCD format of numbering system has a base of.
Option A.   8.
Option B.   2.
Option C.   10.
Correct Answer is.   2.
Explanation.   BCD is base 2.

Question Number.   30.   The characteristic of Log 0.698 is.
Option A.   1.
Option B.   -1.
Option C.   -2.
Correct Answer is.   -1.
Explanation.   The characteristic of a logarithm is the integral part of the logarithm. The mantissa is the decimal part. So, for example $Log8(29345) = 4.94694$ the characteristic is 4 and the mantissa 0.94694. The log definition $y=bx$, $logb(y)=x$. So $0.698 = 10powerx$. x must be -1.*** (i.e minus one-point-something).

Question Number.   31.   Log 59,000 is equal to.
Option A.   0.77452.
Option B.   4.7745.

Option C.   5.77452.
Correct Answer is.   4.7745.
Explanation.   Log 10=1, Log 100 = 2, Log 1000=3. Log 59,000 = Log 59+Log 1000 = something between 1 and 2, + 3.

Question Number.   32.   If $2x^2 + kx-8 = 0$ has two equal real roots, then.
Option A.   k is an imaginary number.
Option B.   k=±8.
Option C.   k=-8.
Correct Answer is.   k is an imaginary number.
Explanation.   Because of the +/- part of the quadratic solution formula, it is not possible for the equation to have two equal roots. k is therefore an imaginary number.

Question Number.   33.   Given the log of A exceeds that of B by 4, find the correct statement about A and B.
Option A.   A is 4000 times the value of B.
Option B.   A is 10,000 times the value of B.
Option C.   A is 1000 times the value of B.
Correct Answer is.   A is 10,000 times the value of B.
Explanation.   log 10=1, log 100=2, log 1000=3, log 10000=4, log 100,000=5.

Question Number.   34.   What is 11110001 base2 in Octal?.
Option A.   72.
Option B.   684.
Option C.   361.
Correct Answer is.   361.
Explanation.   Divide into blocks of 3 (from right to left), and convert each block into DECIMAL - you have just converted to OCTAL. (Note: 'c' is automatically out, since you cannot have '7' in octal).

Question Number.   35.   If x^2-3=6, then x=.
Option A.   ±3.
Option B.   18.
Option C.   ± 2.
Correct Answer is.   ±3.
Explanation. x^2=6 +3, x^2=9, x=+/-3.

Question Number.   36.   Given that s=0, solve the equation s=ut+½at² for the two possible values of t.
Option A.   t=0, t=2u/a.
Option B.   t=0, t=a/2u.
Option C.   t=0, t=-2u/a.
Correct Answer is.   t=0, t=-2u/a.
Explanation.   s=ut+½at2 Make s=0, 0=ut+½at² Divide all terms by u, 0 = t + a/2ut² Factorise, 0=t(1+a/2ut) So either t=0, or -2u/a=0 (so everything in the brackets=0).

Question Number.   37.   What is Log 9-Log 3 + Log 4.

Option A.   Log 12.
Option B.   Log 10.
Option C.   Log 16.
Correct Answer is.   Log 12.
Explanation.   Log 9 = 2Log3, therefore 2Log3-Log3 + Log 4 = Log3 + Log4 = Log(3 x 4) = Log12.

Question Number.   38.   What is log 0.1?.
Option A.   -0.1.
Option B.   0.
Option C.   -1.
Correct Answer is.   -1.
Explanation.   Log of 0.1 is always -1, (log 0.01 = -2, log 0.001 = -3 etc).

Question Number.   39.   What is log 1?.
Option A.   10.
Option B.   1.
Option C.   0.
Correct Answer is.   0.
Explanation.   Log of 1 is always 0.

Question Number.   40.   What is the log of 20000.2?.
Option A.   0.47892.
Option B.   4.7892.
Option C.   47.892.
Correct Answer is.   4.7892.
Explanation.   Log of a 5-figure number (not including the decimal) is always 4 point something.

Question Number.   41.   A quadratic equation has the real roots x=6 and x=9. Determine the equation which is satisfied by these roots.
Option A. $x^2-54x+15=0$.
Option B. $x^2-15x+54=0$.
Option C. $x^2+15x-15=0$.
Correct Answer is. $X^2-15x+54=0$.
Explanation.   Change the sign of each root -6, -9. Coefficient of x is the addition, the constant is the multiplication. http://www.themathpage.com/alg/quadratic-equations.htm.

Question Number.   42.   What is $10111_2 - 1001_2$?.
Option A. 1100_2.
Option B. 1110_2.
Option C. 1010_2.
Correct Answer is. 1110_2.
Explanation.   NIL.

Question Number.   43.   What is the characteristic of 5.74?.
Option A.   1.

Option B.   -1.
Option C.   0.
Correct Answer is.   0.
Explanation.   If you find the Log of 5.74, it will be 0.--- The '0' is the characteristic.

Question Number.   44.   What is log63?.
Option A.   6log3.
Option B.   log18.
Option C.   3log6.
Correct Answer is.   3log6.
Explanation.   3log6.

Question Number.   45.   Solve for x: 5x-7=3.
Option A.   x=-4/5.
Option B.   x=-2.
Option C.   x=2.
Correct Answer is.   x=2.
Explanation.   5x-7 = 3add 7 to both sides to give 5x = 10 divide both sides by 5 to give x = 2.

Question Number.   46.   Octal is the word given to what base?.
Option A.   8.
Option B.   2.
Option C.   16.
Correct Answer is.   8.
Explanation.   NIL.

Question Number.   47.   Which of the following is a quadratic equation?.
Option A. $3x^2+2x+1=0$.
Option B. $3x+2y+4=0$.
Option C. $3x^3+3x-2 = 0$.
Correct Answer is. $3x^2+2x+1=0$.
Explanation.   A quadratic equation has only one unknown and the highest power is two.

Question Number.   48.   What is log 1000?.
Option A.   2.0787.
Option B.   1.0787.
Option C.   3.0787.
Correct Answer is.   3.0787.
Explanation.   Log 10 = 1 Log 100 = 2 Log 1000 = 3 Log 10000 = 4 etc.

Question Number.   49.   What is log AB?.
Option A.   log (A+B).
Option B.   log A+log B.
Option C.   Log A-Log B.
Correct Answer is.   log A+log B.
Explanation.   External website.

Question Number.   50.   What is LogA/B?.
Option A.   log A+Log B.
Option B.   log A-Log B.
Option C.   Log (A-B).
Correct Answer is.   log A-Log B.
Explanation.   External website.

Question Number.   51.   log 100+2 =.
Option A.   4.
Option B.   Log 200.
Option C.   Log 200.
Correct Answer is.   4.
Explanation.   log 100=2, 2+2 = 4.

Question Number.   52.   Log 100/2 =.
Option A.   Log 200.
Option B.   Log 98.
Option C.   1.
Correct Answer is.   1.
Explanation.   log 100=2, 2/2 = 1.

Question Number.   53.   Log 100+cos60.
Option A.   0.25.
Option B.   25.
Option C.   2.5.
Correct Answer is.   2.5.
Explanation.   Log 100=2, cos60=0.5, 2+0.5=2.5.

1.3a Geometry.

Question Number. 1. What is the external angle indicated on the figure below?.
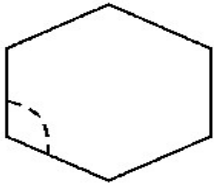
Option A. 60.
Option B. 120.
Option C. 30.
Correct Answer is. 120.
Explanation. NIL.

Question Number. 2. If a wheel of radius R revolves 1/2 a turn, how many radians does it turn through?.
Option A. 2π radians.
Option B. $2R^2$ radians.
Option C. π radians.
Correct Answer is. π radians.
Explanation. There are 2π radians in one complete turn (i.e. 360 degrees).

Question Number. 3. If there are two similar angles in a right triangle, these angles are.

Option A. supplementary.
Option B. subordinate.
Option C. complementary.
Correct Answer is. complementary.
Explanation. Complementary angles add up to 90 degrees. Supplementary angles add up to 180 degrees. A right (angled) triangle already has one 90 degree angles so the other 2 must add up to 90.

Question Number. 4. An equilateral triangle has.
Option A. no equal sides.
Option B. 2 equal sides.
Option C. 3 equal sides.
Correct Answer is. 3 equal sides.
Explanation. Triangle definitions.

Question Number. 5. The three angles of a triangle summed together equal.
Option A. 90°.
Option B. 180°.
Option C. 360°.
Correct Answer is. 180°.
Explanation. The sum of the angles of a triangle ar 180 degrees.

Question Number. 6. The circumference of a circle is found by.
Option A. multiplying the diameter by 3.142.

Option B. multiplying the radius by 3.142.
Option C. dividing the diameter by 3.142.
Correct Answer is. multiplying the diameter by 3.142.
Explanation. Circumference = π x diameter.

Question Number. 7. Calculate the height of an obtuse triangle whose base is X cm and the area is Y square cm.
Option A. Y x 2/X.
Option B. Y + X/2.
Option C. Y * 2 * X.
Correct Answer is. Y * 2/X.
Explanation. Y = 1/(Y+2) 2X * h, h = Y * 2/X.

Question Number.   8.   A right-angled triangle has sides of 3 inches and 4 inches, what will the third side be?.
Option A.   5 inches.
Option B.   5.5 inches.
Option C.   6 inches.
Correct Answer is.   5 inches.
Explanation.   3,4,5 triangle.

Question Number.   9.   To work out the circumference of a circle use.
Option A.   D * 0.3142.
Option B.   D * 3.142.
Option C.   D-3.142.
Correct Answer is.   D * 3.142.
Explanation.   Circumference = 3.14 * diameter.

Question Number.   10.   An equilateral triangle has.
Option A.   two equal side.
Option B.   no equal sides.
Option C.   three equal sides.
Correct Answer is.   three equal sides.
Explanation.   Triangle definition.

Question Number.   11.   A quadrilateral with only two parallel sides is a.
Option A.   Trapezium.
Option B.   Trapezoid.
Option C.   Rhombus.
Correct Answer is.   Trapezoid.
Explanation.   Shape definitions.

Question Number.   12.   A triangle with equal angles is called.
Option A.   right angled.
Option B.   equilateral.

Option C.   isosceles.
Correct Answer is.   equilateral.
Explanation.   Triangle definitions.

Question Number.   13.   Two gears are in mesh, one is larger than the other, the smaller gear rotates.
Option A.   at a faster speed.
Option B.   at a lower speed.
Option C.   at the same speed.
Correct Answer is.   at a faster speed.
Explanation.   The smallest gear rotates the fastest.

Question Number.   14.   The name given to this shape.
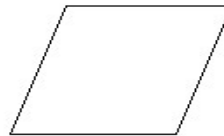
Option A.   Trapezoid.
Option B.   Parallelogram.
Option C.   Rhombus.
Correct Answer is.   Parallelogram.
Explanation.   Shape definition.

Question Number.   15.   A triangle with equal sides is.
Option A.   isosceles.
Option B.   equilateral.
Option C.   acute.
Correct Answer is.   equilateral.
Explanation.   NIL.

Question Number. 16. Two gears are in mesh, one has twice the number of teeth as the other.

Option A. the two gears rotate at the same speed.

Option B. the gear with fewer teeth rotates faster than the other.

Option C. the gear with fewer teeth rotates slower than the other.

Correct Answer is. the gear with fewer teeth rotates faster than the other.

Explanation. The smaller gear rotates at twice the speed of the larger gear.

Question Number. 17. Locus points plotted equidistant from a central points represent.

Option A. circumference.

Option B. diameter.

Option C. radius.

Correct Answer is. circumference.

Explanation. Locus is the line scribed by points moving equidistant from a point - in this case it will scribe the circumference of a circle.

Question Number. 18. A circle contains.

Option A. $2\pi r$ radians.

Option B. 2π radians.

Option C. 4π radians.

Correct Answer is. 2π radians.

Explanation. There are 2π radians in 360°.

Question Number. 19. An oblique pyramid is one which has its axis.

Option A. perpendicular to its base.

Option B. not perpendicular to its base.

Option C. parallel to its base.

Correct Answer is. not perpendicular to its base.

Explanation. Nil.

Question Number. 20. An input gear has 20 teeth and the output gear has 120 teeth. If the input gear rotates 360°, the output gear will rotate.

Option A. 60°.

Option B. 45°.

Option C. 90°.

Correct Answer is. 60°.

Explanation. Ratio 1:6. The big gear will rotate 1/6 of the small gear. 360/6 = 60°.

Question Number. 21. A line from the centre of a circle is called.

Option A. diameter.

Option B. its segment.

Option C. radius.

Correct Answer is. radius.

Explanation. NIL.

Question Number. 22. Give the name of the triangle, which has two sides equal in length and two equal angles.

Option A. Equilateral.

Option B. Isosceles.

Option C. Obtuse.

Correct Answer is. Isosceles.

Explanation. NIL.

Question Number. 23. In an equilateral triangle, all of the angles are equal, to.

Option A. π divided by 3.

Option B. π divided by 4.

Option C. π divided by 2.

Correct Answer is. π divided by 3.

Explanation. Since 360° = 2π radians, 180° = π radians. The angles of an equilatrial triangle are each 180/3 (60°) or $\pi/3$.

Question Number. 24. What is an obtuse angle?.

Option A. One greater than 180°.

Option B. One less than 90°.

Option C. One greater than 90°, but less than 180°.

Correct Answer is. One greater than 90°, but less than 180.

Explanation. NIL.

Question Number. 25. A congruent triangle has.

Option A. same shape and size.

Option B. same size different shape.

Option C. same shape different size.

Correct Answer is. same shape and size.

Explanation. Congruent triangles have the same sides AND the same angles.

Question Number. 26. Which shape has no parallel sides?.

Option A. Trapezoid.

Option B. Kite.

Option C. Rhombus.

Correct Answer is. Kite.

Explanation. NIL.

Question Number. 27. The properties of a scalene triangle are.

Option A. acute angle.

Option B. all sides different lengths.

Option C. all sides are equal.

Correct Answer is. all sides different lengths.

Explanation. A Scalene triangle has all different sides.

Question Number. 28. What is the height of an oblique pyramid?.

Option A. The height is angled to the base.

Option B. The height is perpendicular to the base.

Option C. The height is parallel to the sides.

Correct Answer is. The height is perpendicular to the base.

Explanation. Height is always measured perpendicular (90 degrees) to the base.

Question Number. 29. What is the value of in the diagram shown?.
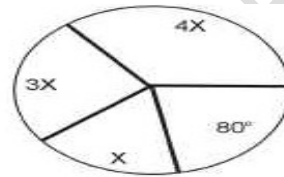
Option A. 30°.

Option B. 35°.

Option C. 40°.

Correct Answer is. 35°.

Explanation. x + 3x + 4x + 80 = 360, 8x +80 = 360, 8x = 360-80, x = 280/8 = 35.

Question Number. 30. How many degrees are there in the smaller of the segments, where AB is one sixth of AC?.
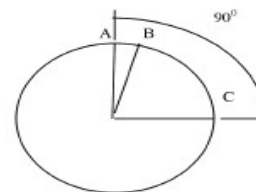
Option A. 15°.

Option B. 14.5°.

Option C. 10°.

Correct Answer is. 15°.

Explanation. 90/6 = 15 degrees.

Question Number. 31. In a parallelogram, if all the sides are of equal length and 1 angle is 90°, it is a.

Option A. rhomboid.

Option B.   quadrilateral.

Option C.   square.

Correct Answer is.   square.

Explanation.   A square.

Question Number.   32.   In a rhombus.

Option A.   all sides are different length with no angles 90°.

Option B.   all sides are equal length with no angles 90°.

Option C.   adjacent sides are different lengths with no angles 90°.

Correct Answer is.   all sides are equal length with no angles 90°.

Explanation.   A rhombus is a square on the tilt.

Question Number.   33.   An isosceles triangle has the following properties:.

Option A.   Two sides parallel.

Option B.   Three sides the same length.

Option C.   Two sides the same length.

Correct Answer is.   Two sides the same length.

Explanation.   An isoscelese triangle has 2 sides and 2 angles the same.

Question Number.   34.   In an oblique triangle the axis is.

Option A.   perpendicular to the base.

Option B.   at a slant to the base.

Option C.   parallel to the base.

Correct Answer is.   at a slant to the base.

Explanation.   An oblique triangle is on the slant.

Question Number.   35.   How far does a wheel of 7m radius travel in one revolution?.

Option A.   14.

Option B.   22m.

Option C.   44m.

Correct Answer is.   44m.

Explanation. $C = 2\pi R = 2 * 3.14 * 7 = 44$ (approx.).

Question Number.   36.   For a scalene triangle which is true?.

Option A.   2 sides are equal.

Option B.   No 2 sides are equal.

Option C.   One angle is acute.

Correct Answer is.   No 2 sides are equal.

Explanation.   A scalene triangle has no sides equal.

Question Number.   37.   A line to create a segment from the centre of a circle is a.

Option A.   radius.

Option B.   diameter.

Option C.   chord.

Correct Answer is.   diameter.

Explanation.   A chord does not go through the centre of the circle. A radius does not produce a segment.

Question Number.   38.   A shape with 4 equal sides and one 90° angle is a.

Option A.   parallelogram.

Option B.   rhombus.

Option C.   square.

Correct Answer is.   square.

Explanation.   Neither a parallelogram (a pushed-over rectangle) nor a rhombus (a pushed-over square) has any 90° angles. A square has (at least) one 90° angle.

Question Number.   39.   In a right angled triangle the longest side is 20cm long, the shortest

side is 12cm. What length is the last side?.

Option A.   13.6cm.
Option B.   18cm.
Option C.   16cm.
Correct Answer is.   16cm.
Explanation.   12-16-20 triangle is a 3-4-5 triangle.

Question Number.   40.   The sum of the internal angles of a triangle is.
Option A.   180°.
Option B.   2π radians.
Option C.   360°.
Correct Answer is.   180°.
Explanation.   Internal angles of a triangle add up to 180 degrees (note: 360 degrees and 2π radians are the same thing).

Question Number.   41.   A triangle has angles 67° and 48°. The third angle is.
Option A.   115°.
Option B.   75°.
Option C.   65°.
Correct Answer is.   65°.
Explanation.   67+ 48 = 115. 180-115 = 65°.

Question Number.   42.   The sum of the angles of a polygon with 'n' sides is.
Option A.   180 x (n-2).
Option B.   (n/4) x 180.
Option C.   60 x n.
Correct Answer is.   180 x (n-2).
Explanation.   180(n-2).

Question Number.   43.   Suppose the earth to be a real sphere with the radius R. The arc distance from HK (N23) to the North pole is:.

Option A.   0.9R.

Option B.   2.2R.
Option C.   1.2R.
Correct Answer is.   1.2R.
Explanation.   Circumference = 2πR (take π = 3). Proportion of quoted arc of circumference is 67/360. 67/360 x (2 x 3 x R) = 1.1R (approx, slightly more if you take π = 3.14)).

Question Number.   44.   One radian is.

Option A.   the angle subtended at the centre of a circle when the arc-length formed between two radial lines is equal to pi.
Option B.   the angle subtended at the centre of a circle when the arc-length formed between two radial lines is equal in length to the radius.
Option C.   66.67°.
Correct Answer is.   the angle subtended at the centre of a circle when the arc-length formed between two radial lines is equal in length to the radius.
Explanation.   NIL.

Question Number.   45.   How many degrees in π radians ?.
Option A.   180.
Option B.   360.
Option C.   90.
Correct Answer is.   180.
Explanation.   2π radians = 360 degrees.

Question Number.   46.   The sum of the external angles of any polygon is.
Option A.   180 degrees.
Option B.   540 degrees.
Option C.   360 degrees.
Correct Answer is.   360 degrees.
Explanation.   External website.

Question Number. 47. Which of the 2 angles are called supplementary?.

Option A. 60 degrees and 120 degrees.

Option B. 40 degrees and 40 degrees.

Option C. 30 degrees and 60 degrees.

Correct Answer is. 60 degrees and 120 degrees.

Explanation. Add up to 180 degrees.

Question Number. 48. An acute angle is.

Option A. less than 90 degrees.

Option B. less than 180 degrees.

Option C. more than 90 degrees.

Correct Answer is. less than 90 degrees.

Explanation. NIL.

http://math.about.com/library/bldefacute angle.htm.

Question Number. 49. A straight line which goes from one point on the circumference to another is called.

Option A. an arc.

Option B. a tangent.

Option C. a chord.

Correct Answer is. a chord.

Explanation. NIL.

http://en.wikipedia.org/wiki/Chord_%28g eometry%29.

Question Number. 50. What is the name given to a quadrilateral with two pairs of adjacent sides equal and the diagonals intersect at right angles? Note not all the sides are equal?.

Option A. kite.

Option B. parallelogram.

Option C. rhombus.

Correct Answer is. kite.

Explanation. Draw the figure to check.

Question Number. 51. Find the size of the other two angles of an isoscelese triangle with one angle of 100°.

Option A. 40°, 40°.

Option B. 30°, 30°.

Option C. 100°, 20°.

Correct Answer is. 40°, 40°.

Explanation. Isoscelese triangle has 2 angles equal. If one angle is 100° the other two add up to 80°. These must be the equal angles so each will be 40°.

Question Number. 52. A triangle always has.

Option A. exactly one right angle.

Option B. at least two acute angles.

Option C. exactly two acute angle.

Correct Answer is. at least two acute angles.

Explanation. NIL.

http://mathforum.org/library/drmath/vie w/55061.html.

Question Number. 53. The locus of a point which stays the same distance from a given point is.

Option A. a circle.

Option B. a parallel line.

Option C. an ellipse.

Correct Answer is. a circle.

Explanation. A locus is the path a point travels following a given rule. In this case imagine the path of the end of a piece of string fixed at the other end and kept taught.

1.3b Geometry.

Question Number. 1. In the following equation what is the y-intercept? 4y = 2x + 8.

Option A. 2.
Option B. 4.
Option C. 8.
Correct Answer is. 2.
Explanation. First get rid of the 4 from RHS (divide all by 4) y = 0.5x + 2. Intercept with y-axis is when x = 0. So put x = 0 and what is left? (remember that 0.5 x 0 = 0).

Question Number. 2. How many times does the x-axis get crossed when y = x^2 -3.

Option A. 3.
Option B. 1.
Option C. 2.
Correct Answer is. 1.
Explanation. y = x^2 (a quadratic) is a shape like a 'U-curve' where the bottom of the 'U' sits on the (0,0) point. The -3 means the 'U' is shifted down the y-axis 3 places.

Question Number. 3. On a graph what is the intercept of y when 4y = x + 8.
Option A. 4.
Option B. 8.
Option C. 2.
Correct Answer is. 2.
Explanation. Use y = mx + c The 'c' is the y-intercept. 4y = x + 8 must be converted to y = 1/4x + 8/4".

Question Number. 4. What is the equation of the line shown?.
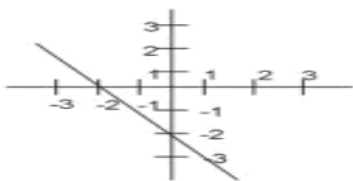
Option A. y = 2x + 2.
Option B. y = -2-x.
Option C. y = x-2.
Correct Answer is. y = -2-x.
Explanation. Slope (gradient) is 2/2 and is negative (i.e. -1). y-intercept is -2. Equation of the line (y = mx + c) is y = -1x -2 or y = -2-x.

Question Number. 5. The graph points (9, 3) and (3, 1) what is the slope?.
Option A. 9/5.
Option B. 1/3.
Option C. 3/1.
Correct Answer is. 1/3.
Explanation. Slope = change in Y / change in = (3-1)/(9-3) = 2/6 = 1/3.

Question Number. 6. A straight line graph has the equation 3y = 12x–3 What is the gradient?.
Option A. 1/4.
Option B. 4/1.
Option C. 3/4.
Correct Answer is. 4/1.
Explanation. The coefficient of x is the gradient, but only when the equation is in the form y = mx + c. So y = 12/3x -3/3 12/3 = 4/1.

Question Number. 7. For an equation 2y = 5x + 3 what is the gradient?.
Option A. 3/5x.
Option B. 5/2.
Option C. 5x+3/2.
Correct Answer is. 5/2.

Explanation.   y = mx + c Gradient is the 'm' (but the coefficient of y must be 1. If it is not, divide all terms by the coefficient of y).

Question Number.   8.   Using cosine to find the angle of a triangle, which statement is true?.
Option A.   Opposite/Hyp.
Option B.   Opposite/Adjacent.
Option C.   Adjacent/Hyp.
Correct Answer is.   Adjacent/Hyp.
Explanation.   S.O.H.C.A.H.T.O.A.

Question Number.   9.   What type of equation is $y = x^2 + 9x + 14$?.
Option A.   Quadratic.
Option B.   Circular.
Option C.   Exponential.
Correct Answer is.   Quadratic.
Explanation.   Quadratic has x2 as its highest order.

Question Number.   10. $2y = 5x + 3$ What is the gradient?.
Option A.   2/5.
Option B.   5/2 + 3.
Option C.   5/2.
Correct Answer is.   5/2.
Explanation.   Gradient is the m when the formula is in the form y = mx + c.

Question Number.   11.   What is the slope between the points (3,1) and (9,3)?.
Option A.   1/3.
Option B.   3/1.
Option C.   2.
Correct Answer is.   1/3.
Explanation.   (Y2-Y1)/(-), 3-1 = 2, 9-3 = 6. 2/6 = 1/3.

Question Number.   12.   What is commonly referred to as the law of a straight line?.
Option A. $y = x^2$ plus 180.
Option B.   The line must pass through the 180 degree datum.
Option C.   y = mx + c.
Correct Answer is.   y = mx + c.
Explanation.   NIL.

Question Number.   13.   The y intercept of 4y = 4x + 8 is.
Option A.   4.
Option B.   8.
Option C.   2.
Correct Answer is.   2.
Explanation.   Must be in form y = Mx + C, C is y-intercept. y = x + 2 in this case.

Question Number.   14.   A straight line passes through the two points (1,4) and (6,1). What is the gradient of the line?.
Option A.   3/5.
Option B.   -3/5.
Option C.   2/5.
Correct Answer is.   -3/5.
Explanation.   The gradient is found by dividing the difference between the y coordinates by the difference between the x coordinates. In this case it will be 4-1/1-6 = 3/-5 =-3/5.

Question Number.   15.   What is the equation of a straight line with gradient m and intercept on the y axis c?.
Option A.   y = mx + c.
Option B.   x = y + mc.
Option C.   y = cx + m.
Correct Answer is.   y = mx + c.
Explanation.   NIL.

Question Number. 16. What is the gadient of the straight line whose equation is 2y + 3x = 6?.

Option A. 3.

Option B. 3/2.

Option C. -3/2.

Correct Answer is. -3/2.

Explanation. First put into the form y = mx + c, i.e. y = -3x/2 +3 m = gradient hence gradient is -3/2.

Question Number. 17. Two lines with equations y = 3x-6 and y = 3x + 4 ?.

Option A. meet when y = 3.

Option B. are at right angles.

Option C. are parallel.

Correct Answer is. are parallel.

Explanation. They both have the same gradient i.e. 3 and hence are parallel.

Question Number. 18. What is the equation of a straight line that passes through the two points (0,0) and (3,2).

Option A. y = 3x + 2.

Option B. y = 2x + 3.

Option C. y =2x/3.

Correct Answer is. y =2x/3.

Explanation. Gradient of the line is (2-0)/(3-0) = 2/3 this is the difference in the y values divided by the difference in the x values; m =2/3, The intercept on the y axis is 0, that is when x = 0 ; c = 0, The gradient of a straight line is of the form y = mx + c so we get y = 2x/3 +0 = 2x/3.

Question Number. 19. The line with equation x = 3 is.

Option A. at 45° to both axes.

Option B. parallel to the x axis.

Option C. parallel to the y axis.

Correct Answer is. parallel to the y axis.

Explanation. If x = 3 then the line will pass through all points where x=3 i.e. (3,0); (3,1);(3,2) that is a line parallel to the y axis.

Question Number. 20. What is the equation of the graph shown?.
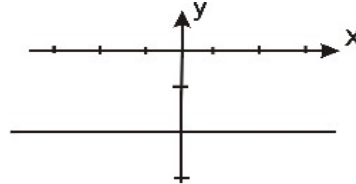
Option A. y = -2.

Option B. x = -2.

Option C. y = 2x.

Correct Answer is. y = -2.

Explanation. All the points on he line have a y value of -2, hence the equation is y = -2.

Question Number. 21. Use the graphs to solve the simultaneous equations y = x + 2 and 3y + 2x = 6.

Option A. x = 2, y = 0.

Option B. x = 0, y = 2.

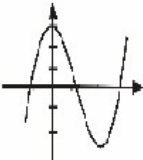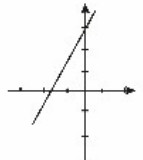Option C. x = 0, y = 0.

Correct Answer is. x = 0, y = 2.

Explanation. This is easy. The solution is the point when the lines cross, i.e. (0,2): x=0, y=2.

Question Number.   22.   The plot of the equation y = 1/x is a.

Option A.   straight line.

Option B.   curve with one turning point.

Option C.   curve with two turning points.

Correct Answer is.   curve with two turning points.

Explanation.   y = 1/x is a curve with two turning point. Try plotting it with values of x of -2, -1, 0, 1, 2 and you will see that it appears in the no.1 and no.3 quadrants and goes off to infinity.
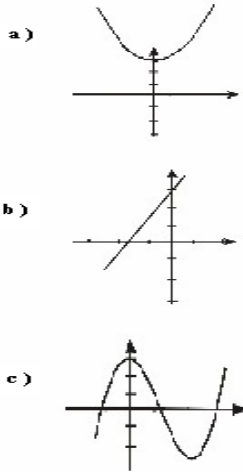
Question Number.   23.   Which of the graphs shown is given by the equation y = x^2 + 3?.

Correct Answer is.   C is correct.

Explanation.   y = ax + b is a straight line, y = ax^2 + b is a quadratic which has one turning point, y = ax^3 + bx + c has two turning points.

Question Number.   24.   Which of the graphs shown is given by the equation; 2y = 4x +6 ?.

Correct Answer is.   B is correct because y = ax + b, is equation of straight line.

Explanation.   y = ax + b is a straight line, y = ax^2 + b is a quadratic which has one turning point y = ax^3 + bx + c has two turning points.

Question Number.   25.   Which of the graphs shown is given by the equation; y = $2x^3$ + 4x + 3 ?.
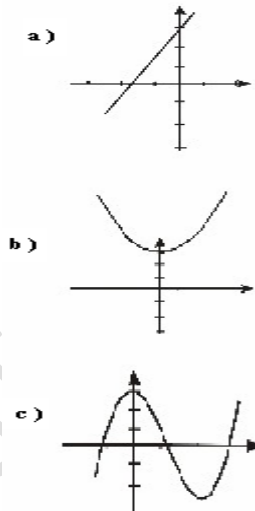
Correct Answer is.   Graph in C is correct, because it has two turning points.

Explanation.   y = ax + b is a straight line, y = ax^2 + b is a quadratic which has one turning point, y = ax^3 + bx + c has two turning points.

1.3c Geometry.

Question Number.   1.   What is the tangent of 90° ?.

Option A.   Negative infinity.

Option B.   0.

Option C.   Positive infinity.

Correct Answer is.   Positive infinity.

Explanation.   Technically, the tan curve goes off the graph to + infinity at 90 degrees, but then comes back on at - infinity at the same point.

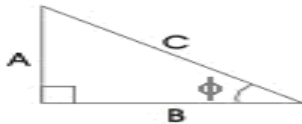Choose + infinity for the answer here (since it goes to +infinity first).

Question Number.   2.   Two angles of a triangle are 68° and 32°. Therefore the third angle must be.
Option A.   114°.
Option B.   80°.
Option C.   63°.
Correct Answer is.   80°.
Explanation.   The sum of all the angles in a triangle is 180 degrees.

Question Number.   3.   Which of the following formulae are correct for the triangle shown?.

Option A. $A^2 = C^2 + B^2$.
Option B. $B^2 = C^2 + A^2$.
Option C. $C^2 = A^2 + B^2$.
Correct Answer is. $C^2 = A^2 + B^2$.
Explanation.   Pythagoras theorem.
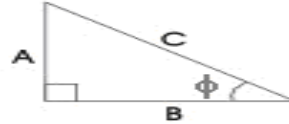
Question Number.   4.   In a right-angled triangle the other two angles are both 45°. The length of the opposite side can be calculated by.

Option A.   cos 45° x length of the adjacent side of the triangle.
Option B.   cos 45° x length of the adjacent side of the triangle.
Option C.   sin 45° x length of the hypotenuse side of the triangle.

Correct Answer is.   sin 45° x length of the hypotenuse side of the triangle.
Explanation.   sin 45° = opp/hyp opp = sin 45° / hyp.

Question Number.   5.   Sin ø =.

Option A.   A/C.
Option B.   B/C.
Option C.   C/A.
Correct Answer is.   A /C.
Explanation.   S.O.H.C.A.H.T.O.A.

Question Number.   6.   Cos A =.

Option A.   1.2.
Option B.   0.6.
Option C.   0.8.
Correct Answer is.   0.8.
Explanation.   S.O.H.C.A.H.T.O.A.

Question Number.   7.   In a right-angle triangle, the sine of an angle is.

Option A.   opposite divided by hypotenuse.

Option B.   adjacent divided by hypotenuse.

Option C.   opposite divided by adjacent.

Correct Answer is.   opposite divided by hypotenuse.

Explanation.   S.O.H.C.A.H.T.O.A.

Question Number.   8.   In a right-angle triangle, the tangent of an angle is.

Option A.   opposite divided by adjacent.

Option B.   adjacent divided by hypotenuse.

Option C.   opposite divided by hypotenuse.

Correct Answer is.   opposite divided by adjacent.

Explanation.   S.O.H.C.A.H.T.O.A.

Question Number.   9.   In a right-angle triangle, the cosine of an angle is.

Option A.   opposite divided by hypotenuse.

Option B.   adjacent divided by hypotenuse.

Option C.   opposite divided by adjacent.

Correct Answer is.   adjacent divided by hypotenuse.

Explanation.   S.O.H.C.A.H.T.O.A.

Question Number.   10.   On a right angle triangle, the longest side is 20 cm and the shortest is 12 cm. What is the other side?.

Option A.   13 cm.

Option B.   18 cm.

Option C.   16 cm.

Correct Answer is.   16 cm.

Explanation.   3,4,5 triangle. Also applies to multiples of 3,4,5 such as 6,8,10 and 12,16,20.

Question Number.   11.   In a right triangle, SINE theta =.

Option A.   adjacent divided by hypotenuse.

Option B.   opposite divided by adjacent.

Option C.   opposite divided by hypotenuse.

Correct Answer is.   opposite divided by hypotenuse.

Explanation.   SOHCAHTOA.

Question Number.   12.   Complete the following: SINE a =.

Option A.   a squared times b squared.

Option B.   opposite side divided by the hypotenuse side.

Option C.   adjacent side divided by the opposite side.

Correct Answer is.   opposite side divided by the hypotenuse side.

Explanation.   S.O.H.C.A.H.T.O.A.

Question Number.   13.   A sector with angle A is subtended to the centre point of a circle. Area of the sector is proportional to:.

Option A.   Angle A.

Option B.   Cos A.

Option C.   Sin A.

Correct Answer is.   Angle A.

Explanation.   Area of a sector is proportional to the subtended angle of the sector.

Question Number.   14.   Starting from zero amplitude, the cosine curve repeats itself between.

Option A.   -180 and 180 degree.

Option B.   -90 and 270 degrees.

Option C.   0 and 360 degree.

Correct Answer is.   -90 and 270 degrees.

Explanation.   Sketch the cosine curve and see. Neither 0 or -180 degrees are zero amplitude.

Question Number.   15.   Choose the correct statement:.

Option A. $Cosec^2 x - Cot^2 x = 1$.

Option B. $Sec^2 x + tan^2 x = 1$.

Option C. $Cos^2 x - Sin^2 x = 1$.

Correct Answer is. $Cosec^2 x - Cot^2 x = 1$.

Explanation.   See http://www.ilovemaths.com/2trigid.htm.

Question Number.   16.   A right angled triangle has the two shortest sides of 5cm and 12 cm. What is the length of the longest side?.

Option A.   17cm.

Option B.   15cm.

Option C.   13cm.

Correct Answer is.   13cm.

Explanation.   Use Pythagoras theorem The square on the hypotenuse is equal to the sum of the squares on the other two sides. $5^2 + 12^2 = h^2$ $25 + 144 = h^2$, h = √169 =13.

Question Number.   17.   The trigonometrical ratio; adjacent divided by hypotenuse is.

Option A.   Sine.

Option B.   Tangent.

Option C.   Cosine.

Correct Answer is.   Cosine.

Explanation.   Sin = Opp/Hyp, Cos = Adj/Hyp, Tan = Opp/Adj.

Question Number.   18.   57.3 degrees is equal to.

Option A.   2 radians.

Option B.   1 radian.

Option C.   π radians.

Correct Answer is.   1 radian.

Explanation.   This is worth learning.

Question Number.   19.   A right angled triangle has sides 6cm, 8cm and 10 cm. What is the sine of the angle between the 8cm side and the 10 cm side?.

Option A.   0.75.

Option B.   0.6.

Option C.   0.8.

Correct Answer is.   0.6.

Explanation.   A 6,8,10 triangle is 2 x the 3, 4, 5 triangle which is a right angled triangled triangle with hypotenuse 5.   For our triangle the hypotenuse will be 10. The angle we are considering has an opposite side of 6 and sine of an angle is the opposite/hypotenuse. Hence the answer is 6/10 = 0.6.

Question Number.   20.   Sin 90 =.

Option A.   Infinity.

Option B.   1.

Option C.   0.

Correct Answer is.   1.

Explanation.   Sin 90 = 1, Cos 90 = 0, tan 90 = infinity.

Question Number.   21.   What size of angle has the same ratio for both the sine and the cosine?.

Option A.   60 degrees.

Option B.   0 degrees.

Option C.   45 degrees.

Correct Answer is.   45 degrees.

Explanation.   An isosceles right angled triangle has two 45 degree angles. The size of the two sides that are not the hypotenuse are the same. This means that both the sine which is opposite/hypotenuse and the cosine which is

adjacent/hypotenuseis the same as the adjacent = opposite in this case.

Question Number.   22.   Sin A is equal to.
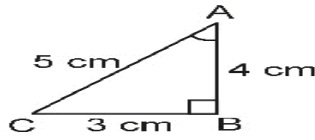
Option A.   3/4.
Option B.   3/5.
Option C.   4/5.
Correct Answer is.   3/5.
Explanation.   B&C is opposite to A, A&B is adjacent to A, A&C is hypotenuse, sin = o/h, cos = a/h , tan= o/a.

Question Number.   23.   If cos 60 is 0.5, what is sin 30?.
Option A.   0.5.
Option B.   None of the above.
Option C.   0.866.
Correct Answer is.   0.5.
Explanation.   Cos θ = sin (90-θ).

1.4

Question Number.   1.   5/16 + 3/32 expressed as a single fraction is.
Option A.   13/32.
Option B.   8/48.
Option C.   15/512.
Correct Answer is.   13/32.
Explanation.   5/16 = 10/32 , 10/32 + 3/32 = 13/32.

Question Number.   2.   Dividing 41/2 by 2 1/6 gives the answer of.
Option A.   21/3.
Option B.   25/12.
Option C.   54/26.
Correct Answer is.   54/26.
Explanation.   41/2 = 9/2, 21/6 = 13/6 Turn one fraction up-side-down then multiply 9/2 x 6/13 = 54/26.

Question Number.   3.   10000 expressed as ten raised to a power would be.
Option A.   105.
Option B.   103.
Option C.   104.
Correct Answer is.   104.
Explanation.   10 * 10 *10 = 1000, 10 * 10 * 10 * 10 = 10000.

Question Number.   4.   60 mm expressed as a percentage of 3 metres is.
Option A.   2 %.
Option B.   1.8 %.
Option C.   0.5 %.
Correct Answer is.   2 %.
Explanation.   (60 * 100) / 3000.

Question Number.   5.   The average speed of an aircraft that travels 7200 miles in 12 hours is.

Option A.   864 MPH.
Option B.   167 MPH.
Option C.   600 MPH.
Correct Answer is.   600 MPH.
Explanation.   7200 /12.

Question Number.   6.   The sum of complex numbers a+bi and a'+b'i are.
Option A.   (a+b)+(a'+b')i.

Option B.   (a+a')i+(b+b').

Option C.   (a+a')+(b+b')i.

Correct Answer is.   (a+b)+(a'+b')i.

Explanation.   Add the real numbers to each
other, then add the imaginary numbers to each
other, and keep them separate.