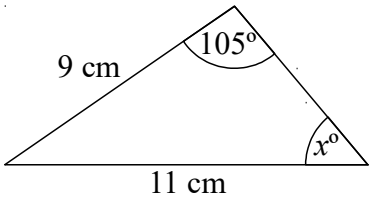
Higher (Grade 7-9) GCSE Mini Test 2

1 Solve $\frac{2}{x+3} + \frac{9}{x+7} = 1$

x = 5

x = -4

2



Work out the value of x.
Give your answer to 1 decimal place.

52.2°

3 Given that $g(x) = 5x + 3$

Work out an expression for $g^{-1}(x)$

$$g^{-1}(x) = \frac{x - 3}{5}$$

4 Write $7\sqrt{50}$ in the form $k\sqrt{2}$, where k is an integer.

35√2

5 Starting with $x_0 = 1$, use the iteration formula

$$x_{n+1} = \frac{4}{x_n^2 + 2}$$

three times to find an estimate for the solution to $x^3 + 2x = 4$

1.28 (2dp)

6 y is inversely proportional to x

When $y = 5$, $x = 0.5$

Find the value of y when $x = 0.25$

10

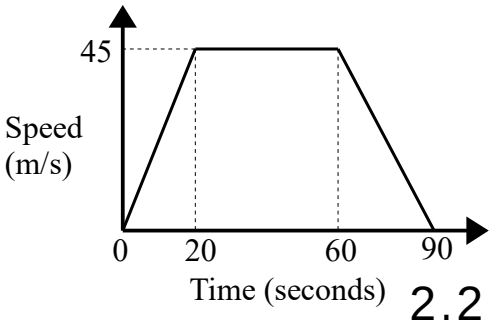
7 $V = IR$

I = 6.7 correct to 1 decimal place
R = 11.81 correct to 2 decimal places

Work out the upper bound for V.
Give your answer to 2 decimal places.

79.75

8



2.25 m/s²

Calculate the acceleration in the first 20 seconds

9 A circle has the equation $x^2 + y^2 = 7$

(i) Write down the coordinates of the centre of the circle. (0,0)

(ii) Write down the exact length of the radius of the circle.

√7

10 The coordinates of the maximum point of a curve are (2, -5)

Write down the coordinates of the maximum point of the curve with equation $y = f(x) + 2$

(2, -3)

11 Prove algebraically that the sum of the squares of any 2 even positive integers is always a multiple of 4.

$(2n)^2 + (2m)^2$

$4n^2 + 4m^2$

$4(n^2 + m^2)$

12 There are 10 counters in a bag.

5 of the counters are red.
3 of the counters are blue.
2 of the counters are green.

Billie takes two counters are taken at random from the bag.

Work out the probability that both of the counters Billie takes are the same colour.

$\frac{28}{90}$

13 Solve $2x^2 - 7x - 4 < 0$

$-\frac{1}{2} < x < 4$

14 Solve the simultaneous equations:

$2x^2 - y^2 = 41$

$2x + 3y = 1$

$x = 5$, $y = -3$ or $x = -\frac{37}{7}$, $y = \frac{27}{7}$

15 Write $x^2 + 3x - 2$ in the form $(x + a)^2 + b$ where a and b are integers.

$(x + \frac{3}{2})^2 - \frac{17}{4}$

16 Prove algebraically that the recurring decimal $0.\dot{1}3\dot{5}$ can be written as $\frac{5}{37}$

$x = 0.135$

$1000x = 135.135$

$999x = 135$

$x = \frac{135}{999}$

$x = \frac{5}{37}$

17 Cone A and Cone B are mathematically similar.

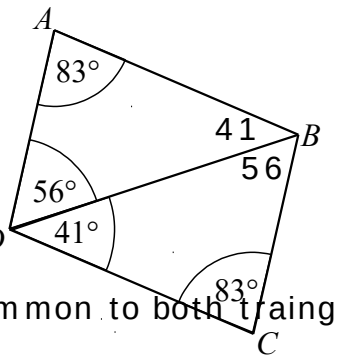
The height of Cone A is 12 cm and the height of Cone B is 8 cm.

The total surface area of Cone A is 60 cm^2.

Calculate the total surface area of Cone B.

$\frac{80}{3}$ cm^2

18 Prove that triangle ABD is congruent to triangle BCD.



$180 - 83 - 56 = 41$

$180 - 83 - 41 = 56$

$ABD = BDC$ BD is common to both traingles

$ADB = CBD$ ASA

19 Here are the first 5 terms of a quadratic sequence.

-2 1 8 19 34

Find an expression, in terms of n, for the nth term of this sequence.

$2n^2 - 3n - 1$

20 Sketch the graph of $y = \cos x°$ for $0 \le x \le 360$