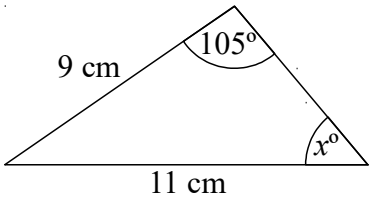
Higher (Grade 7-9) GCSE Mini Test 2

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

2



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

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

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

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

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 $x^3 + 2x = 4$

6 y is inversely proportional to x

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

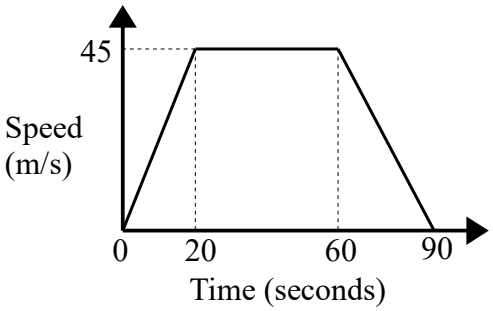
Find the value of y when $x = 0.25$

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.

8



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.

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

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 $y = f(x) + 2$

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

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.

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

14 Solve the simultaneous equations:

$$2x^2 - y^2 = 41$$
$$2x + 3y = 1$$

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

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

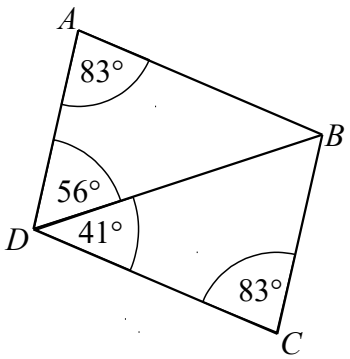
17 Cone A and Cone B are mathematically similar.

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.

18 Prove that triangle ABD is congruent to triangle BCD.



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.

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