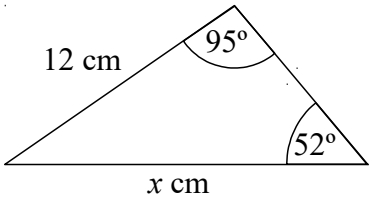
Higher (Grade 7-9) GCSE Mini Test 5

1 Simplify fully $\dfrac{2x+6}{x-3} \div \dfrac{2x^2+7x+3}{x^2-9}$

2



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

3 Given that $g(x) = \dfrac{2x+6}{5}$

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

4 Show that $\dfrac{1}{\frac{1}{\sqrt{3}}+\sqrt{3}}$ can be written as $\dfrac{\sqrt{3}}{4}$

5 Using $x_{n+1} = \dfrac{10}{x_n^2+4}$

With $x_0 = 1$

Find the values of x_1, x_2 and x_3.

6 y is inversely proportional to the cube of x

When $y = 0.5$, $x = 2$

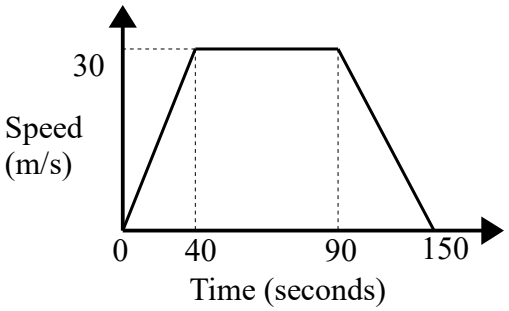
Find the value of y when $x = 4$

7 $$f = \frac{\sqrt{g}}{h}$$

$g = 22$ correct to 2 significant figures
$h = 9.2$ correct to 1 decimal place

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

8



Calculate the total distance travelled.

9 The point A has the coordinates (2,7)
The point B has the coordinates (8,4)

Find the equation of the perpendicular bisector to AB.

10 The coordinates of the turning point of a curve are (-4, 2)

Write down the coordinates of the turning point of the curve with equation $y = -f(x)$

11 Prove algebraically that the sum of any three consecutive even integers is always a multiple of 6.

12 There are 12 counters in a bag.

5 of the counters are red.
4 of the counters are blue.
3 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 different colours.

13 Solve $x^2 - 2x - 24 \geq 0$

14 Solve the simultaneous equations:

$$x^2 + y^2 = 16$$
$$2x + y = 8$$

15 By completing the square, find the turning point of the graph with equation $y = x^2 - x + 10$

16 Prove algebraically that the recurring decimal $0.2\dot{1}\dot{8}$ can be written as $\frac{12}{55}$

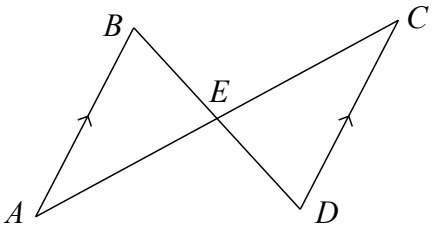
17 Cylinder A and Cylinder B are mathematically similar.

The surface area of Cylinder A is 50 cm^2 and the surface area of Cylinder B is 128 cm^2.

The height of Cylinder A is 7 cm.

Calculate the height of Cylinder B.

18 *AB* and *CD* are parallel and equal in length.



Prove that triangle *ABE* and triangle *CDE* are congruent.

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

3 5 8 12 17

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

20

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