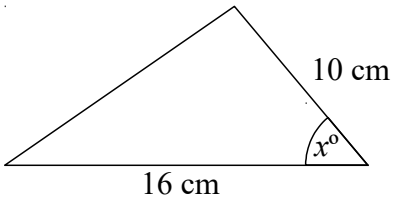
Higher (Grade 7-9) GCSE Mini Test 1

1 Simplify fully $\dfrac{3x^2 - 17x + 10}{x^2 - 7x + 10}$

2



The area of the triangle is 55cm^2
Work out the value of x.
Give your answer to 1 decimal place.

3 Given that $f(x) = 2x + 1$ and $g(x) = x^2 + 3$

Find $fg(x)$

4 Write $(4 + \sqrt{5})^2$ in the form $a + b\sqrt{5}$, where a and b are integers.

5 The number of people living in a town t years from now is P_t where

$P_0 = 42000$
$P_{t+1} = 1.02(P_t - 550)$

Work out the number of people in the town 3 years from now.

6 g is directly proportional to the square root of h

When $g = 4$, $h = 36$

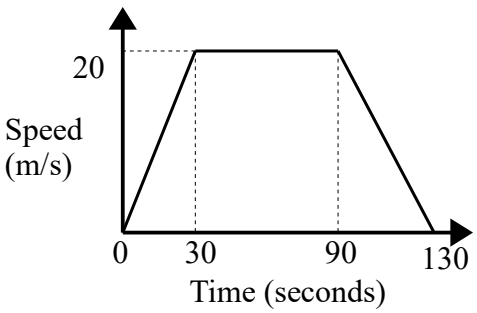
Find the value of h when $g = 2$

7 $$a = \frac{b}{c}$$

b = 9.37 correct to 2 decimal places
c = 5.4 correct to 1 decimal place

Work out the lower bound for a.
Give your answer to 2 decimal places.

8



Calculate the total distance travelled.

9 P is the point (2,1) on the circle $x^2 + y^2 = 5$

Work out the equation of the tangent to the circle at P.

10 The coordinates of the turning point of a curve are (1, 4)

Write down the coordinates of the turning point of the curve with equation $y = f(x + 3)$

11 Prove that the sum of the squares of any two consecutive integers is always an odd number.

12 There are 10 counters in a bag.

6 of the counters are red.
4 of the counters are blue.

Two counters are taken at random from the bag.

Work out the probability that one counter of each colour are taken.

13 Solve $x^2 + 10x + 21 \geq 0$

14 Solve the simultaneous equations:

$$y = x^2 + 3x - 18$$
$$x + 2y + 14 = 0$$

15 Write $x^2 + 10x + 5$ in the form $(x + a)^2 + b$ where a and b are integers.

16 Prove algebraically that the recurring decimal $0.4\dot{0}\dot{9}$ can be written as $\frac{9}{22}$

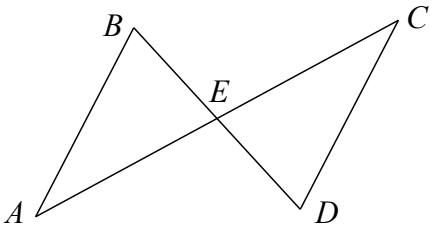
17 Cylinder A and cylinder B are mathematically similar.

The length of cylinder A is 6 cm and the length of cylinder B is 12 cm.

The volume of cylinder A is 80 cm^3.

Calculate the volume of cylinder B.

18 E is the midpoint of AC and BD.



Prove that triangle ABE and triangle CDE are congruent.

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

5 3 -1 -7 -15

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

20

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