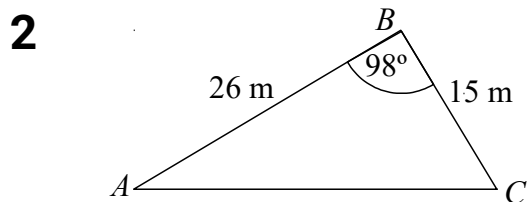


Higher (Grade 7-9) GCSE Mini Test 3

1 Simplify fully $\frac{3x+6}{x} \div \frac{3x^2+2x-8}{x^2-2x}$

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



Work out the length of AC .
Give your answer to 3 significant figures.

$$31.8 \text{ m}$$

3 Given that $f(x) = 3x + 1$ and $g(x) = x^2 - 5$
Find $fg(3)$

$$13$$

4 Simplify fully $\frac{(5+2\sqrt{3})(5-2\sqrt{3})}{\sqrt{3}}$

You must show all your working.

$$\frac{13\sqrt{3}}{3}$$

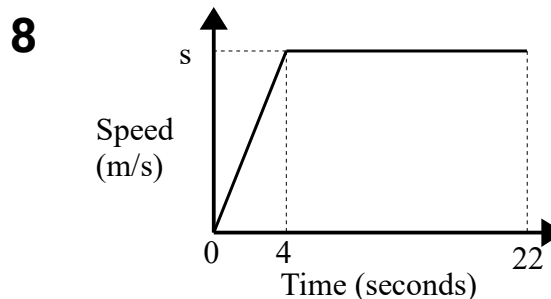
5 Using $x_{n+1} = 3 + \frac{8}{x_n^2}$
With $x_0 = 3$
Find the values of x_1 , x_2 and x_3 .
 $x_1 = 3.8$
 $x_2 = 3.528979592$
 $x_3 = 3.64237953$

6 a is directly proportional to b
When $a = 10$, $b = 8$
Find the value of b when $a = 14$

$$11.2$$

7 $a = \frac{b}{c}$
 $b = 23.65$ correct to 2 decimal places
 $c = 5.7$ correct to 1 decimal place
Work out the upper bound for a .
Give your answer to 2 decimal places.

$$4.19$$



The total distance travelled is 200m.
Find the value of s .

$$s = 10$$

9 A straight line, L , passes through the point with coordinates $(6,5)$ and is perpendicular to the line with equation $y = 3x + 1$

Find an equation of the straight line L .

$$y = -\frac{1}{3}x + 7$$

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

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

$$(4, 2)$$

11 n is an integer.

Prove algebraically that the sum of $(n + 2)(n + 1)$ and $n + 2$ is always a square number.

$$n^2 + 3n + 2 + n + 2$$

$$n^2 + 4n + 4$$

$$(n + 2)(n + 2) = (n + 2)^2$$

12 There are 9 counters in a bag.

5 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 two red counters are taken.

$$\frac{20}{72}$$

13 Solve $3x^2 - 20x + 12 < 0$

$$\frac{2}{3} < x < 6$$

14 Solve the simultaneous equations:

$$x^2 + y^2 = 73$$

$$y = 3x - 1$$

$$x = 3 \quad x = -\frac{12}{5}$$

$$y = 8 \quad y = -\frac{41}{5}$$

15 By completing the square, find the turning point of the graph with equation $y = x^2 + 6x - 1$

$$(-3, -10)$$

16 Prove algebraically that the recurring decimal $0.\dot{7}\dot{8}$ can be written as $\frac{26}{33}$

$$x = 0.78 \quad x = \frac{78}{99}$$

$$100x = 78.78$$

$$99x = 78 \quad x = \frac{26}{33}$$

17 Cone A and Cone B are mathematically similar.

The volume of Cone A is 250 cm^3 and the volume of Cone B is 16 cm^3 .

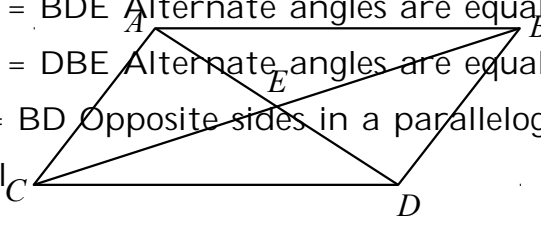
The total surface area of Cone B is 12 cm^2 .

Calculate the total surface area of Cone A.

$$75 \text{ cm}^2$$

18 $ABCD$ is a parallelogram

$CAE = BDE$ Alternate angles are equal
 $ACE = DBE$ Alternate angles are equal
 $AC = BD$ Opposite sides in a parallelogram are equal



ASA Prove that triangle ACE is congruent to triangle BDE .

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

1 6 17 34 57

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

$$3n^2 - 4n + 2$$

20

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

