

A-level Maths Bridging Unit Part 1

Q1.

Expand and simplify $(3x^2 + 2)(2x + 5) - 6x(x^2 - 3)$

Answer _____

Q2.

Expand and simplify $(2x + 5)(2x - 5)(3x + 7)$

Answer _____

A-level Maths Bridging Unit Part 1

Q3.

$$(ax + b)(bx + a) \equiv 10x^2 + cx + 10 \quad \text{where } a \text{ and } b \text{ are positive integers.}$$

Find the **two** possible values of c .

Answer _____ or _____

Q4. (a) Simplify fully $\frac{\sqrt{8}}{\sqrt{2}}$

Answer _____

(b) $\sqrt{6} \times \sqrt{5} \times \sqrt{4} \times \sqrt{3} \times \sqrt{2} \times \sqrt{1} = k \sqrt{5}$

Work out the value of k .

Answer _____

A-level Maths Bridging Unit Part 1

Q5.

Write $\frac{26}{\sqrt{2}} - \frac{12}{\sqrt{18}} + 2\sqrt{50}$ in the form $a\sqrt{2}$ where a is an integer.

Answer _____

A-level Maths Bridging Unit Part 1

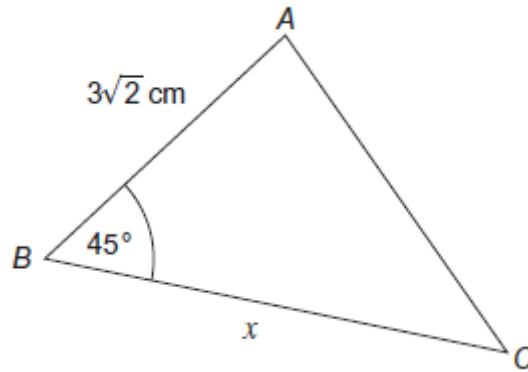
Q6.

ABC is a triangle.

$$AB = 3\sqrt{2} \text{ cm}$$

$$\text{Angle } ABC = 45^\circ$$

Not drawn accurately



The area of ABC is 12 cm^2

$$\text{You are given that } \sin 45^\circ = \frac{1}{\sqrt{2}}$$

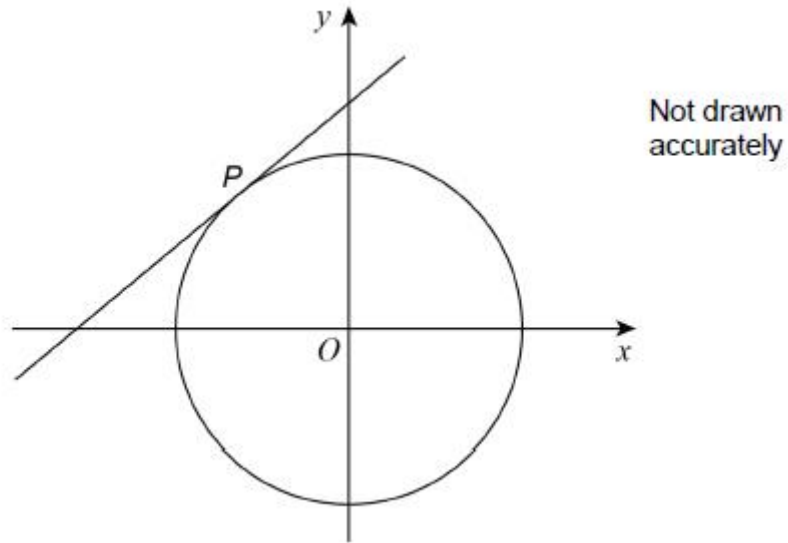
Work out the length x .

Answer _____ cm

A-level Maths Bridging Unit Part 1

Q7.

$P(-1, 4)$ is a point on a circle, centre O



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

Give your answer in the form $y = mx + c$

Answer _____

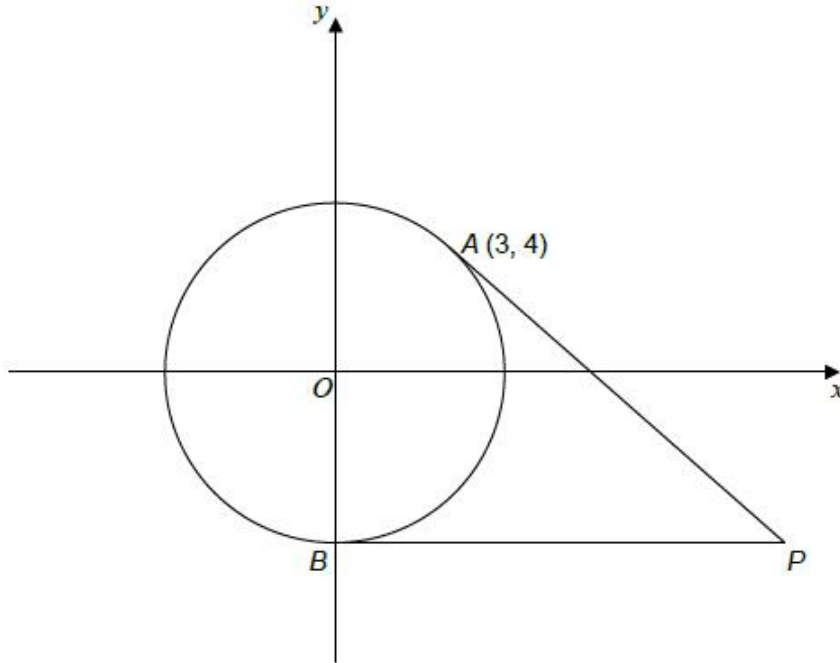
A-level Maths Bridging Unit Part 1

Q8. A and B are points on the circle with equation $x^2 + y^2 = 25$

A is $(3, 4)$

B is a point on the y -axis.

PA and PB are tangents.



(a) Show that the coordinates of B are $(0, -5)$

(b) Give a reason why $PA = PB$

(c) P is the point (a, b)
Work out the values of a and b .

$a =$ _____

$b =$ _____

A-level Maths Bridging Unit Part 1

Q9.

Prove that $5x(x + 6) - (3x + 5)^2$ is negative for all values of x .

Q10.

Prove that $5n - (2n + 3)(n + 1)$ is always negative.

A-level Maths Bridging Unit Part 1

Q11.

Prove that $x^2 + x + 1$ is always positive.

Q12.

Solve $5x - y = 5$
 $2y - x^2 = 11$

You **must** show your working.
Do **not** use trial and improvement.

Answer _____

A-level Maths Bridging Unit Part 1

Q13.

Solve the simultaneous equations

$$y = x^2 - 6x - 20$$

$$y = 4 - x$$

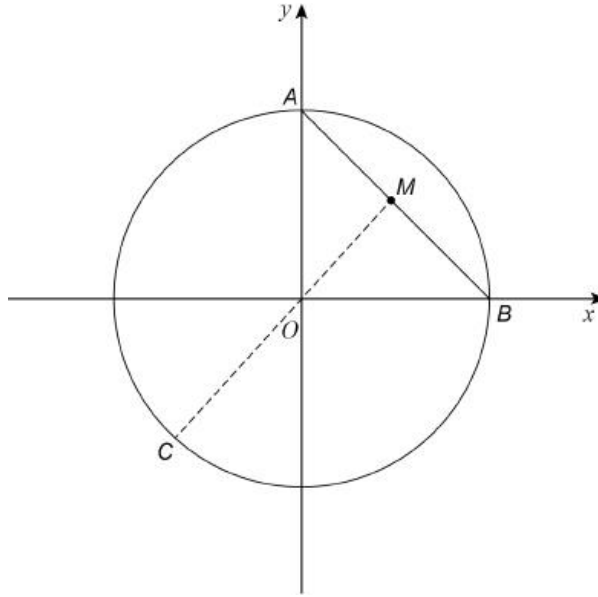
You **must** show your working.

Answer _____

A-level Maths Bridging Unit Part 1

Q14. A , B and C are points on the circle $x^2 + y^2 = 36$ as shown.

A is on the y -axis. B is on the x -axis. M is the midpoint of AB . COM is a straight line.



(a) Show that the coordinates of A are $(0, 6)$

(b) Work out the coordinates of B .

Answer (_____ , _____)

(c) Show that the equation of the straight line passing through C , O and M is $y = x$

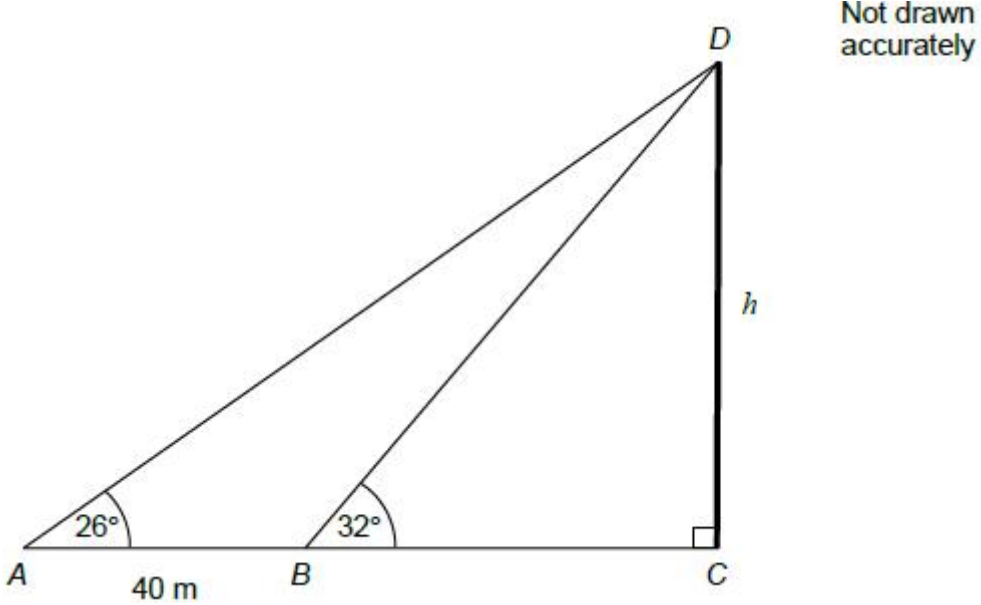
(d) Work out the coordinates of C . Give your answers in surd form.

Answer (_____ , _____)

A-level Maths Bridging Unit Part 1

Q15.

The diagram shows a vertical tower CD of height, h , metres.
 ABC is horizontal.
 $AB = 40$ metres.



Work out the height, h , of the tower.

Answer metres

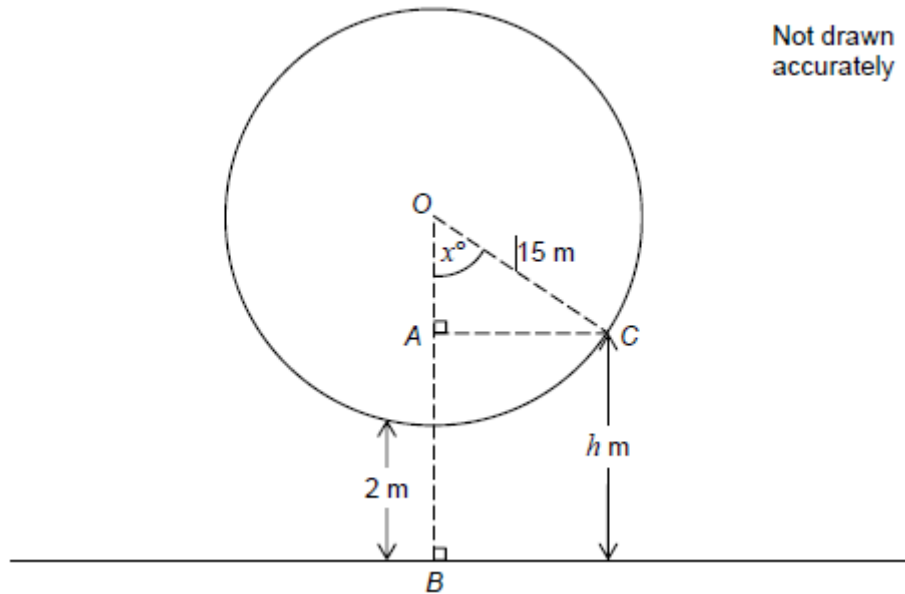
A-level Maths Bridging Unit Part 1

Q16.

A Big Wheel is modelled as a circle with centre O and radius 15 metres.

The wheel turns in an anticlockwise direction.

The lowest point on the wheel is always 2 metres above horizontal ground.



- (a) C is a point on the wheel, h metres above horizontal ground.

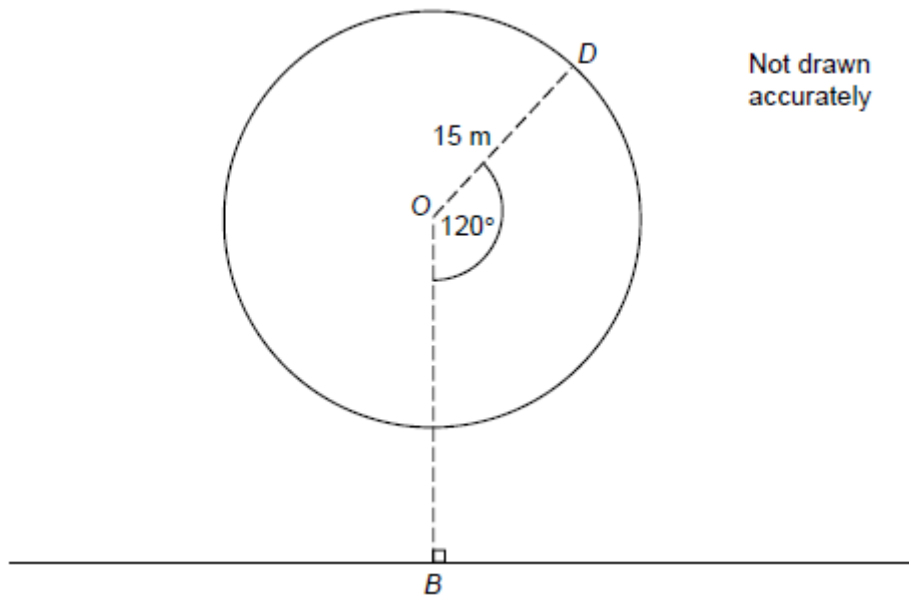
Angle $COB = x^\circ$

Show that $h = 17 - 15 \cos x^\circ$

A-level Maths Bridging Unit Part 1

(b) D is a point on the wheel.

Angle $DOB = 120^\circ$

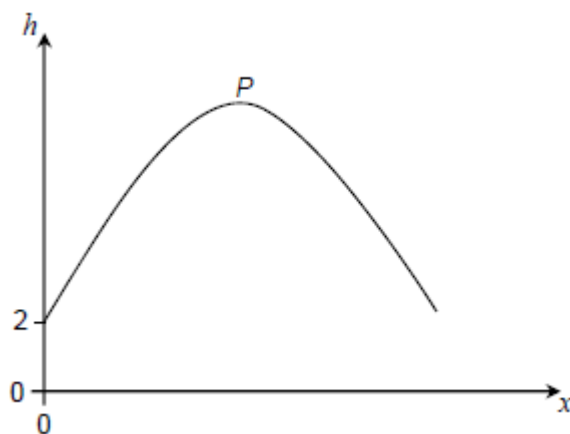


Work out the height of D above horizontal ground.

Answer _____ metres

(c) Here is a sketch of the graph $h = 17 - 15 \cos x^\circ$ for one **complete** turn of the wheel.

P is the highest point on the graph.



Work out the coordinates of P

Answer (_____, _____)

A-level Maths Bridging Unit Part 1

Q17.

Work out the value of $\frac{5}{\sqrt{3}} - \sqrt{6\frac{3}{4}}$

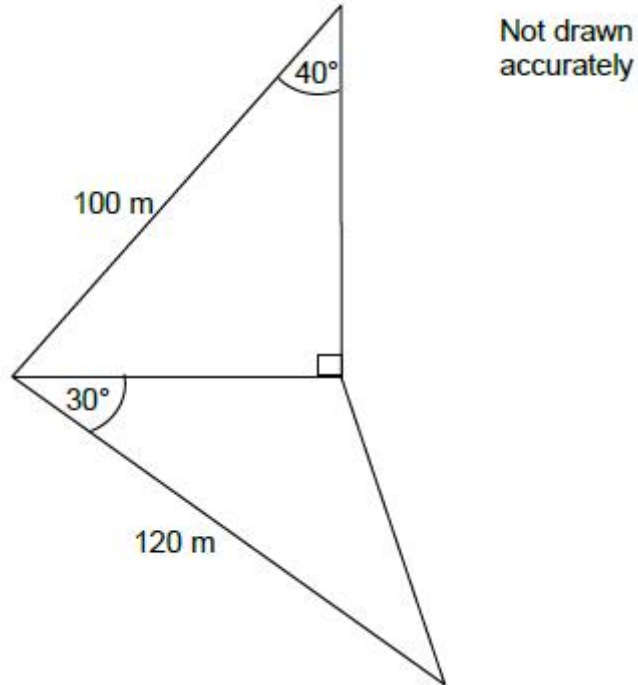
Give your answer in the form $k\sqrt{3}$

Answer _____

A-level Maths Bridging Unit Part 1

Q18.

Two triangular lawns are shown.
Wire fencing is needed for all **five** sides.



Wire fencing is sold in 50-metre rolls.

Work out the number of rolls needed.

Answer _____

A-level Maths Bridging Unit Part 1