

Pre-A-Level Maths Booklet

DUE MONDAY SEPTEMBER 10th

This must be **printed** & completed to a quality standard and submitted by **deadline. No late submissions**

Name: _____

Maths Band: _____

Teachers: _____

Solving either algebraically

1. Solve, algebraically, these simultaneous equations.

$$\begin{aligned}y &= 4 + x - x^2 \\ 3x + y &= 7\end{aligned}$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$x = \dots\dots\dots y = \dots\dots\dots[5]$$

2. Solve.

$$3x^2 - 8x + 2 = 0$$

Give your answers correct to 2 decimal places.

$$\dots\dots\dots[3]$$

3. (a) Expand and simplify.

$$(4x + 7)(x + 5)$$

$$\dots\dots\dots[2]$$

(b) Hence solve this equation.

$$\frac{x-5}{x+5} = 4x + 7$$

.....[4]

4. (a) Factorise and solve.

$$x^2 - x - 30 = 0$$

.....[3]

(b) Solve this equation, leaving your answers in surd form.

$$2x^2 + x - 2 = 0$$

.....[3]

Total for Solving **out of 20**

Simplifying

5. Find as a single fraction.

$$\frac{3}{2x-1} + \frac{1}{x-2}$$

Give your answer as simply as possible.

.....[3]

6. (a) (i) Factorise.

$$x^2 - 25$$

.....[1]

(ii) Hence simplify.

$$\frac{x^2 - 25}{2x^2 + 11x + 5}$$

.....[3]

(b) Rearrange this formula to make r the subject.

$$A = 4\pi r^2$$

.....[2]

7. (a) By completing the square, express $x^2 + 12x - 10$ in the form $(x + a)^2 + b$.

.....[3]

(b) Hence state the minimum value of $x^2 + 12x - 10$.

.....[1]

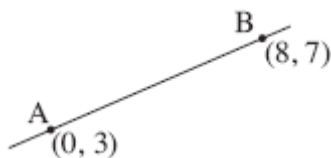
Total for Simplifying _____ **out of 13**

8. The point A has coordinates $(-2, 5)$ and the point B has coordinates $(4, 1)$.

Find the coordinates of the midpoint of the line AB.

(..... ,)[2]

9. A is the point $(0, 3)$ and B is the point $(8, 7)$.



Not to scale

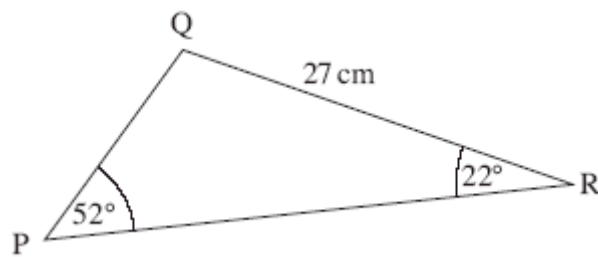
- (a) Calculate the length of AB.

.....[3]

- (b) (i) Find the gradient of the line AB.

.....[1]

10.

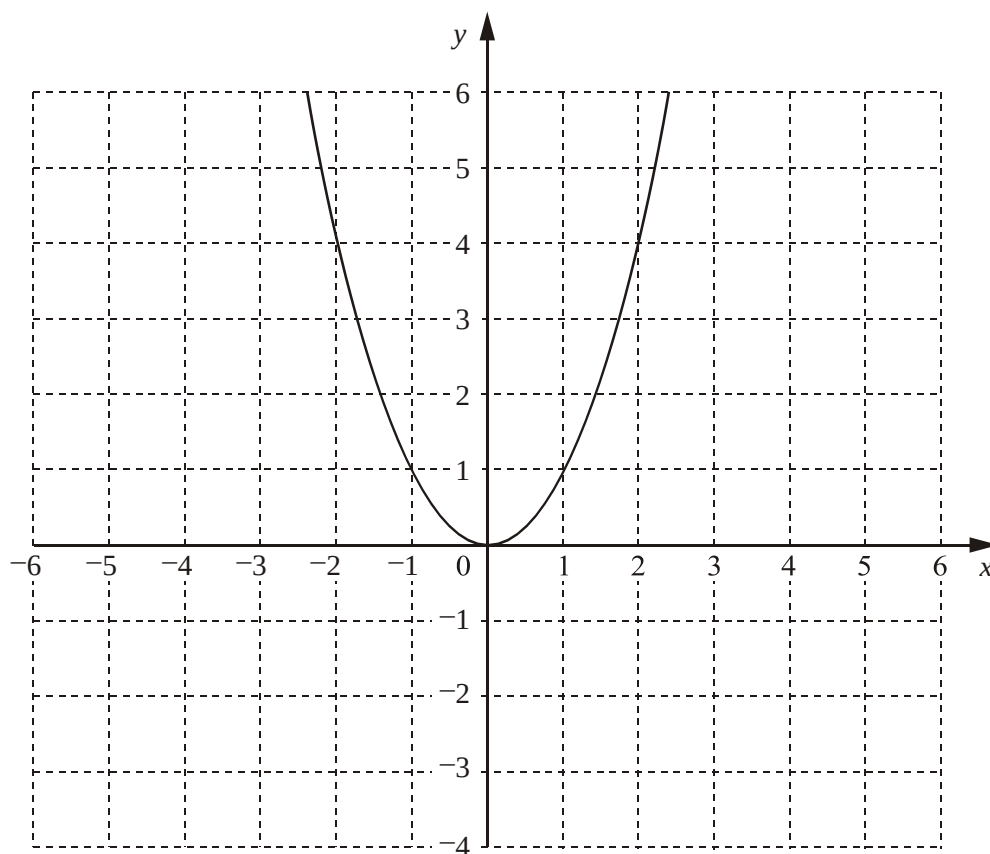


Not to scale

Calculate the length PR.

..... cm [3]

11. This is the graph of $y = x^2$.



(a) On the same grid, **sketch** the graph of

(i) $y = (x + 2)^2$,

[1]

(ii) $y = x^2 - 3$.

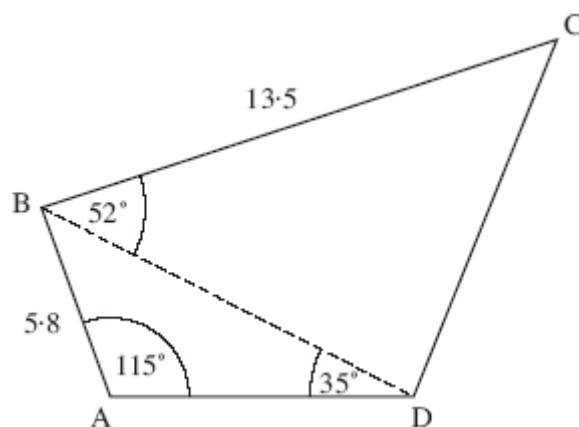
[1]

- (b) Describe the transformation which maps $y = x^2$ onto $y = (x + 2)^2 - 3$.

.....

[2]

12. ABCD is a quadrilateral.
 AB = 5.8 cm and BC = 13.5 cm.
 Angle BAD = 115°, angle DBC = 52° and angle BDA = 35°.



- (a) Calculate the length BD.

..... cm[3]

- (b) Calculate the area of triangle BCD.

..... cm²[2]

Total for Geometric **out of 18**

THAN 1 MARK

13. (a) Simplify $\sqrt{2} + \sqrt{50}$.

Give your answer in the form $a\sqrt{2}$.

.....[2]

- (b) Expand and simplify.

$$(5 + \sqrt{3})^2$$

.....[2]

14. (a) Simplify.

$$\frac{12}{\sqrt{3}}$$

.....[2]

- (b) Expand and simplify.

$$(\sqrt{3} - 5)^2$$

.....[3]

15. Work out.

- (a) (i) 7^0

.....[1]

(ii) $125^{\frac{2}{3}}$

.....[3]

Total for Simplifying Surds and Indices

out of 13