

Year 11 into Year 12 Worksheet: due in the first year 12 Maths lesson: No Calculator.

- 1** Express in the form $(x + a)^2 + b$
- | | | | |
|-------------------------|-------------------------|---------------------------|---------------------------|
| a $x^2 + 2x + 4$ | b $x^2 - 2x + 4$ | c $x^2 - 4x + 1$ | d $x^2 + 6x$ |
| e $x^2 + 4x + 8$ | f $x^2 - 8x - 5$ | g $x^2 + 12x + 30$ | h $x^2 - 10x + 25$ |

2. Factorise $x^2 + 7x + 6$ (Total 2 marks)

3. Simplify $\frac{3(x + 2)^2}{x + 2}$ (Total 1 mark)

4. Simplify fully $\frac{3(2x + 1)}{4x^2 - 1}$ (Total 2 marks)

5. Simplify $\frac{4x^2 - 9}{2x^2 - 5x + 3}$ (Total 3marks)

6. (a) Evaluate

(i) 3^{-2} (ii) $36^{\frac{1}{2}}$

(iii) $27^{\frac{2}{3}}$ (iv) $\left(\frac{16}{81}\right)^{-\frac{3}{4}}$ (5 marks)

7. Work out the value of

(i) $(2^2)^3$ (ii) $(\sqrt{3})^2$

(iii) $\sqrt{2^4 \times 9}$ (Total 4 marks)

8. (a) Work out

(i) 8^0 (ii) 5^{-2}

(iii) $27^{-\frac{1}{3}}$ (iv) $25^{\frac{1}{2}}$ (4 marks)

(b) Given that $x = 2^k$ and $\sqrt{\frac{4}{x}} = 2^c$, find c in terms of k (3 marks)

9. (a) Write down the value of $8^{\frac{1}{3}}$ (1)

$8\sqrt{8}$ be written in the form 8^k

(b) Find the value of k(1)

$8\sqrt{8}$ can also be expressed in the form $m\sqrt{2}$ where m is a positive integer.

(c) Express $8\sqrt{8}$ in the form $m\sqrt{2}$ (2)

(d) Rationalise the denominator of $\frac{1}{8\sqrt{8}}$

Give your answer in the form $\frac{\sqrt{2}}{p}$ where p is a positive integer.....(2)(Total 6 marks)

10. Work out $\frac{(5 + \sqrt{3})(5 - \sqrt{3})}{\sqrt{22}}$ Give your answer in its simplest form.(Total 3 marks)

11. A straight line, L, has equation $3y = 7x - 12$

Find

(i) the gradient of L.....

(ii) the y-co-ordinate of the point where L cuts the y-axis.....(Total 2 marks)

12. A straight line, L, passes through the point with coordinates (0,6) and is perpendicular to the line with equation $y = 3x + 2$.

Find an equation of the straight line L.....(Total 3 marks)

13. The straight line L₁ has equation $y = -x + 2$

The straight line L₂ is parallel to the straight line L₁. The straight line L₂ passes through the point (3, 2).

Find an equation of the straight line L₂.....(Total 3 marks)

14.

Figure 1

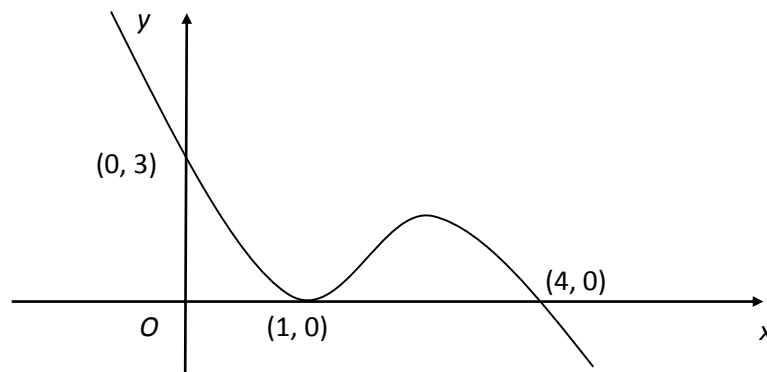


Figure 1 shows a sketch of the curve with equation $y = f(x)$. The curve passes through the points (0, 3) and (4, 0) and touches the x-axis at the point (1, 0).

On separate diagrams, sketch the curve with equation

(a) $y = f(x + 2)$, (3)

(b) $y = f(x) + 1$, (3)

(c) $y = f(x - 3)$, (3)

Q15.

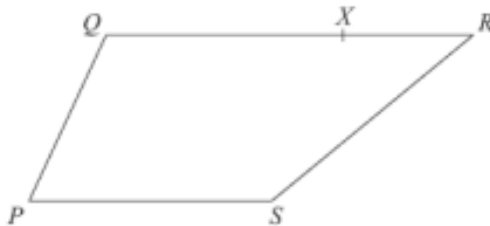


Diagram **NOT**
accurately drawn

$PQRS$ is a trapezium.
 PS is parallel to QR .
 $QR = 2PS$

$\overrightarrow{PQ} = \mathbf{a}$ $\overrightarrow{PS} = \mathbf{b}$

X is the point on QR such that $QX : XR = 3 : 1$

Express in terms of \mathbf{a} and \mathbf{b} .

(i) \overrightarrow{PR} (2)

(ii) \overrightarrow{SX} (3)

.....
(5 marks)

