

1. Express

$$\frac{2\sqrt{2}}{\sqrt{3}-1} - \frac{2\sqrt{3}}{\sqrt{2}+1},$$

in the form $p\sqrt{6} + q\sqrt{3} + r\sqrt{2}$, where the integers p , q and r are to be found.

(Total 4 marks)

2. Find the value of

(a) $81^{\frac{1}{2}}$, (1)

(b) $81^{\frac{3}{4}}$, (2)

(c) $81^{-\frac{3}{4}}$. (1)

(Total 4 marks)

3. $f(x) = x^2 - 8x - 29 \equiv (x + a)^2 + b,$

where a and b are constants.

(a) Find the value of a and the value of b . (2)

(b) Solve $x^2 - 8x - 29 = 0$ and express the roots $c \pm d\sqrt{5}$, where c and d are integers to be found

Finally sketch $f(x)$ showing the axis of symmetry and the vertex

(4)
(Total 6 marks)

4. Find the set of values of x for which

$$x^2 - 7x - 18 > 0.$$

(Total 4 marks)

5. The width of a rectangular sports pitch is x metres, $x > 0$. The length of the pitch is 20 m more than its width. Given that the perimeter of the pitch must be less than 300 m,

- (a) form a linear inequality in x .

(2)

Given that the area of the pitch must be greater than 4800 m^2 ,

- (b) form a quadratic inequality in x .

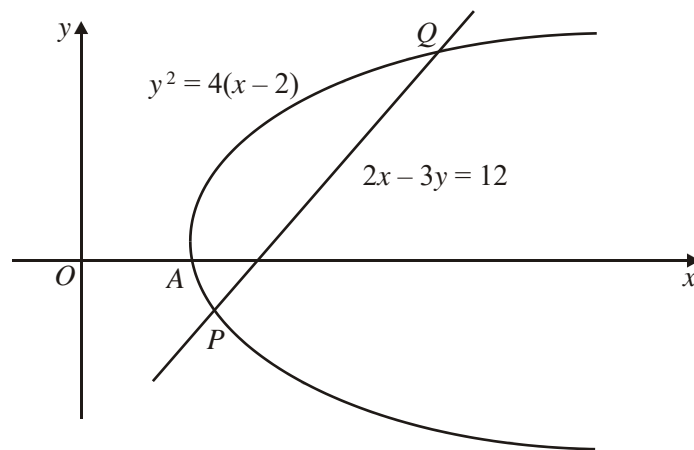
(2)

- (c) by solving your inequalities, find the set of possible values of x .

(4)

(Total 8 marks)

6.



The diagram above shows the curve with equation $y^2 = 4(x - 2)$ and the line with equation $2x - 3y = 12$.

The curve crosses the x -axis at the point A , and the line intersects the curve at the points P and Q .

- (a) Write down the coordinates of A .

(1)

- (b) Find, using algebra, the coordinates of P and Q .

(6)

(Total 7 marks)

7. Find the set of values of x for which

$$(2x + 1)(x - 2) > 2(x + 5).$$

(Total 7 marks)