GCSE HIGHER · REVISION MAT 1

Completing the square and turning points

1 Write down the roots of

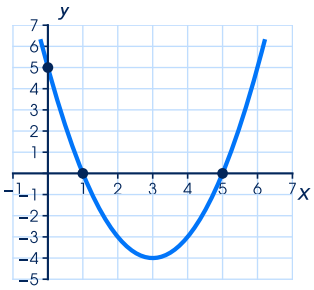
$$y = (x - 2)(x + 5)$$

2 Write $x^2 + 8x + 5$ in the form $(x + a)^2 + b$.

3 Show that the turning point of $y = (x - 3)^2 + 2$ is $(3, 2)$.

Is it a maximum or a minimum?

4 Find the equation of this curve in the form $y = x^2 + bx + c$.



5 Show that $x^2 - 6x + 11$ is positive for all values of x.

6 Find the turning point and the roots of

$$y = x^2 - 10x + 21$$

7 Write $2x^2 + 12x + 7$ in the form $a(x + b)^2 + c$.

8 $y = x^2 + px + q$ has a turning point at $(4, -9)$.

Find p, q and the roots.

Mr&Mrs MATHS

ANSWERS · REVISION MAT 1

Completing the square and turning points

1 **$x = 2$ and $x = -5$**

2 $(x + 4)^2 - 16 + 5$

$(x + 4)^2 - 11$

3 $(x - 3)^2 \geq 0$, smallest when $x = 3$

$y = 2$ there.

(3, 2) is a minimum.

4 Roots 1 and 5

$y = (x - 1)(x - 5)$

$y = x^2 - 6x + 5$

5 $(x - 3)^2 + 2$

$(x - 3)^2 \geq 0$

So the expression is always at least 2.

6 $(x - 5)^2 - 4$

Turning point (5, –4)

Roots $x = 3$ and $x = 7$

7 $2(x^2 + 6x) + 7$

$2[(x + 3)^2 - 9] + 7$

$2(x + 3)^2 - 11$

8 $y = (x - 4)^2 - 9 = x^2 - 8x + 7$

$p = -8$, $q = 7$

Roots $x = 1$ and $x = 7$

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