GCSE HIGHER · REVISION MAT 3

Completing the square and turning points

1 Write down the turning point of

$y = (x + 2)^2 - 7$

2 Complete the square for

$x^2 + 10x$

3 Kai says the turning point of $y = (x - 4)^2 + 1$ is $(-4, 1)$.

Is Kai correct?

4 For $y = x^2 - 4x - 12$, find

(a) the roots

(b) the y-intercept

(c) the turning point

5 Complete the square to show that

$x^2 + 2x + 5 = 0$

has no real solutions.

6 Solve by completing the square

$x^2 + 6x - 3 = 0$

Give your answers to 2 d.p.

7 Write $5 + 4x - x^2$ in the form $a - (x - b)^2$.

8 Find the values of k for which

$x^2 + 6x + k = 0$

has no real roots.

Mr&Mrs MATHS

ANSWERS · REVISION MAT 3

Completing the square and turning points

1 **(–2, –7)**

2 **$(x + 5)^2 - 25$**

3 $(x - 4)^2 = 0$ when $x = 4$

No, it is (4, 1).

4 (a) $(x - 6)(x + 2)$: !6 and –2

(b) !(0, –12)

(c) $(x - 2)^2 - 16$: !(2, –16)

5 $(x + 1)^2 + 4 = 0$

$(x + 1)^2 = -4$

A square cannot be negative.

6 $(x + 3)^2 = 12$

$x = -3 \pm \sqrt{12}$

$x = 0.46$ or $x = -6.46$

7 $-(x^2 - 4x) + 5$

$= -[(x - 2)^2 - 4] + 5$

$9 - (x - 2)^2$

8 $(x + 3)^2 + k - 9 = 0$

No roots if $k - 9 > 0$

$k > 9$