Name:

Exam Style Questions

Turning Points using Completing the Square

Corbettmaths

Equipment needed: Pen, Pencil

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 265a

Answers and Video Solutions

1. (a) Write $x^2 + 4x - 6$ in the form $(x + a)^2 - b$

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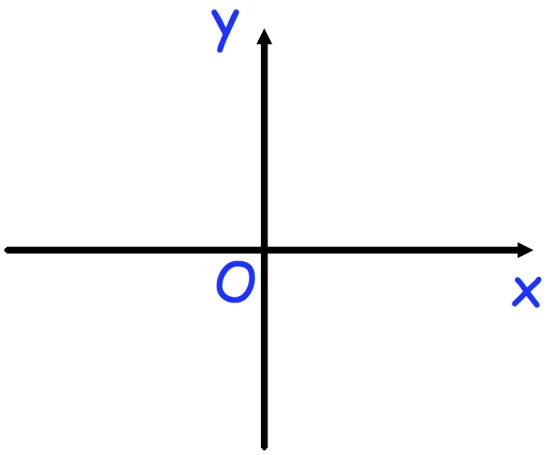
(2)

(b) Sketch the graph of $y = x^2 + 4x - 6$

Show the coordinates of the turning point and the y-intercept.



(3)

2. (a) Write $x^2 - 2x + 10$ in the form $(x - a)^2 + b$

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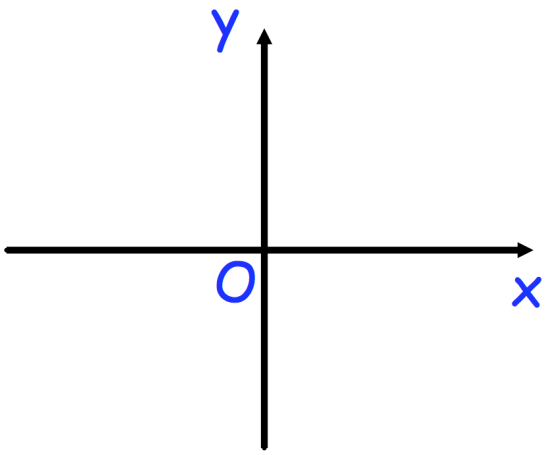
(2)

(b) Sketch the graph of $y = x^2 - 2x + 10$

Show the coordinates of the turning point and the y-intercept.



(3)

3. The equation of a curve is $y = (x - 3)^2 + 4$

Write down the coordinates of the turning point

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(1)

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4. The equation of a curve is $y = (x + 6)^2 - 8$

Write down the coordinates of the turning point

.....

(1)

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5. The equation of a curve is $y = (x - 1)^2 + 13$

Write down the coordinates of the turning point

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(1)

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6. The equation of a curve is $y = (x + 7)^2$

Write down the coordinates of the turning point

.....

(1)

7. (a) Write $x^2 + 8x + 18$ in the form $(x + a)^2 + b$

.....

(2)

(b) Hence, write down the coordinates of the turning point of $y = x^2 + 8x + 18$

.....

(1)

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8. Given that $x^2 - 10x + 3 \equiv (x - a)^2 - b$

(a) Find the values of a and b

a = ... b = ...

(2)

(b) Hence, write down the coordinates of the turning point of $y = x^2 - 10x + 3$

.....

(1)

9. A curve has equation $y = x^2 - 16x + 45$

Use completing the square to work out the coordinates of the turning point.

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(3)

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10. A curve has equation $y = x^2 + 12x + 80$

Use completing the square to work out the coordinates of the turning point.

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(3)

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11. A curve has equation $y = x^2 - 6x - 17$

Work out the coordinates of the turning point.

.....

(3)

12. A curve has equation $y = x^2 + 4x + 1$

(a) Work out the coordinates of the turning point.

.....

(3)

(b) Write down the equation of the line of symmetry of $y = x^2 + 4x + 1$

.....

(1)

The straight line $y = 3x + 1$ intersects the curve $y = x^2 + 4x + 1$ at the points A and B.

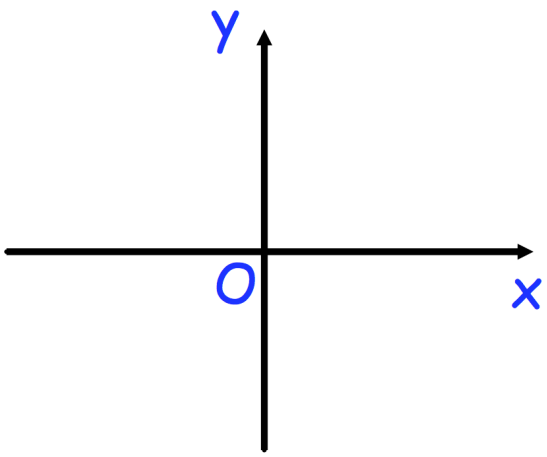
(c) Find the coordinates of the points A and B.

.....

(3)

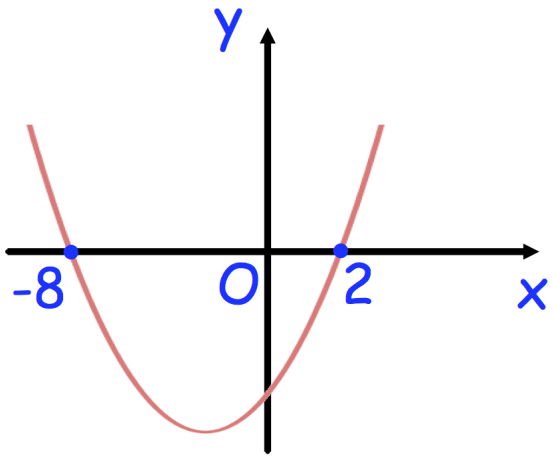
13. (a) Sketch the graph of $y = x^2 - 14x + 52$

Show the coordinates of any turning points.



(3)

Here is a sketch of the curve with equation $y = x^2 + ax + b$



(b) Find the coordinates of the turning point of the curve.

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(3)

14. The point (–3, 8) is the turning point of the graph of $y = x^2 + ax + b$ where a and b are integers.

Find the values of a and b.

a = ... b = ...

(3)

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15. The point (5, –1) is the turning point of the graph of $y = x^2 + ax + b$ where a and b are integers.

Find the values of a and b.

a = ... b = ...

(3)

16. A curve has equation $y = x^2 + 5x + 7$

Use completing the square to work out the coordinates of the turning point.

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(3)

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17. A curve has equation $y = -x^2 - 4x + 22$

Work out the coordinates of the turning point.

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(3)

18. The turning point of the curve with equation $y = x^2 - 8x + b$ has a y-coordinate of 14.

Work out the value of b.

.....

(3)

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19. The curve with equation $y = (x + a)^2 + b$ passes through the point (2, 4)

The turning of the curve has an x-coordinate of –1

Find the y-coordinate of the turning point.

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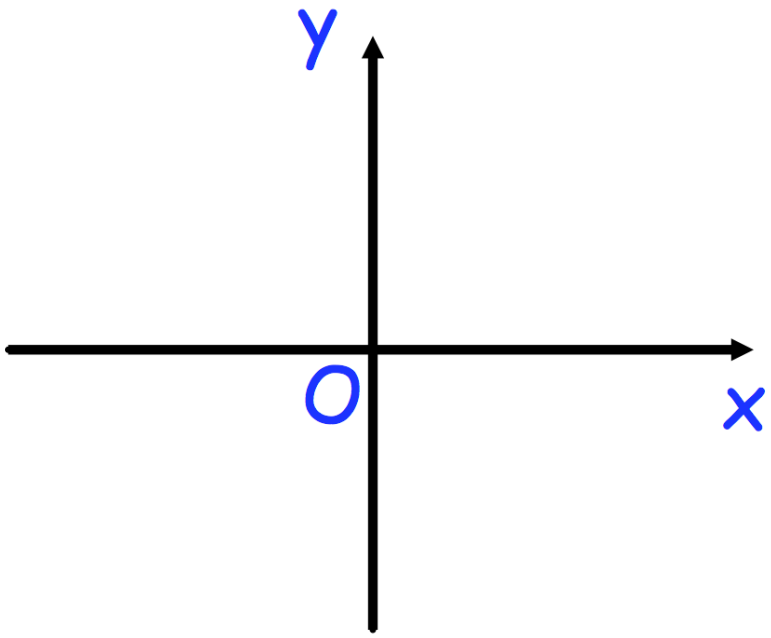
(3)

20. Sketch the graph of $y = 2x^2 - 12x + 1$

Show the coordinates of the turning point and the coordinates of any intercepts with the coordinate axes.



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