

Practice Worksheet (Compact Layout)

$$y = 2x^2 - 12x + 11$$
$$y = 4x^2 + 16x + 9$$
$$y = 3x^2 + 18x + 20$$

You must show all your working.

YOU DO 2

By completing the square, find the coordinates of the turning point of the curve with equation

$$y = 5x^2 - 20x + 27$$

You must show all your working.

CHALLENGE

By completing the square, find the coordinates of the turning point of the curve with equation

$$y = -2x^2 + 8x - 3$$

You must show all your working.

ANSWERS & WORKED SOLUTIONS**I Do**

Step 1: Factor out the 2 from the x terms: $y = 2(x^2 - 6x) + 11$

Step 2: Complete the square inside the bracket: $2[(x - 3)^2 - 9] + 11$

Step 3: Multiply out the square bracket: $2(x - 3)^2 - 18 + 11$

Step 4: Simplify: $y = 2(x - 3)^2 - 7$

Step 5: Identify the turning point (flip sign in bracket, keep outside sign). **Answer: (3, -7)**

We Do

Step 1: Factor out 4: $y = 4(x^2 + 4x) + 9$

Step 2: Complete the square: $4[(x + 2)^2 - 4] + 9$

Step 3: Multiply out: $4(x + 2)^2 - 16 + 9$

Step 4: Simplify: $y = 4(x + 2)^2 - 7$. **Answer: (-2, -7)**

You Do 1

Step 1: Factor out 3: $y = 3(x^2 + 6x) + 20$

Step 2: Complete the square: $3[(x + 3)^2 - 9] + 20$

Step 3: Multiply out: $3(x + 3)^2 - 27 + 20$

Step 4: Simplify: $y = 3(x + 3)^2 - 7$. **Answer: (-3, -7)**

ANSWERS & WORKED SOLUTIONS (CONTINUED)

You Do 2

Step 1: Factor out 5: $y = 5(x^2 - 4x) + 27$

Step 2: Complete the square: $5[(x - 2)^2 - 4] + 27$

Step 3: Multiply out: $5(x - 2)^2 - 20 + 27$

Step 4: Simplify: $y = 5(x - 2)^2 + 7$. **Answer: (2, 7)**

Challenge

Step 1: Factor out -2 from the x terms: $y = -2(x^2 - 4x) - 3$

Step 2: Complete the square: $-2[(x - 2)^2 - 4] - 3$

Step 3: Multiply out carefully: $-2(x - 2)^2 + 8 - 3$

Step 4: Simplify: $y = -2(x - 2)^2 + 5$. **Answer: (2, 5)**