Outcome 3 – Identifying features of a Quadratic Function

Bronze example

Examples…

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

For the above quadratic function identify…

1. The coordinates of the turning point. (3, 5)
2. The nature of the turning point. Minimum
3. The equation of the axis of symmetry. x = 3

Silver example

Examples…

$y = 4 - (x-3)^2$

For the above quadratic function identify…

1. The coordinates of the turning point. (3, 4)
2. The nature of the turning point. Maximum
3. The equation of the axis of symmetry. x = 3

Gold example

Examples…

Find the coordinates of the turning point of the parabola with equation…

$y = x^2 + 4x - 12$

$x^2 + 4x - 12 = 0$ 1. Find the roots (set = 0 and factorise)

$(x+6)(x-2) = 0$

$x = -6 \quad x = 2$ 2. Find x coordinate

x = (-6 + 2) ÷ 2 = -2 **x is halfway between the roots!**

y = $(-2)^2$ + 4 × (-2) - 12 = -16 3. Find y coordinate

(-2, -16) **Sub in to get y!**

4. Write coord

Bronze Questions

For the following quadratic functions identify…

a) The coordinates of the turning point.

b) The nature of the turning point.

c) The equation of the axis of symmetry.

1. $y = (x-9)^2 + 7$
2. $y = (x-11)^2 - 1$
3. $y = (x-15)^2 - 17$
4. $y = (x+8)^2 + 5$
5. $y = (x-9)^2 - 6$
6. $y = (x+10)^2 + 19$
7. $y = (x-\frac{1}{2})^2 - 8$
8. $y = (x+\frac{1}{4})^2 + \frac{3}{2}$

Gold Questions

Calculate the coordinates of the turning points of the following parabolas…

1. $y = x^2 - 6x + 7$
2. $y = x^2 + 10x + 21$
3. $y = x^2 - 10x$
4. $y = x^2 - 2x - 8$
5. $y = x^2 - 12x + 20$
6. $y = x^2 - 16x + 15$
7. $y = x^2 - 25$
8. $y = x^2 + 10x + 30$

Silver Questions

For the following quadratic functions identify…

a) The coordinates of the turning point.

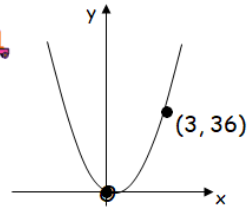
b) The nature of the turning point.

c) The equation of the axis of symmetry.

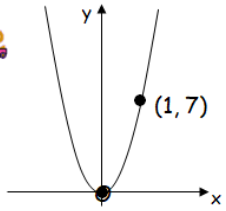
1. $y = 6 - (x-8)^2$
2. $y = 2 - (x-10)^2$
3. $y = 16 - (x-14)^2$
4. $y = 4 - (x+7)^2$
5. $y = 5 - (x-8)^2$
6. $y = 20 - (x+11)^2$
7. $y = 9 - (x-\frac{1}{3})^2$
8. $y = \frac{5}{2} - (x+\frac{1}{6})^2$

For the parabolas with equations $y = kx^2$ determine the value of k.

1



2



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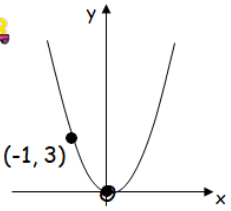

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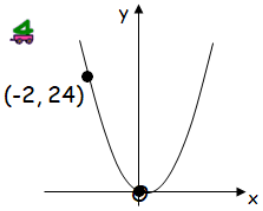

Bronze Answers

1. (9, 7), min, x = 9
2. (11, -1), min, x = 11
3. (15, -17), min, x = 15
4. (-8, 5), min, x = -8
5. (9, -6), min, x = 9
6. (-10, 19), min, x = -10
7. $(\frac{1}{2}, -8)$, min, $x = \frac{1}{2}$
8. $(-\frac{1}{4}, 3/2)$, min, $x = -\frac{1}{4}$

Silver Answers

1. (8, 6), max, x = 8
2. (10, 2), max, x = 10
3. (14, 16), max, x = 14
4. (-4, 7), max, x = -4
5. (8, 5), max, x = 8
6. (-11,20), max, x = -11
7. (1/3, 9), max, x = 1/3
8. (-1/6, 5/2), max, x = -1/6

Gold Answers

(3, -2) (-5, -4)

(5, -25) (1, -9)

(6, -16) (8, -49)

(0, -25) (-5, 5)