AChor/MFM2P **Name: _____**
Date: _____

Worksheet 8-3: Quadratic Representations

Quadratic Relations:

A quadratic relation can be expressed in the form $y = ax^2 + bx + c$, or in the form $y = a(x - r)(x - s)$.

- For a quadratic relation in the **standard form:** $y = ax^2 + bx + c$, the ***y*-intercept is *c***.

Why? When $x = 0$, $y = a(0)^2 + b(0) + c = c \quad \rightarrow \quad y = c$

1. Determine the *y*-intercept of each quadratic relation.

(a) $y = x^2 + 5x + 4$

(b) $y = x^2 - 8x + 15$

(c) $y = x^2 + 6x - 16$

- For a quadratic relation in the **factored form:** $y = a(x - r)(x - s)$, the ***x*-intercepts are *r* and *s***.
- *r* and *s* are also the **zeros** of the quadratic relation.

Why? Zeros refer to the values of *y*, and the *y*-value of the *x*-intercept must be 0.

2. Determine the *x*-intercepts of each quadratic relation. (Hint: What values of *x* make *y* zero?)

(a) $y = (x - 2)(x - 6)$

(b) $y = (x + 3)(x + 7)$

(c) $y = (x - 5)(x + 3)$

3. Given the quadratic relation $y = x^2 + 2x - 15$:

(a) Does the relation have a maximum or minimum value?

(b) What is the *y*-intercept?

(c) What are the zeros for the relation?

4. Given the quadratic relation $y = 2x^2 - 12x + 16$:

(a) Does the relation have a maximum or minimum value?

(b) What is the *y*-intercept?

(c) What are the zeros for the relation?

5. Given the quadratic relation $y = -x^2 - 5x - 6$:

(a) Does the relation have a maximum or minimum value?

(b) What is the *y*-intercept?

(c) What are the zeros for the relation?

6. Given the quadratic relation $y = x^2 + 4x - 12$:

(a) Does the relation have a maximum or minimum value?

(b) What is the *y*-intercept?

(c) What are the zeros for the relation?

7. Given the quadratic relation $y = x^2 - x - 6$:

(a) Does the relation have a maximum or minimum value?

(b) What is the *y*-intercept?

(c) What are the zeros for the relation?

8. Given the quadratic relation $y = x^2 - 9$:

(a) Does the relation have a maximum or minimum value?

(b) What is the *y*-intercept?

(c) What are the zeros for the relation?

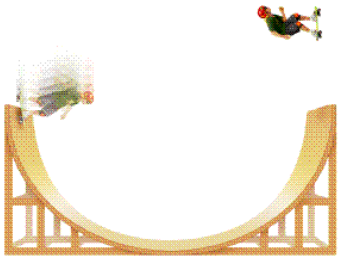
9. The curve formed by a rope bridge can be modelled by the relation $y = x^2 - 11x + 10$, where x is the horizontal distance in metres and y is the height in metres.

(a) Write the relation in factored form: $y = (x - r)(x - s)$.

(b) What are the zeros of the relation?

(c) What is the horizontal distance from one end of the bridge to the other?

10. The shape of one of the skateboard ramps to be built in the park can be modelled by the quadratic relation $d = 0.08l^2 - 0.8l$, where d represents the depth in metres and l represents the horizontal distance in metres. What is the total horizontal distance across the ramp?



Online Graphing for Quadratic Relations: http://www.algebrahelp.com/calculators/function/graphing/

Answers: **1.** (a) 4, (b) 15, (c) −16; **2.** (a) 2 and 6, (b) −3 and −7, (c) −3 and 5; **3.** (a) minimum, (b) −15, (c) −5 and 3; **4.** (a) minimum, (b) 16, (c) 2 and 4; **5.** (a) maximum, (b) −6, (c) −2 and −3; **6.** (a) minimum, (b) –12, (c) –6 and 2; **7.** (a) minimum, (b) –6, (c) –2 and 3; **8.** (a) minimum, (b) –9, (c) –3 and 3; **9.** (a) $y = (x - 1)(x - 10)$, (b) 1 and 10, (c) 9 m; **10.** $y = 0.08l(l - 10)$, zeros are 0 and 10, distance = 10 m