Example 1: Analyze a Quadratic Equation

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

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

(b) What is the y-intercept?

(c) Factor the expression.

(d) Graph the both the standard form and factored form of the equations in Desmos. What do you notice?

(e) From the graph, what are the x-intercepts?

(f) What do you notice about the answers in (d) and (e)?

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

For a quadratic in factored form, $y = a(x - r)(x - s)$, the x-intercepts are _____ and _____.

If a is positive, the parabola opens _____

If a is negative, the parabola opens _____

Example 2: Interpret a Quadratic Equation.

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) What is the relation in factored form?

(b) What are the zeros of the relation?

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

(d) Put the equation in standard form into Desmos to check your answers.

Homework: Section 8.2 Handout

Hints for homework:

4. (a) Rearrange the expression and common factor out a (-x).
   (b) Use x values from 1 to 9 and substitute into the given formula.
   (c) Use the table of values created in (b)
5. (b) Expand your expression for area.
   (c) Graph your expression using Desmos and find the maximum area.
6. Graph the expression in Desmos first and then answer the questions.
7. (a) Graph the expression in Desmos to find the intercepts.
   (b) Use distances 0 to 8 m in the table and calculate the height.
   (c) and (d) Use the graph to answer the questions.