

Quadratics and Former Topics: A Review and Extend Problem Set

Quadratics and Domain and Range

Problem 1

A ball is thrown from a cliff based on the function $f(t) = -2t^2 + 11t + 51$, which represents the height of the ball in feet after t seconds.

- Find the domain of the ball's path, *algebraically*. State what the domain represents in real-world terms.
- Find the range of the ball's path, *algebraically*. State what the range represents in real-world terms.

HINT: It's a *great* idea to sketch the ball's path first to fully understand this problem.

Problem 2

Make your own!

Quadratics and Linear Piecewise Functions

Problem 1

Consider the following functions:

$$f(x) = -\frac{1}{2}x^2 + 3$$

$$g(x) = \begin{cases} \frac{3}{2}x + 1, & x < 0 \\ 2, & x \geq 0 \end{cases}$$

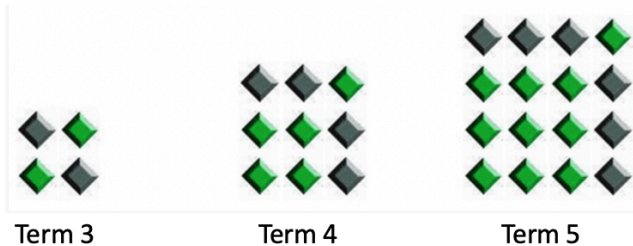
- Graph the piecewise inequality
- Find all values of x that satisfy the equation $f(x) = g(x)$

Problem 2

Make your own!

Quadratics and Visual Patterns

Problem 1



- Create an expression for the number of **light green** diamonds in Term n
- How many **light green** diamonds will there be in Term 28?
- How many **dark green** diamonds will there be in Term 28?

Problem 2

Make your own!

Quadratics and **Absolute Value Functions**

Problem 1

Using any method (except Desmos, for this one), find the solution to the following equation:

$$x^2 - 6x + 9 = -|x - 1| + 2$$

For some nice practice, it is possible to solve this by graphing by hand.

Problem 2

Make your own!

Quadratics and **Exponential Functions**

Problem 1

Mr. Sweeney had \$300 in his checking account in 2019. Every year, his account grows by 15%.

Mr. Peralta's checking account can be modeled by the function $f(x) = -x^2 + 1200$, which represents the amount of money in his checking account x years after 2019.

In what year will Mr. Peralta have *less* money in his checking account compared to Mr. Sweeney?

HINT: It may be a good idea to create a function for Mr. Sweeney's checking account, then use your calculator see when his function is smaller than Mr. Peralta's function.

Problem 2

Make your own!

Quadratics and **Expressions**

Problem 1

Consider the following expressions:

$$A = 5x^2 - 4x + 7$$

$$B = 1 - 2x$$

- Find $A + B$. Then state its degree, leading coefficient, and constant.
- Find AB . Then state its degree, leading coefficient, and constant.

Problem 2

Make your own!

Quadratics and **Average Rate of Change**

Problem 1

Consider the function $f(x) = 2x^2 + 5x - 1$. Find the average rate of change of $f(x)$ from $x = 2$ to $x = 7$

Problem 2

Make your own!

Quadratics and **Literal Equations**

Problem 1

The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. What is r in terms of V and h ?

Problem 2

Make your own! (One suggestion might be to look up the “accelerate due to gravity” formula on Google)

Quadratics and **Systems of Equations**

Problem 1

Solve the following system of equations:

$$\begin{aligned}2x + 2y &= 250 \\ xy &= 600\end{aligned}$$

Problem 2

Make your own!

Quadratics and **Systems of Inequalities**

Problem 1

Graph and solve the following system of inequalities:

$$\begin{aligned}20x + 50y &< 250 \\ y &\leq -0.25x^2 + 2.5x\end{aligned}$$

Problem 2

Make your own!