

Unit 1: Building Functions

1. Using the function below, evaluate:

$$f(x) = \begin{cases} x^2 - 3, & x < 2 \\ 4x - 7, & x \geq 2 \end{cases}$$

a. $f(-1) =$
b. $f(2) =$

2. Evaluate, given that $f(x) = -2x + 4$ and $g(x) = x^2$

a. $(g - f)(2a) =$
b. $(f \circ g)(3) =$

3. $f(x) = \begin{cases} (x + 3) + 1, & x \geq -3 \\ (-x - 3) + 1, & x < -3 \end{cases}$

- a. $f(-4) =$
b. $f(-3) =$
c. If the input is -1, what is the output?

4. $f(x) = \begin{cases} x^2, & x \leq 1 \\ 1/x, & x > 1 \end{cases}$

- a. If $x = 1$, $y = ?$
b. The point $(7, \text{_____})$ is on the function (fill in blank)
c. Is $(0, 0)$ on the function?

5. $f(x) = \begin{cases} x^3, & x \leq 2 \\ -x + k, & x > 2 \end{cases}$

- a. If $f(4) = 2$, what is k ?
b. If the point $(3, 5)$ is on the graph, what is k

6. Name the transformations that are going on:

a. $f(x) = x^2 \rightarrow g(x) = -3((2x - 4)^2)$

b. $f(x) = 2x \rightarrow g(x) = \frac{1}{2}(x-2) + 7$

Unit 2: Polynomials and Rational Functions

Solving Rational Equations: Remember, they need a common denominator!

1. Solve for n :

$$\frac{5}{n^3 + 5n^2} = \frac{4}{n + 5} + \frac{1}{n^2}$$

2. Solve for x :

$$\frac{x-3}{x} - \frac{3}{x+1} + \frac{3}{x^2+x} = 0$$

3. $\frac{x+2}{x} - \frac{4}{x-1} + \frac{2}{x^2-x} = 0$

Solve for x :

Find the following for each function:

1. $f(x) = \frac{(x-3)(x+4)}{(x-5)(x+4)(x-3)}$

Domain:

Vertical asymptote(s):

End behavior asymptote:

x-intercept(s):

y-intercept:



2. $f(x) = \frac{4x^2 - 12x - 40}{x^2 - x - 20}$

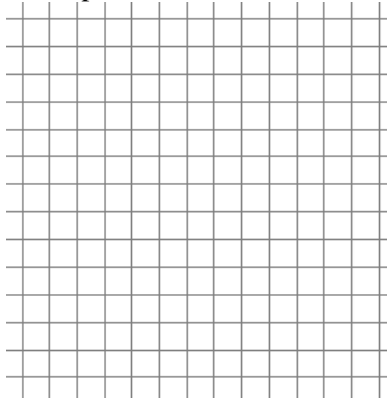
Domain:

Vertical asymptote(s):

End behavior asymptote:

x-intercept(s):

y-intercept:



3. $f(x) = \frac{2x^2 - 7x + 3}{x - 1}$

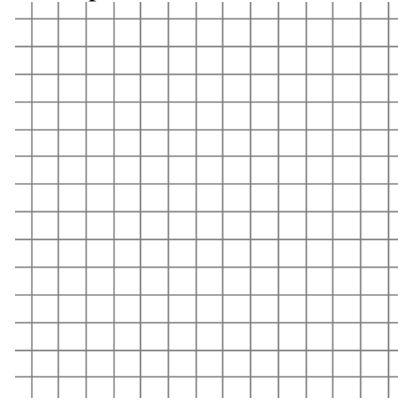
Domain:

Vertical asymptote(s):

End behavior asymptote:

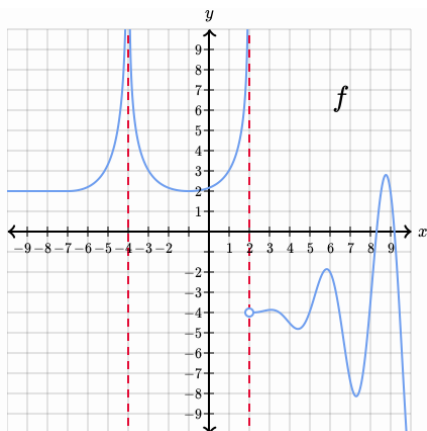
x-intercept(s):

y-intercept:



Analyze the Limits to the following graph:

1.



Unit 3: Conic Sections**Equations Practice**

For each equation, identify if it is a circle, ellipse, hyperbola, or parabola. Then, write the equation in standard form!

1. $-4x^2 + 8x + 6y^2 + 48y + 56 = 0$

3. $3x^2 + 3y^2 - 12x = 0$

2. $-4x^2 - 16x - y^2 - 6y = 9$

4. $y - 2x^2 + 4x - 7 = 0$

Identifying the conic without completing the square:

1. $y^2 + 2y = 3 + 4x^2$

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

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

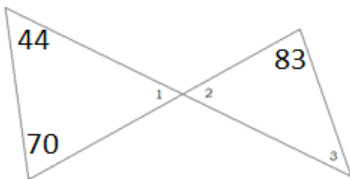
4. $y^2 - 8y = 6x - 16$

Unit 4: Exponential, Logarithmic, and Logistic Functions

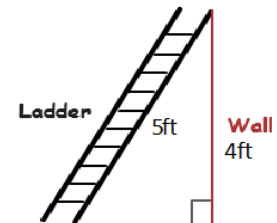
- What value of x satisfies the equation $\log_3(x - 4) = 2$?
- Lucy invested \$6,000 into an account that earns 6% interest compounded continuously. **Approximately** how long will it take for Lucy's investment to be valued at \$25,000?

Unit 5: Introduction to Trigonometry

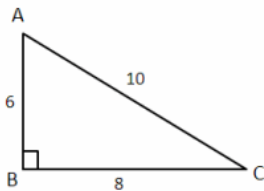
- If angles 1 and 2 are congruent, find the measure of all the numbered angles in the above diagram.



- Approximately how far is the base of the ladder from the building in the diagram?



- Solve for the measure of $\angle C$. Round to the nearest whole number.



- A 5 meter long ramp reaches up to a doorway 4 meters off of the ground. What is the angle of elevation of the ramp?