**Functions** **Date:** _____

**Main Idea:** Investigating the different features of functions.

## Features of Functions – Intercepts with Axes

⚠ Complete the tables for each of the following functions.

$f(x) = 2x - 4$

| $x$ | $-3$ | $-2$ | $-1$ | $0$ | $1$ | $2$ | $3$ |
|---|---|---|---|---|---|---|---|
| $f(x)$ | | | | | | | |

$g(x) = x^2 - x - 6$

| $x$ | $-3$ | $-2$ | $-1$ | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| $g(x)$ | | | | | | | |

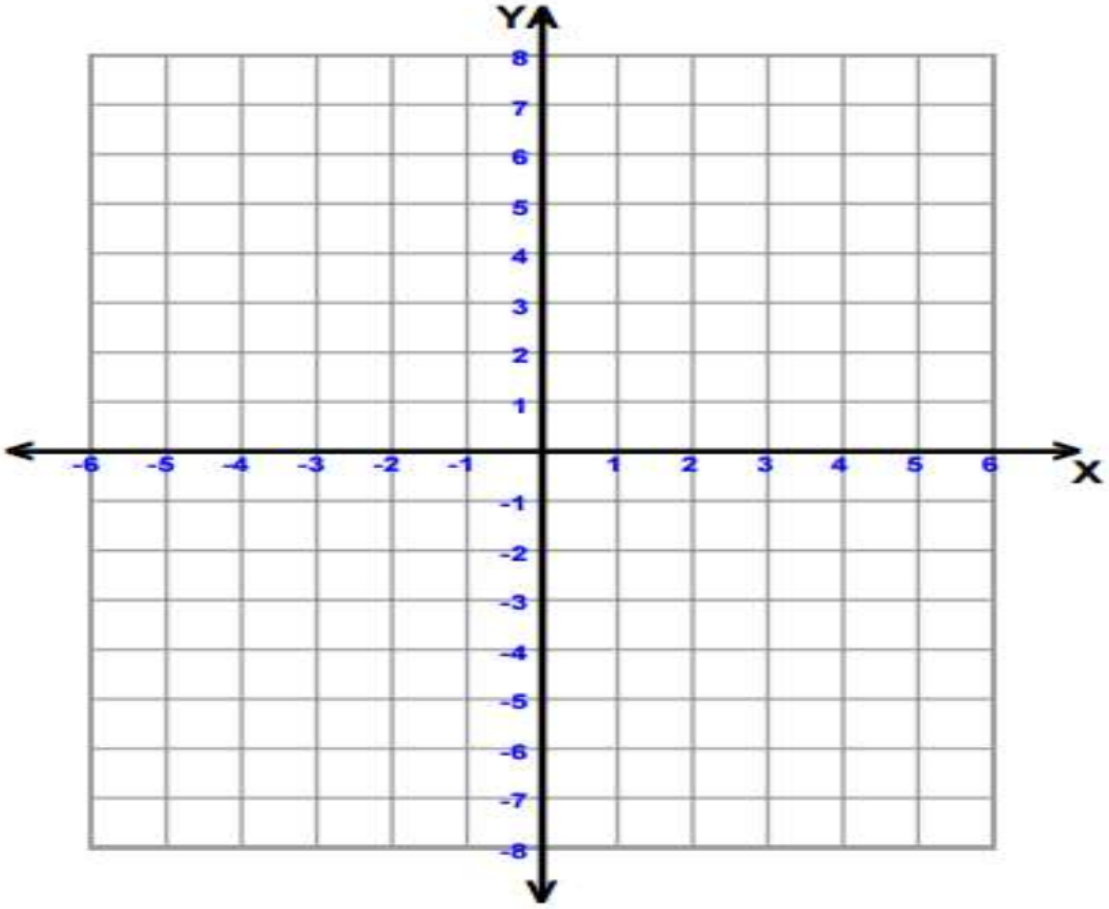
$h(x) = 2^x - 2$

| $x$ | $-3$ | $-2$ | $-1$ | $0$ | $1$ | $2$ | $3$ |
|---|---|---|---|---|---|---|---|
| $h(x)$ | | | | | | | |

$$j(x) = \frac{2}{x+1} + 2$$

| $x$ | $-3$ | $-2$ | $-1$ | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| $j(x)$ | | | | | | | |

⚠ Graph each of the functions below.




⚠ Write down the coordinates of the $y$-intercepts of all four functions. What is significant about them?

⚠ Write down the coordinates of the $x$-intercepts of all four functions. What is significant about them?

⚠ Determine the $y$-intercept for each of the following functions:

a) $y = 2x - 3$ b) $y = x^2 + 3x - 10$ c) $y = 3^x$

d) $y = 2x^2 + 5x - 3$ e) $y = 3 \cdot 2^x - 12$ f) $y = \frac{1}{x-2} + 3$

---

⚠

Determine the $x$-intercept(s) for each of the following functions:

a) $y = 2x - 3$

b) $y = x^2 + 3x - 10$

c) $y = 3^x$

d) $y = 2x^2 + 5x - 3$ e) $y = 3 \cdot 2^x - 12$ f) $y = \frac{1}{x-2} + 3$

## Use Math to Explain the World

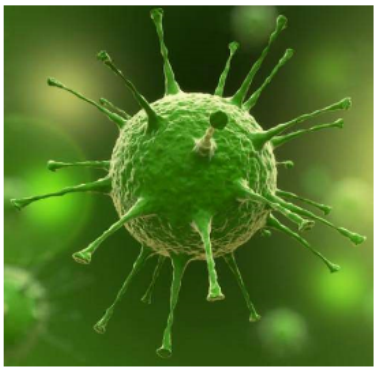
In an entertainment show, a man is shot out of a cannon towards a net on the far side of a field.

The path that the man follows can be described by the formula $h(t) = \frac{1}{4}t^2 - \frac{7}{4}t + 7$, where $h(t)$ is the height (in meters) above the ground and $t$ is the time in seconds after the cannon is fired.

⚠ How high above the ground is the opening of the cannon?

⚠ If the net is 28 meters away from the cannon, would the man land safely on it (assume that the net is at ground level)?

As part of a biology experiment, you monitor the population of a virus after a patient has received the required vaccine. The population $p(t)$, in parts per million, can be found at any time $t$, in hours, from the formula $p(t) = 5\left(\frac{1}{2}\right)^{t-1}$.



⚠ What is the virus population before the vaccine is taken?

⚠ How long will it take for the virus to reach a population of zero?