

Unit 3: Solving Equations and Systems of Equations



Activity 3.1

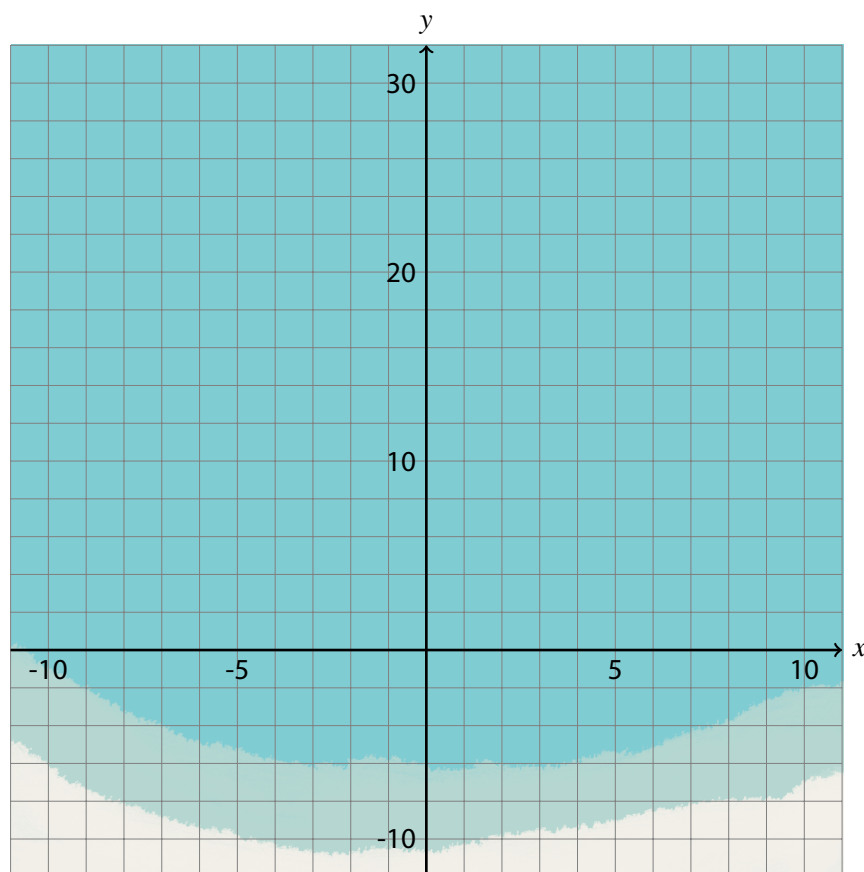
When bottom fishing, some fishermen use their arm length to estimate the lengths of their fishing lines. A normal bottom fishing set-up consists of taking your arm length and adding 6 inches to that. You then double this length to make 60 inches. Write out an algebraic equation to describe this, and use that equation to find how long your arm length is.

Activity 3.2

Among the fishing community, it is common to keep your favorite fishing spots a secret. This prevents overfishing at these spots. A couple of your friends have decided to share their favorite spots in a bay by giving two equations each—their fishing spot is supposed to be at the intersection of the two equations. Find the intersections of the following equations (if you can!), and see if they were honest or lying in telling you their secret spot.

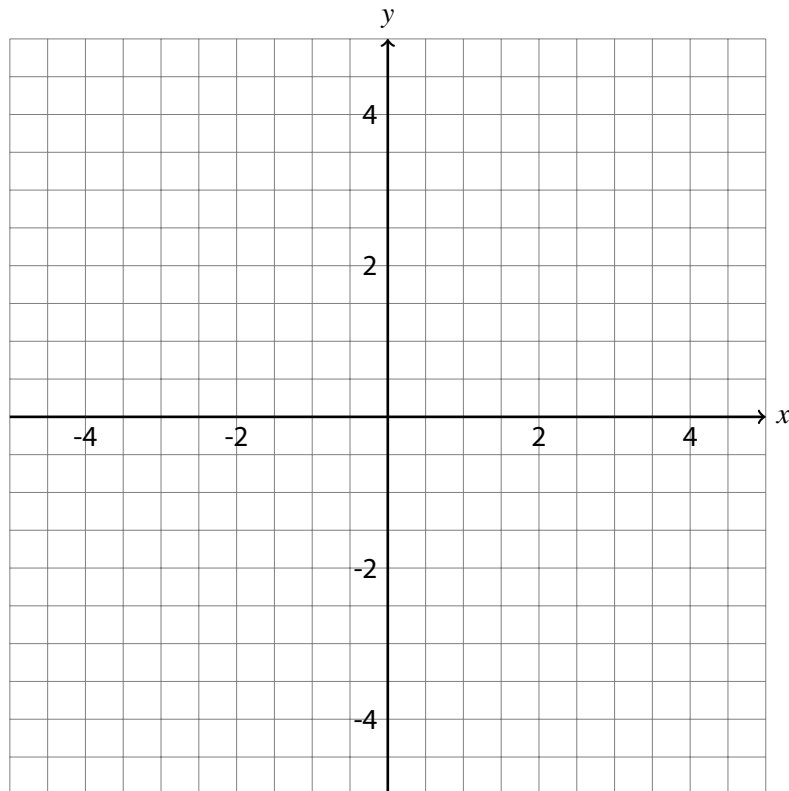
Friend	Equation 1	Equation 2	Solution	Lying or honest?
Lani	$y = 2x + 10$	$y = 10$		
Aloha	$y = 10x + 15$	$y = 10x - 10$		
Koa	$y = 5x - 2$	$y = \frac{15x - 6}{3}$		
Malu	$y = -6$	$x = -5$		

Below is the bay with a Cartesian plane. Check your answers by graphing the lines on the plane.



Activity 3.3

A modern GPS (Global Positioning System) can accurately pinpoint your location and track your progress throughout a day. Your GPS data shows that on your last two fishing trips, you traveled in straight lines and found a great fishing spot on both days at the point $(-3, 2)$. To get to that point quickly, you decide to travel in a straight line from the shore (represented by the x -axis). Find two possible paths to get to your fishing spot (write the equations). Graph your paths and the point where you want to end up.



Did you just form a system of linear equations? How do you know?

Activity 3.4

Suppose that you want to buy fishing hooks online, and the shipping cost is always the same no matter how many hooks you buy at a time.

Last month, you bought 500 hooks for \$13.00 (including shipping). This month, you bought 5000 hooks for \$83.00 (including shipping).

What is the cost for each hook, not including the shipping charge?

What is the cost of the shipping?

What is the cost for n , number of hooks?

Activity 3.5

Your family is on a fishing trip, and you decide to catch something for dinner. Your favorite fish to eat is papio, which live in a channel that runs diagonally to the beach where you're standing. There's a particularly nice fishing spot in the channel, shown on the graph at point $(4, -2)$. You want to cast your line from the beach straight to the fishing spot. You also want the slope of your fishing line's equation to be *greater than* -1 . Graph two possible fishing lines.

