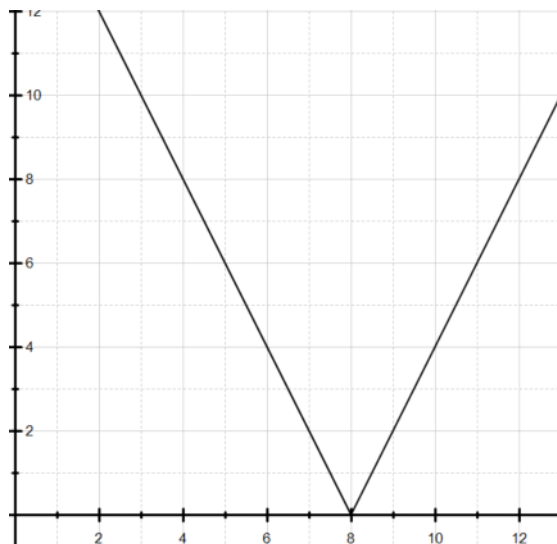


WARM UP

What is the rate of change over the interval $10 \leq x \leq 13$?



ESSENTIAL QUESTION

What are the key features of piecewise-defined functions?

NEEDED VOCAB:

► **Piecewise-Defined Function**

GOAL: "I CAN..."

Graph and apply piecewise-defined functions."

In a relay race, each runner carries a baton for an equal distance before handing off the baton to the next runner.

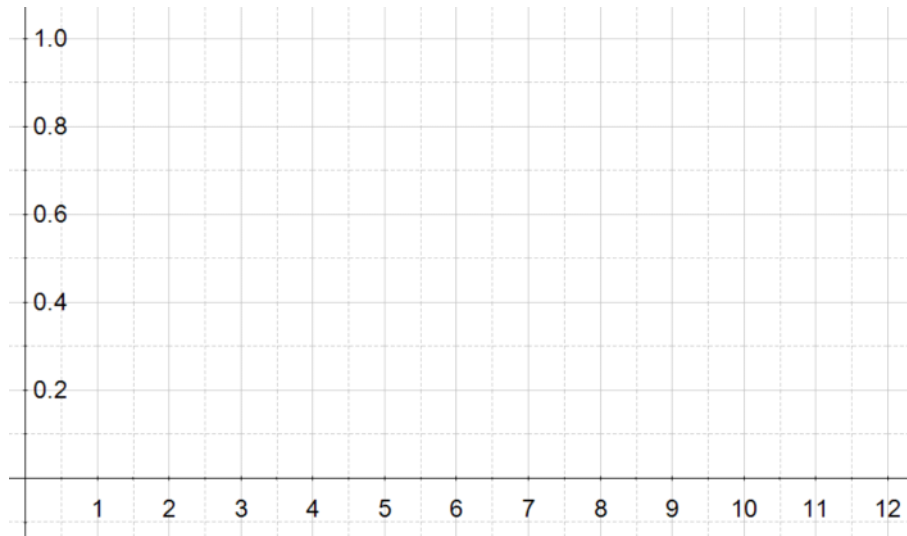
Path of the Baton

A. Graph the distance traveled by the baton as a function of time. How is the speed of each runner represented in the graph?

B. Who is the fastest runner?

Path of the Baton		
	Time (min)	Total Distance (mi)
Start	0	0
Runner 1	3	0.25
Runner 2	5.75	0.50
Runner 3	9	0.75
Runner 4	11.50	1.00

B. Who is the fastest runner?



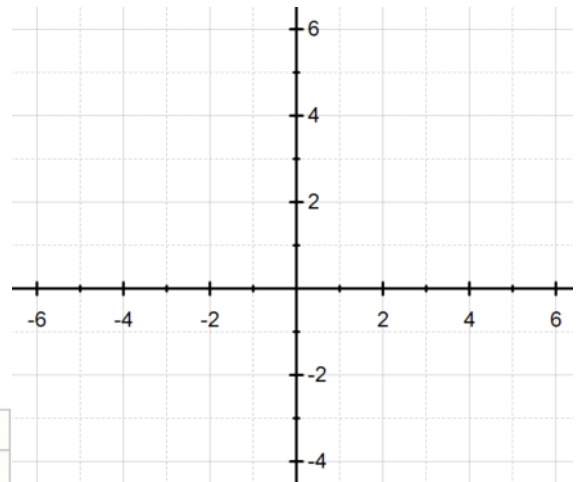
EXAMPLE 1

How is $f(x) = 2|x|$ related to a linear function?

1. Express $f(x) = -3|x|$ as a piecewise-defined function.

EXAMPLE 2

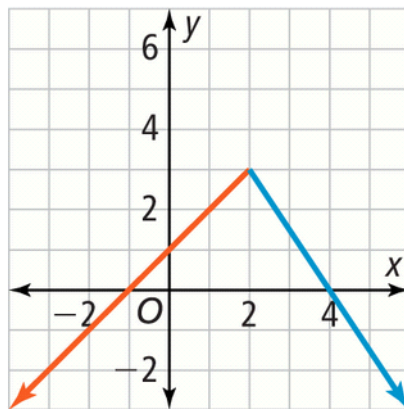
A. What is the graph of $f(x) = \begin{cases} x + 1, & x \leq 2 \\ -\frac{3}{2}x + 6, & x > 2 \end{cases}$?



B. Over what part of the domain is the function

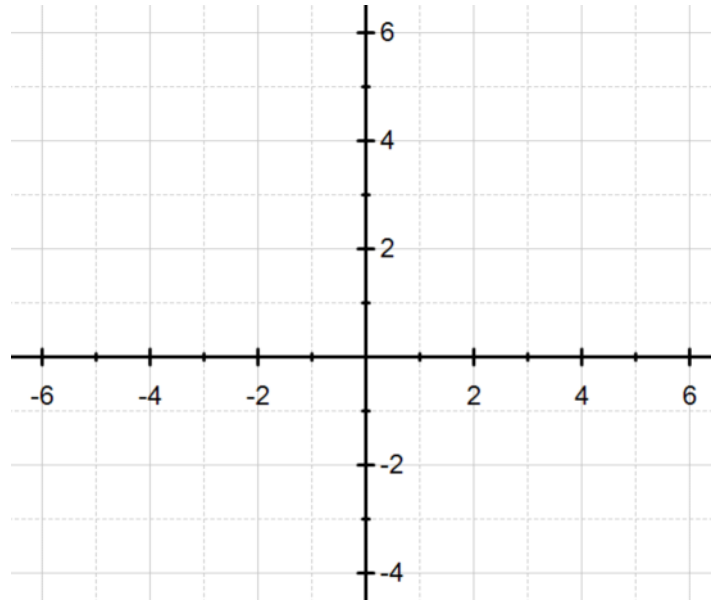
$$f(x) = \begin{cases} x + 1, & x \leq 2 \\ -\frac{3}{2}x + 6, & x > 2 \end{cases}$$

increasing? Decreasing?



2. Graph the following function. $f(x) = \begin{cases} x - 2, & x \leq 1 \\ -2x + 3, & x > 1 \end{cases}$

Over what interval is the graph increasing? Decreasing?

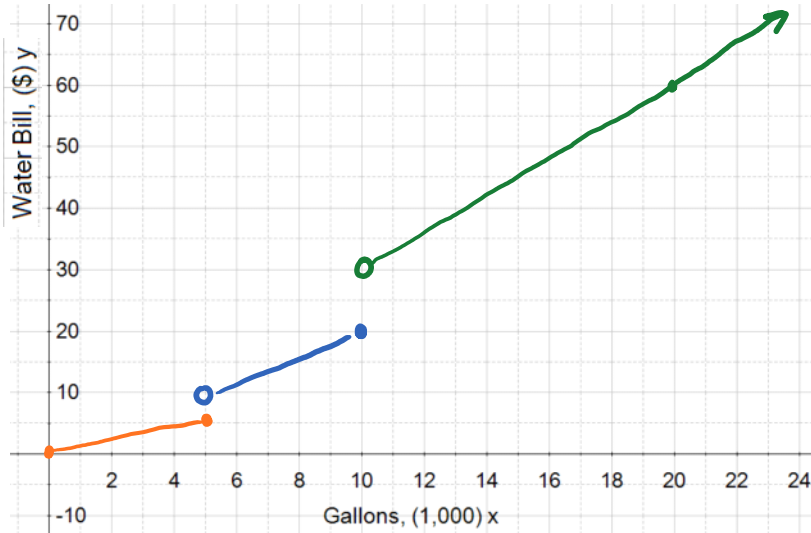


EXAMPLE 3

Cheyenne's mother is reviewing the monthly water bills from the summer. Each Monthly bill includes a graph like the one shown, which reflects the different rates charged for water based usage.

Several relatives visited Cheyenne's family in July and their water bill more than doubled. Assuming that the water consumption did not double that month, what is a possible explanation for the increase?

Tier 3
Tier 2
Tier 1



3. Make a conjecture about why a utility company might charge higher rates for greater levels of water consumption.

EXAMPLE 4

A gym owner wants to purchase custom wristbands for a marketing promotion. She thinks she will need about 75 bands. Her assistant insists that ordering over 100 wristbands will be less expensive than ordering 75. How can the assistant convince the gym owner?

Cost of Custom Wristbands Order



0 to 50 wristbands..... \$2.00 each + \$20 Shipping
51 to 100 wristbands.....\$1.00 each + \$10 Shipping
over 100 wristbands.....\$0.50 each + free Shipping

4. Recall that the cost per number of wristbands is:

$$f(x) = \begin{cases} 2x + 20, & 0 \leq x \leq 50 & \text{0 to 50 wristbands} \\ x + 10, & 50 < x \leq 100 & \text{51 to 100 wristbands} \\ 0.5x, & x > 100 & \text{over 100 wristbands} \end{cases}$$

What is the difference in cost between one order of 200 wristbands, two orders of 100 wristbands each, and four orders of 50 wristbands each?

<https://tinyurl.com/vp9vnqt>



HOMework

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14-22 EVEN, 24, 25, 30

