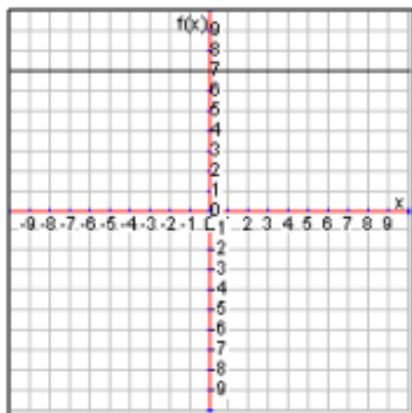


Functions 8.F.5 Pre-Test

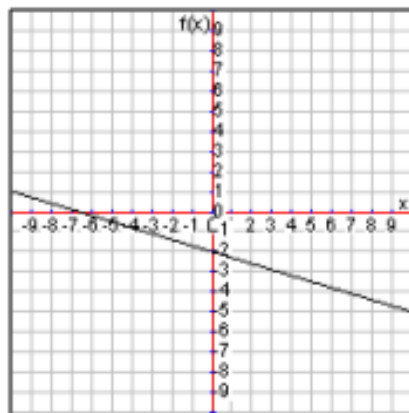
Please do not use a calculator.

Tell whether the following linear function is increasing, decreasing, or constant.

1. $y = 7$

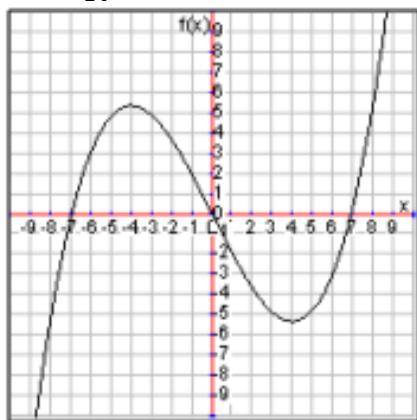


2. $y = -0.3x - 2$



For the following functions tell for what inputs they are increasing and for what inputs they are decreasing.

3. $y = \frac{1}{24}x^3 - 2x$

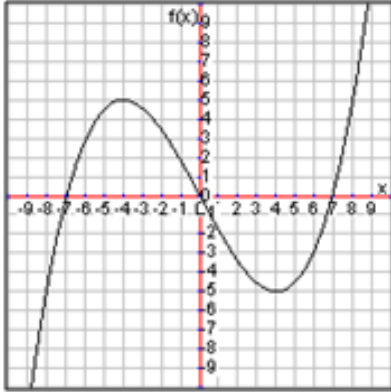


4. $y = (x + 3)^2 - 5$



For the following functions give the max or min (local or absolute).

5. $y = \frac{5}{128}x^3 - \frac{15}{8}x$



6. $y = (x + 3)^2 - 5$



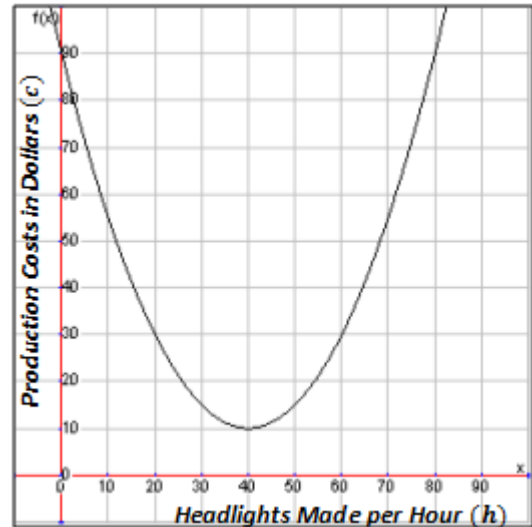
Use the following graph showing a function modeling the production cost of a headlight (c) a factory has in terms of the number of headlights it builds per hour (h) to answer the questions.

7. What appears to be the best production cost the factory can expect?

8. How many headlights should the factory make per hour to get the lowest production cost?

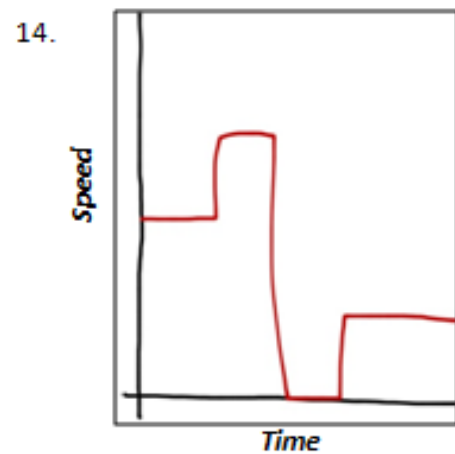
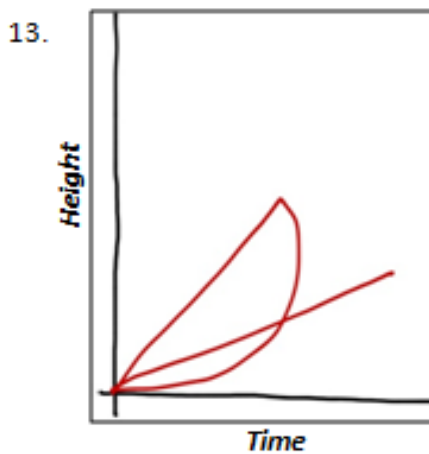
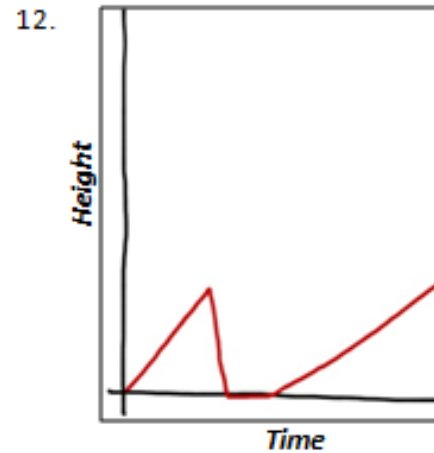
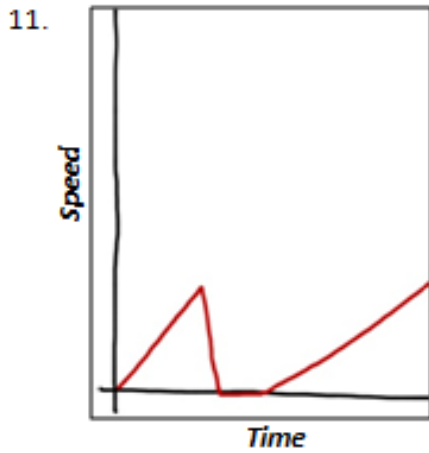
9. If the factory cannot make more than 60 headlights per hour, what are all the possible realistic inputs for this function?

10. What are all the possible production costs that this factory could have while making headlights?

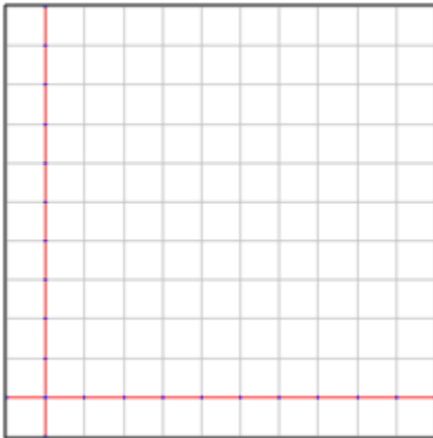


Determine whether each of the following graphs match the story and explain why.

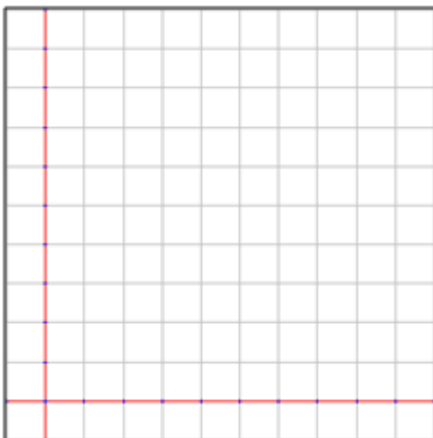
Herman was hiking in the Himalayas and began his day at the bottom of a mountain. He hiked up at a steady medium pace for a while before realizing he had forgotten his camera back at the bottom of the mountain. He went back down quickly and rested at the bottom for a few minutes. Then he started back up the mountain but this time at a slower pace so he could take pictures.



Sketch a graph modeling a function for the following situations.



15. George started at his friend's house and began walking home. After a few blocks, he realized he forgot his cell phone and hurried back to his friend's house to pick it up. After grabbing his phone, he immediately began running back home because he was afraid he was going to be late. Unfortunately he got stuck for a little while trying to cross the busy street. After crossing the busy street, he decided to walk the rest of the way home instead of running.



16. A cat is sitting on a pillow across the room watching the cicadas climb up the sliding glass door. The cat sits perfectly still for several moments before quickly charging towards the sliding glass door where she slams into it coming to halt. After pausing a moment to realize the cicadas were scared away, the cat slowly slinks to the middle of the room to wait on the next cicada to show up.

Functions 8.F.5 Pre-Test Answers

Please do not use a calculator.

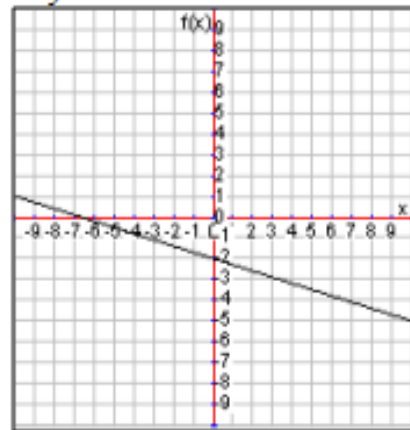
Tell whether the following linear function is increasing, decreasing, or constant.

1. $y = 7$



Constant

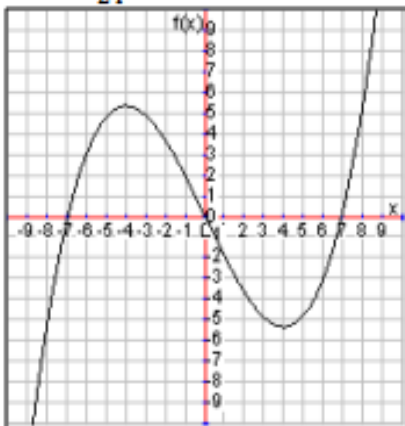
2. $y = -0.3x - 2$



Decreasing

For the following functions tell for what inputs they are increasing and for what inputs they are decreasing.

3. $y = \frac{1}{24}x^3 - 2x$



Increasing on inputs less than -4 and greater than 4

Decreasing between inputs -4 and 4

4. $y = (x + 3)^2 - 5$

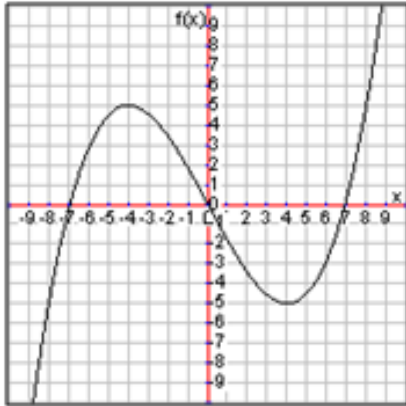


Increasing on inputs greater than -3

Decreasing on inputs less than -3

For the following functions give the max or min (local or absolute).

5. $y = \frac{5}{128}x^3 - \frac{15}{8}x$



Local Max: $y = 5$
Local Min: $y = -5$

6. $y = (x + 3)^2 - 5$



Min: $y = -5$
No Max

Use the following graph showing a function modeling the production cost of a headlight (c) a factory has in terms of the number of headlights it builds per hour (h) to answer the questions.

7. What appears to be the best production cost the factory can expect?

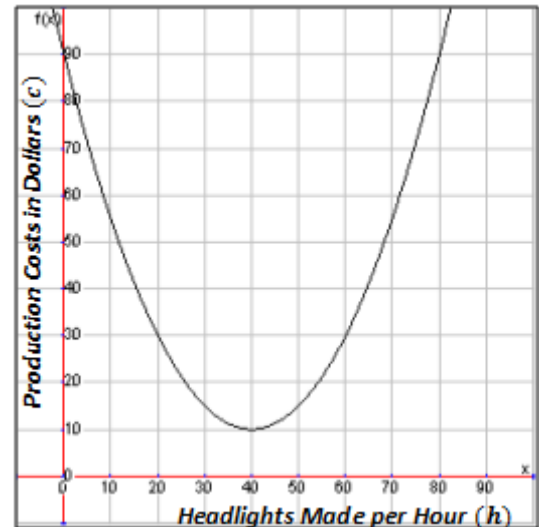
\$10 per headlight

8. How many headlights should the factory make per hour to get the lowest production cost?

40 headlights per hour

9. If the factory cannot make more than 60 headlights per hour, what are all the possible realistic inputs for this function?

Inputs could be from 0 to 60

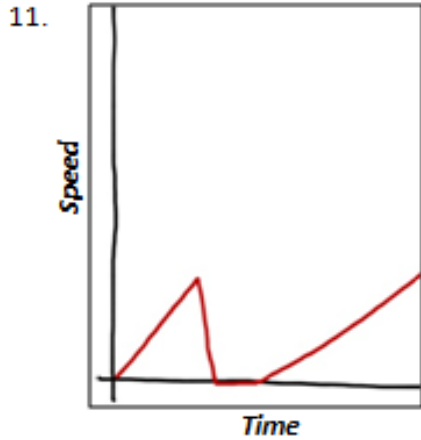


10. What are all the possible production costs that this factory could have while making headlights?

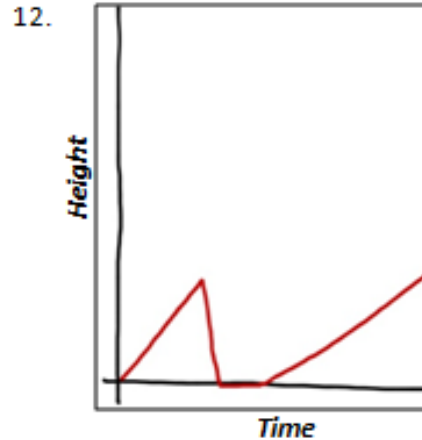
Costs could be from \$10 per headlight to \$90 per headlight. (Note: It might be good to discuss with students why this could happen. For example, if they produce headlights too slowly, they can't buy parts in bulk which drives up their costs. If they produce headlights too quickly, the machines break more often which increases their costs.)

Determine whether each of the following graphs match the story and explain why.

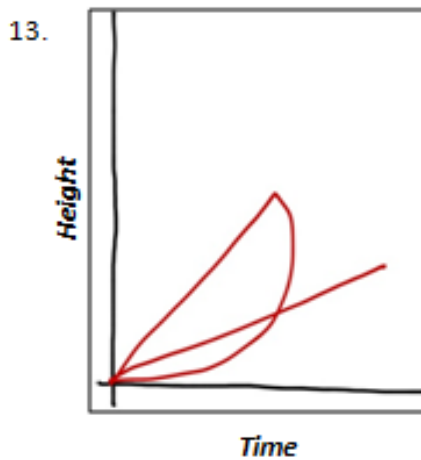
Herman was hiking in the Himalayas and began his day at the bottom of a mountain. He hiked up at a steady medium pace for a while before realizing he had forgotten his camera back at the bottom of the mountain. He went back down quickly and rested at the bottom for a few minutes. Then he started back up the mountain but this time at a slower pace so he could take pictures.



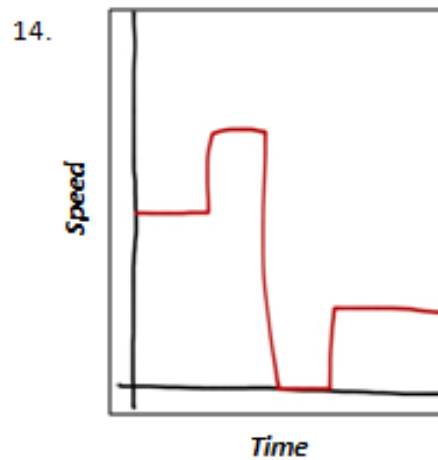
No, the speed doesn't keep increasing.



Yes, he goes up the mountain, back down, and then back up but slower, so it's not as steep.



No, you can't be in several places at the same time.

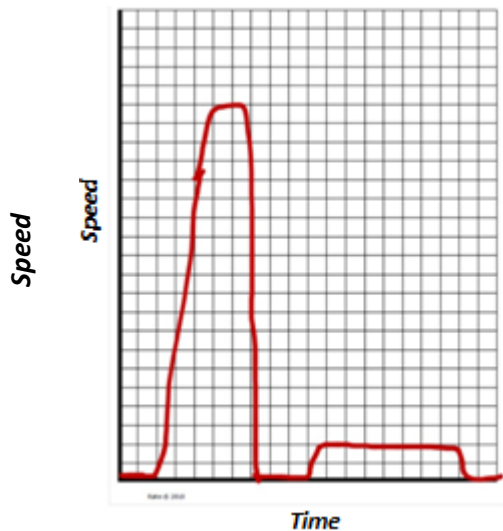


Yes, medium speed, faster speed, no speed when at the bottom, and then slower speed.

Sketch a graph modeling a function for the following situations.



15. George started at his friend's house and began walking home. After a few blocks, he realized he forgot his cell phone and hurried back to his friend's house to pick it up. After grabbing his phone, he immediately began running back home because he was afraid he was going to be late. Unfortunately he got stuck for a little while trying to cross the busy street. After crossing the busy street, he decided to walk the rest of the way home instead of running.



16. A cat is sitting on a pillow across the room watching the cicadas climb up the sliding glass door. The cat sits perfectly still for several moments before quickly charging towards the sliding glass door where she slams into it coming to halt. After pausing a moment to realize the cicadas were scared away, the cat slowly slinks to the middle of the room to wait on the next cicada to show up. Sketch a graph modeling the function of the cat's speed in terms of time.