LESSON MAKER PRO

Peaks and Changes

Read and sketch how quantities change.

HIGH SCHOOL · A2S.AF.H.17

A2S.AF.H.17 "For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship..."

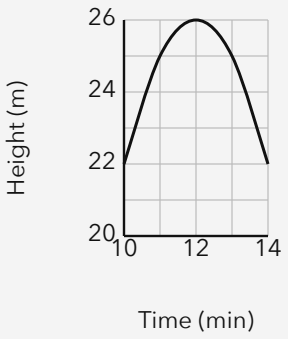
NAME _____ DATE _____

THE BIG IDEA

A high or low point on a graph tells you when a modeled quantity reaches an extreme value. Read the horizontal coordinate for when it happens and the vertical coordinate for the value. A graph rises where the quantity increases and falls where it decreases.

WORKED EXAMPLE

The graph models a kite's height. When is it highest, and how high is it?



1. Find the highest point: (12, 26).
2. Read 12 as time and 26 as height.

Answer: At 12 minutes, the kite is 26 m high.

PRACTICE 4 problems

1 A drone's height is $h(t)=-(t-3)^2+9$, where t is seconds and h is meters. When is it highest, and how high is it?

ANSWER _____

2 Ticket sales follow $S(t)=-(t-4)^2+7$, where t is days and S is hundreds of tickets sold that day. On which day are sales highest?

ANSWER _____

3 A cost is $C(x)=(x-5)^2+3$ dollars. What is the minimum cost?

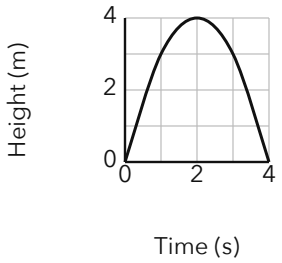
ANSWER _____

4 For $h(t)=-(t-2)^2+8$, is h rising or falling from t=2 to t=5?

ANSWER _____

APPLY IT Show your work

1 A drone climbs and then descends during a video shot. According to the graph, when is it highest, and how high is it?



ANSWER _____

2 The table shows viewers watching your livestream. From hour 3 to hour 5, what is the average change in viewers per hour?

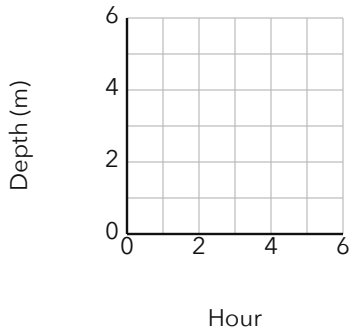
LIVESTREAM VIEWERS

Hour	Viewers (hundreds)
0	1
1	4
3	7
5	3

ANSWER _____

CHALLENGE One step up

At hour 0, a stream is 1 m deep. Its depth rises steadily to 5 m at hour 3, then falls steadily to 1 m at hour 6. Sketch the graph with straight segments. During which hours does the depth fall?



WORK SPACE AND ANSWER

ANSWER KEY

Peaks and Changes

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A drone's height is $h(t)=-(t-3)^2+9$, where t is seconds and h is meters. When is it highest, and how high is it?	**At 3 seconds, the drone is 9 m high.**
2	Ticket sales follow $S(t)=-(t-4)^2+7$, where t is days and S is hundreds of tickets sold that day. On which day are sales highest?	**Day 4.**
3	A cost is $C(x)=(x-5)^2+3$ dollars. What is the minimum cost?	**$3.**
4	For $h(t)=-(t-2)^2+8$, is h rising or falling from t=2 to t=5?	**Falling.**

PART 2 · APPLY IT

1. **At 2 seconds, the drone is 4 m high.** Read the time and height at the graph's highest point, (2, 4).
2. **-200 viewers per hour.** Viewers change by 3 - 7 = -4 hundred over 5 - 3 = 2 hours. Divide to get -2 hundred, or -200, viewers per hour.

CHALLENGE

Draw straight segments from (0, 1) to (3, 5) to (6, 1). The depth falls from hour 3 to hour 6.

For the livestream problem, accept a decrease of 200 viewers per hour. For the challenge, accept a sketch that connects the three specified points in order.