LESSON MAKER PRO

Where Graphs Meet

Find x-values that make two functions equal.

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A1P.AF.F.19 "Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x). a. Find the approximate solutions of an equation graphically..."

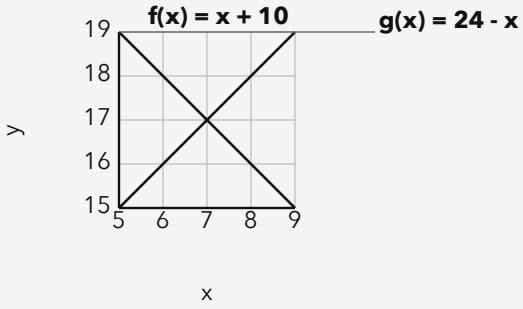
NAME _____ DATE _____

SAME X, SAME HEIGHT

At an intersection, both graphs have the same height at the same x-value. That x-value solves f(x)=g(x). If a crossing falls between grid marks, estimate its x-value.

WORKED EXAMPLE

Use the graph to solve f(x)=g(x).



1. Find where the lines cross: (7, 17).
2. Both functions equal 17 when x = 7.

Answer: x = 7

PRACTICE 4 problems

1 Find x where 3x + 1 = x + 9.

ANSWER _____

2 Find x where 12 - x = 2x + 3.

ANSWER _____

3 Find the positive solution of $x^2 = 5$ to the nearest tenth.

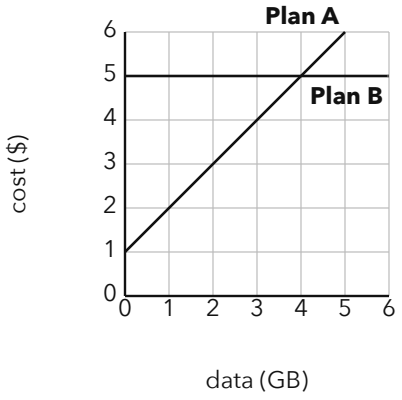
ANSWER _____

4 Find the positive solution of $x^2 = x + 1$ to the nearest tenth.

ANSWER _____

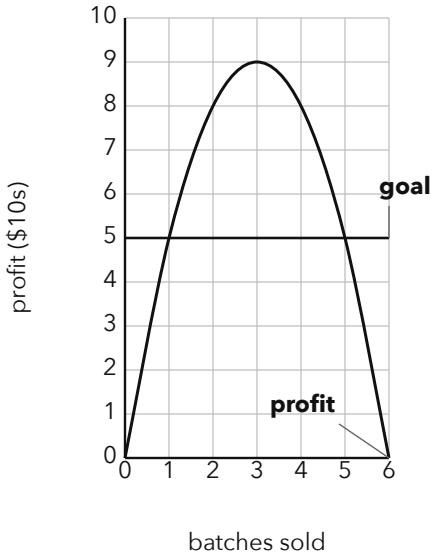
APPLY IT Show your work

1 The graph shows the cost of two data plans for x GB. At how many GB do the plans cost the same, and what is that cost?



ANSWER _____

2 The graph shows a club's profit and its $50 goal. Profit is measured in tens of dollars. At which two batch counts does the club meet its goal?



ANSWER _____

CHALLENGE One step up

For $f(x)=x^2$ and $g(x)=2x+3$, find every intersection x-coordinate. Explain why each value is a solution.

WORK SPACE AND ANSWER

ANSWER KEY

Where Graphs Meet

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find x where 3x + 1 = x + 9.	**x = 4**
2	Find x where 12 - x = 2x + 3.	**x = 3**
3	Find the positive solution of $x^2 = 5$ to the nearest tenth.	**x ≈ 2.2**
4	Find the positive solution of $x^2 = x + 1$ to the nearest tenth.	**x ≈ 1.6**

PART 2 · APPLY IT

1. **4 GB; $5** The lines meet at (4, 5), so both plans cost $5 for 4 GB.
2. **1 batch and 5 batches** The profit curve meets the goal line at x = 1 and x = 5.

CHALLENGE

x = -1 and x = 3. At both values, f(x) and g(x) have the same output, so their graphs intersect.

For the estimates, accept 2.2 and 1.6 to the nearest tenth. In the challenge, accept any explanation that connects equal outputs at the same x-value to an intersection.