LESSON MAKER PRO

Where Graphs Meet

Find solutions at intersections

HIGH SCHOOL · GDA.AF.C

GDA.AF.C "Graphs can be used to obtain exact or approximate solutions of equations, inequalities, and systems of equations and inequalities—including systems of linear equations in two variables and systems of linear and quadratic equations (given..."

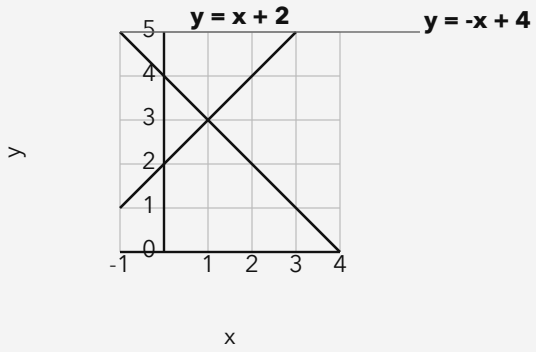
NAME _____ DATE _____

THE BIG IDEA

At an intersection, two graphs share the same x-value and y-value. To find an exact intersection, set their y expressions equal, solve for x, then find y.

WORKED EXAMPLE

Find the intersection shown on the graph.



1. Find where the lines cross.
2. Read x = 1 and y = 3.
3. Check: 1 + 2 = 3 and -1 + 4 = 3.

Answer: (1, 3)

PRACTICE 4 problems

1 Find the intersection: y = 2x + 1 and y = -x + 7.

ANSWER _____

2 Find the intersection: y = -2x + 3 and y = x - 3.

ANSWER _____

3 Find both intersections: $y = x^2$ and y = 2x + 3.

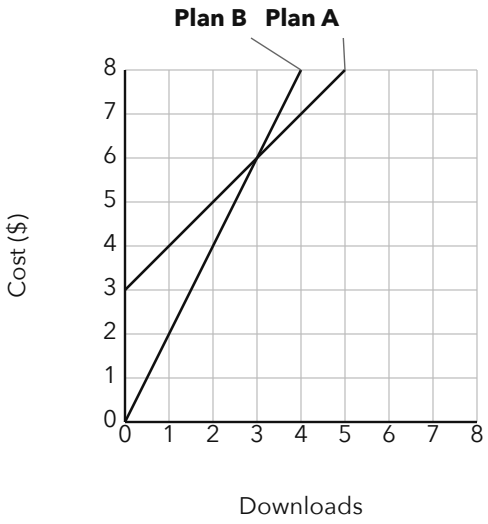
ANSWER _____

4 Find both intersections: $y = x^2 - 4$ and y = 0.

ANSWER _____

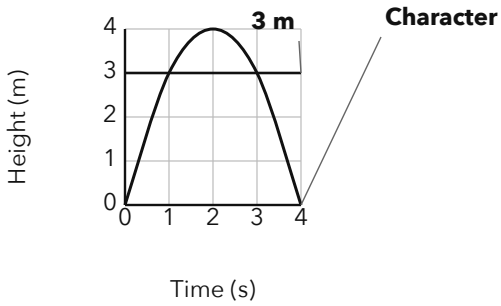
APPLY IT Show your work

1 The graph shows the cost of two music plans. After how many downloads do they cost the same, and what is that cost?



ANSWER _____

2 In a game, a character's height changes over time. At what times is the character 3 meters high?



ANSWER _____

CHALLENGE One step up

Where is $y = x^2 - 1$ above $y = 2x + 2$? Find the intersections first, then explain your answer.

WORK SPACE AND ANSWER

ANSWER KEY # Where Graphs Meet

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the intersection: $y = 2x + 1$ and $y = -x + 7$.	**(2, 5)**
2	Find the intersection: $y = -2x + 3$ and $y = x - 3$.	**(2, -1)**
3	Find both intersections: $y = x^2$ and $y = 2x + 3$.	**(-1, 1) and (3, 9)**
4	Find both intersections: $y = x^2 - 4$ and $y = 0$.	**(-2, 0) and (2, 0)**

PART 2 · APPLY IT

1. **3 downloads; $6** The plan lines intersect at (3, 6).
2. **1 second and 3 seconds** The height curve meets the 3-meter line at $x = 1$ and $x = 3$.

CHALLENGE

The graphs intersect at (-1, 0) and (3, 8). The parabola is above the line when $x < -1$ or $x > 3$ because $(x + 1)(x - 3) > 0$ in those ranges.

Accept intersection points in either order. For the challenge, accept an explanation using test values in each interval.