LESSON MAKER PRO

Where Graphs Meet

Find solutions at intersections.

GRADE 8 · 8A.AF.G.22

8A.AF.G.22 "Solve systems consisting of linear and/or quadratic equations in two variables graphically, using technology where appropriate."

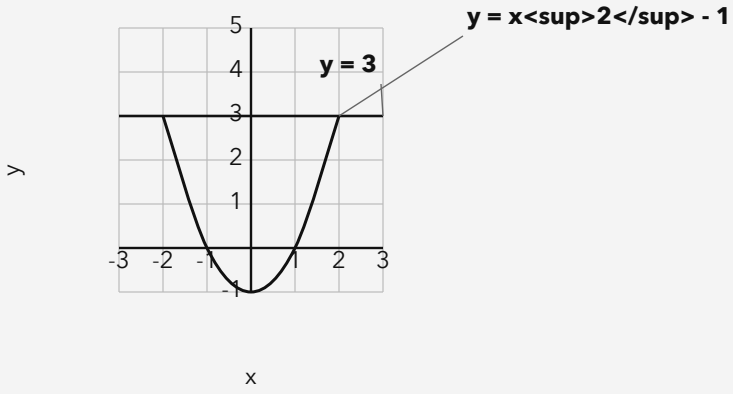
NAME _____ DATE _____

THE BIG IDEA

A solution to two equations is a point on both graphs. Find where the graphs meet, then read each point as an ordered pair (x, y). Graphs that do not meet have no solution.

WORKED EXAMPLE

Where do $y = x^2 - 1$ and $y = 3$ meet?



1. Find where the line meets the curve.
2. Read both intersection points.

Answer: (-2, 3) and (2, 3)

PRACTICE 4 problems

1 Find where $y = x + 4$ and $y = -x + 2$ meet.

ANSWER _____

2 Find all intersections of $y = x^2$ and $y = 1$.

ANSWER _____

3 Find all intersections of $y = x^2$ and $y = x + 2$.

ANSWER _____

4 How many times do $y = x^2 + 2$ and $y = 1$ meet?

ANSWER _____

APPLY IT Show your work

1 Two clips have $v = t^2 + 5$ and $v = 4t + 5$ views, where t is hours since posting and $0 \le t \le 4$. When do they have the same views? How many views do they have each time?

WORK SPACE

ANSWER _____

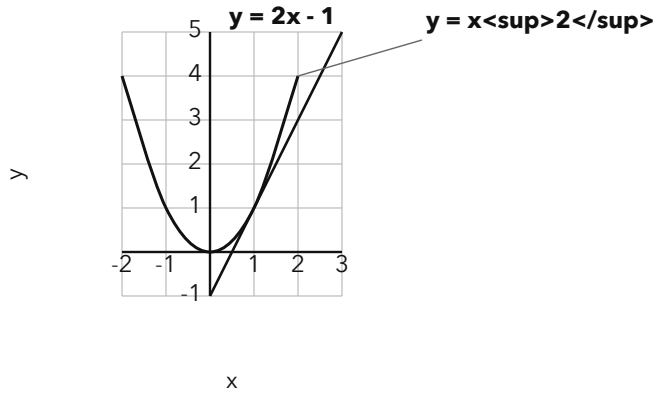
2 A basketball's height is $h = -t^2 + 4t + 5$ feet after t seconds. A rim is 8 feet high. At what times is the ball at rim height?

WORK SPACE

ANSWER _____

CHALLENGE One step up

These graphs touch but do not cross. How many solutions are there? Give the point and explain.



WORK SPACE AND ANSWER

ANSWER KEY

Where Graphs Meet

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find where $y = x + 4$ and $y = -x + 2$ meet.	**(-1, 3)**
2	Find all intersections of $y = x^2$ and $y = 1$.	**(-1, 1) and (1, 1)**
3	Find all intersections of $y = x^2$ and $y = x + 2$.	**(-1, 1) and (2, 4)**
4	How many times do $y = x^2 + 2$ and $y = 1$ meet?	**0 times**

PART 2 · APPLY IT

1. **At 0 hours, both have 5 views. At 4 hours, both have 21 views.** The graphs meet when $t^2 + 5 = 4t + 5$, at $t = 0$ and $t = 4$. Substitute each time into either equation.
2. **At 1 second and 3 seconds.** The height graph meets $h = 8$ when $-t^2 + 4t + 5 = 8$, at $t = 1$ and $t = 3$.

CHALLENGE

One solution, (1, 1). The graphs share that point even though they only touch.

Accept intersection points in either order. For problem 4, accept "no solution."