LESSON MAKER PRO

Where Functions Meet

Predict solutions, then check them.

HIGH SCHOOL · PC.F.3

PC.F.3 "Predict and verify solutions involving functions. Predict solutions involving functions that are quadratic, polynomial of higher order, rational, exponential, and logarithmic..."

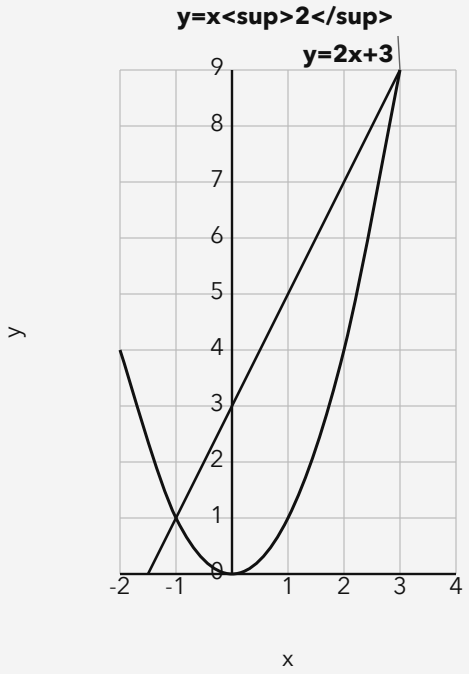
NAME _____ DATE _____

FIND AND VERIFY

To solve f(x)=g(x), look for x-values where their graphs meet. Then use algebra to find the solutions and substitute them into the original equation to check.

WORKED EXAMPLE

Solve $x^2=2x+3$. Predict from the graph, then verify.



1. The graphs meet at x=-1 and x=3.
2. Rearrange: $x^2-2x-3=0$.
3. Factor: $(x-3)(x+1)=0$.
4. Check: $(-1)^2=2(-1)+3=1$, and $3^2=2(3)+3=9$.

Answer: x=-1 or x=3

PRACTICE 4 problems

1 Predict the solutions of $x^2=4x+12$. Verify algebraically.

ANSWER _____

2 Predict all solutions of $x^3=16x$. Verify algebraically.

ANSWER _____

3 Predict the solutions of $9/(x-4)=x-4$. Verify algebraically.

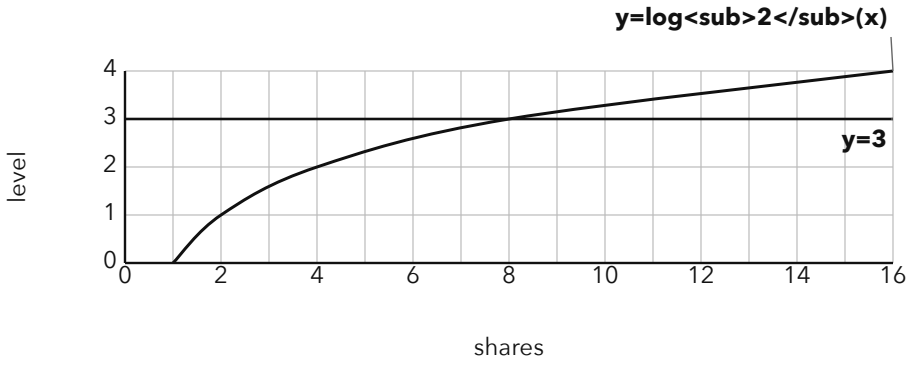
ANSWER _____

4 Predict the solution of $2^x=32$. Verify algebraically.

ANSWER _____

APPLY IT Show your work

1 An app gives a badge level of $\log_2(x)$ for x shares. Use the graph to predict when the level reaches 3, then verify algebraically.



ANSWER _____

2 A video has 3^x hundred views after x days. On which day will it have 2,700 views? Predict, then verify algebraically.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student claims $(x^2-25)/(x-5)=10$ has the solution x=5. Explain the mistake and give the solution set.

WORK SPACE AND ANSWER

Where Functions Meet

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Predict the solutions of $x^2=4x+12$. Verify algebraically.	**$x=-2$ or $x=6$; $x^2-4x-12=(x+2)(x-6)=0$.**
2	Predict all solutions of $x^3=16x$. Verify algebraically.	**$x=-4$, 0, or 4; $x^3-16x=x(x-4)(x+4)=0$.**
3	Predict the solutions of $9/(x-4)=x-4$. Verify algebraically.	**$x=1$ or $x=7$; $(x-4)^2=9$, and neither solution equals the excluded value 4.**
4	Predict the solution of $2^x=32$. Verify algebraically.	**$x=5$; $2^5=32$.**

PART 2 · APPLY IT

1. **8 shares** The graphs meet at $x=8$. Since $2^3=8$, $\log_2(8)=3$.
2. **Day 3** Divide 2,700 by 100 to get $3^x=27$. Since $3^3=27$, $x=3$.

CHALLENGE

The expression is undefined at $x=5$. For $x\neq5$, it simplifies to $x+5=10$, which gives only the excluded value $x=5$. The solution set is empty.

Accept solutions in any order. In the rational problems, students must check excluded values in the original equations.