LESSON MAKER PRO

Solution Forecast

Predict, solve, and verify across function types.

HIGH SCHOOL · PC.F.3.1

PC.F.3.1 "Predict solutions involving functions that are quadratic, polynomial of higher order, rational, exponential, and logarithmic."

NAME _____ DATE _____

PREDICT, THEN CHECK

Look at an equation's structure to predict how to solve it. You can factor a polynomial, use inverse operations for an exponential or logarithm, or clear a fraction. Check each result in the original equation because a zero denominator or an invalid logarithm input can rule it out.

WORKED EXAMPLE

Solve $x^2 - 17x + 66 = 0$. Check both solutions.

1. Factor: $(x - 6)(x - 11) = 0$.
2. Set each factor to zero: $x = 6$ or $x = 11$.
3. Check: $36 - 102 + 66 = 0$, and $121 - 187 + 66 = 0$.

Answer: x = 6 or x = 11

PRACTICE 6 problems

1 Solve $x^2 - 9x + 20 = 0$. Verify $x = 4$ by substitution.

ANSWER _____

2 How many real solutions does $x^3 - 4x^2 - x + 4 = 0$ have? Find them.

ANSWER _____

3 Solve $(x + 1)/(x - 3) = 2$. State the value excluded from the domain.

ANSWER _____

4 Solve $3^x = 243$.

ANSWER _____

5 Solve $\log_2(x - 1) = 3$.

ANSWER _____

6 How many real solutions does $x^4 - 10x^2 + 9 = 0$ have? Find them.

ANSWER _____

APPLY IT Show your work

1 In a video game, a character jumps from an 18-foot ledge. Its height above the ground after x seconds is $h(x) = -x^2 + 7x + 18$ feet. Predict when it lands, then solve $h(x) = 0$ and check your answer.

WORK SPACE

ANSWER _____

2 An artist's video has 50 views at the start of a week. The view count doubles each day, so $v(x) = 50(2^x)$, where x is the number of days since the start. Predict when it reaches 400 views, then solve and check.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A classmate cancels $x - 5$ in $(x^2 - 25)/(x - 5) = 10$ and reports $x = 5$. Is $x = 5$ a solution? Find all real solutions and explain.

WORK SPACE AND ANSWER

ANSWER KEY # Solution Forecast

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve $x^2 - 9x + 20 = 0$. Verify $x = 4$ by substitution.	**$x = 4$ or $x = 5$; for $x = 4$, $16 - 36 + 20 = 0$.**
2	How many real solutions does $x^3 - 4x^2 - x + 4 = 0$ have? Find them.	**Three real solutions: $x = -1$, $x = 1$, and $x = 4$.**
3	Solve $(x + 1)/(x - 3) = 2$. State the value excluded from the domain.	**$x = 7$; $x = 3$ is excluded.**
4	Solve $3^x = 243$.	**$x = 5$**
5	Solve $\log_2(x - 1) = 3$.	**$x = 9$**
6	How many real solutions does $x^4 - 10x^2 + 9 = 0$ have? Find them.	**Four real solutions: $x = -3$, $x = -1$, $x = 1$, and $x = 3$.**

PART 2 · APPLY IT

1. **The character lands after 9 seconds.** Factoring gives $-(x - 9)(x + 2) = 0$, so $x = 9$ or $x = -2$; negative time does not fit the situation. Check: $h(9) = -81 + 63 + 18 = 0$.
2. **It reaches 400 views after 3 days.** Divide $50(2^x) = 400$ by 50 to get $2^x = 8$, so $x = 3$. Check: $50(2^3) = 400$.

CHALLENGE

There are no real solutions. Factoring and canceling gives $x + 5 = 10$, whose only candidate is $x = 5$. But $x = 5$ makes the denominator of the original equation zero, so it is not a solution.

Accept solutions in any order. In the challenge, the explanation must refer to the original equation's zero denominator.