LESSON MAKER PRO

Solution Check

Test proposed solutions in the original equation.

HIGH SCHOOL · PC.F.3.3

PC.F.3.3 "Algebraically verify solutions involving functions that are quadratic, polynomial of higher order, rational, exponential, and logarithmic."

NAME _____ DATE _____

SUBSTITUTE AND CHECK

To verify a proposed solution, substitute it into the original equation and simplify both sides. A fraction's denominator cannot be zero, and a logarithm's argument must be positive. A value is a solution only if the equation is true and every expression is defined.

WORKED EXAMPLE

Is $x = 7$ a solution of $x^2 - 11x = -28$?

1. Substitute 7 for x: $7^2 - 11(7) = -28$.
2. Simplify the left side: $49 - 77 = -28$.
3. Both sides equal -28.

Answer: Yes, x = 7 is a solution.

PRACTICE 6 problems

1 Substitute $x = 4$ into $x^2 - 6x = -8$. Is it a solution? Show your check.

ANSWER _____

2 Substitute $x = -2$ into $x^3 + 4x = -16$. Is it a solution? Show your check.

ANSWER _____

3 Substitute $x = 6$ into $(x + 2)/(x - 4) = 4$. Is it a solution? Show your check.

ANSWER _____

4 Substitute $x = -1$ into $(x^2 - 1)/(x + 1) = x - 1$. Is it a solution? Show your check.

ANSWER _____

5 Substitute $x = 2$ into $3^x + 1 = 10$. Is it a solution? Show your check.

ANSWER _____

6 Substitute $x = 16$ into $\log_2(x) = 5$. Is it a solution? Show your check.

ANSWER _____

APPLY IT Show your work

1 A drone filming a school game has a height of $h(x) = -x^2 + 6x + 4$ meters after x seconds. A student says the drone is 12 meters high after 2 seconds. Verify the claim by substitution.

WORK SPACE

ANSWER _____

2 A student's video has $V(x) = 50(2^x)$ views x days after posting. A friend predicts 800 views after 4 days. Verify the prediction by substitution.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve $\log_2((x^2 - 4)/(x - 2)) = 2$. Check any value you find in the original equation and explain whether it is a solution.

WORK SPACE AND ANSWER

Solution Check

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Substitute x = 4 into x^2 - 6x = -8. Is it a solution? Show your check.	**Yes. 4^2 - 6(4) = 16 - 24 = -8.**
2	Substitute x = -2 into x^3 + 4x = -16. Is it a solution? Show your check.	**Yes. $(-2)^3$ + 4(-2) = -8 - 8 = -16.**
3	Substitute x = 6 into (x + 2)/(x - 4) = 4. Is it a solution? Show your check.	**Yes. (6 + 2)/(6 - 4) = 8/2 = 4.**
4	Substitute x = -1 into (x^2 - 1)/(x + 1) = x - 1. Is it a solution? Show your check.	**No. The denominator is -1 + 1 = 0, so the left side is undefined.**
5	Substitute x = 2 into 3^x + 1 = 10. Is it a solution? Show your check.	**Yes. 3^2 + 1 = 9 + 1 = 10.**
6	Substitute x = 16 into $\log_2(x)$ = 5. Is it a solution? Show your check.	**No. $\log_2(16)$ = 4 because 2^4 = 16, and 4 is not 5.**

PART 2 · APPLY IT

1. **The claim is correct. h(2) = -(2^2) + 6(2) + 4 = -4 + 12 + 4 = 12 meters.** Substitute 2 for x in the height function. The result is 12, as claimed.
2. **The prediction is correct. V(4) = 50(2^4) = 50(16) = 800 views.** Substitute 4 for x in the views function. The result matches the prediction.

CHALLENGE

There is no solution. For x not equal to 2, (x^2 - 4)/(x - 2) simplifies to x + 2. Then $\log_2$(x + 2) = 2 gives x + 2 = 4, so x = 2. But x = 2 makes the denominator of the original expression zero, so it is not a solution.

Accept equivalent substitution steps that show both sides match or identify why a proposed value fails. In the challenge, simplifying the fraction does not make x = 2 valid in the original equation.