LESSON MAKER PRO

When Models Match

Solve equations to find when a model reaches a target.

HIGH SCHOOL · GDA.AF.B

GDA.AF.B "Expressions, equations, and inequalities can be used to analyze and make predictions, both within mathematics and as mathematics is applied in different contexts – in particular, contexts that arise in relation to linear, quadratic..."

NAME _____ DATE _____

FIND THE INPUT

To find when a model reaches a target, set its expression equal to the target and solve for x. For a quadratic equation, factoring may give two solutions. For an exponential equation, try writing both sides with the same base.

WORKED EXAMPLE

Solve $13x + 17 = 82$.

1. Subtract 17 from both sides: $13x = 65$.
2. Divide both sides by 13: $x = 5$.

Answer: x = 5

PRACTICE 6 problems

1 Solve $6x + 8 = 32$.

ANSWER _____

2 Solve $12x - 10 = 26$.

ANSWER _____

3 Find both solutions to $x^2 - 6x = 16$.

ANSWER _____

_____

4 Find both solutions to $x^2 - 10x + 24 = 0$.

ANSWER _____

_____

5 Solve $10 \cdot 2^x = 80$.

ANSWER _____

6 Solve $6 \cdot 2^x = 96$.

ANSWER _____

APPLY IT Show your work

1 A music app charges an $8 sign-up fee plus $6 per month. Your total is $44. How many months did you pay for?

WORK SPACE

ANSWER _____

2 A creator's channel has 12 subscribers at the start of a challenge. The number of subscribers doubles each week. After how many weeks will the channel have 192 subscribers?

WORK SPACE

ANSWER _____

CHALLENGE One step up

In a game, two scoring rules give totals of $A(x) = 6x + 8$ and $B(x) = x^2 + 16$ after round x. At which positive integer rounds do the totals match? Which rule gives the higher total at the round between them? Explain using the scores.

WORK SPACE AND ANSWER

When Models Match

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve $6x + 8 = 32$.	**x = 4**
2	Solve $12x - 10 = 26$.	**x = 3**
3	Find both solutions to $x^2 - 6x = 16$.	**x = -2 or x = 8**
4	Find both solutions to $x^2 - 10x + 24 = 0$.	**x = 4 or x = 6**
5	Solve $10 \cdot 2^x = 80$.	**x = 3**
6	Solve $6 \cdot 2^x = 96$.	**x = 4**

PART 2 · APPLY IT

1. **6 months** Set up $8 + 6x = 44$. Subtract 8 and divide by 6 to get $x = 6$.
2. **4 weeks** Solve $12 \cdot 2^x = 192$. Since $2^x = 16 = 2^4$, $x = 4$.

CHALLENGE

The totals match at rounds 2 and 4. At round 3, A(3) = 26 and B(3) = 25, so rule A gives the higher total.

Accept solutions in either order for the quadratic problems. In the challenge, students may find the matching rounds by factoring $x^2 - 6x + 8 = 0$.