

Equation Quest

Build an equation, then solve the situation.

HIGH SCHOOL • HSA-CED.A.1

CCSS.Math.Content.HSA-CED.A.1 "Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions."

NAME _____

DATE _____

TURN WORDS INTO MATH

Choose a variable for the unknown quantity, then translate each relationship into an equation or inequality. Solve it, check any restrictions such as x not equaling 0 in a denominator, and keep only answers that fit the context.

WORKED EXAMPLE

Solve $11x + 2 = 79$.

1. Subtract 2 from both sides: $11x = 77$.
2. Divide both sides by 11: $x = 7$.
3. Check: $11(7) + 2 = 79$.

Answer: $x = 7$

PRACTICE 6 problems

- 1** Three identical concert tickets cost \$24. Let x be the price of one ticket. Write and solve an equation.

ANSWER _____

- 2** The product of a number and 5, increased by 1, is 21. Write and solve an equation.

ANSWER _____

- 3** A rectangular poster has an area of 30 square inches. Its width is x inches, and its length is $x + 1$ inches. Write and solve an equation for the width.

ANSWER _____

- 4** A club splits a \$30 fee equally among x members. Each member pays \$5. Write and solve an equation.

ANSWER _____

- 5** Solve the exponential equation $3^x = 81$.

ANSWER _____

- 6** A game gives 4 points for each win and 6 bonus points. You need more than 18 points. Write and solve an inequality for x wins.

ANSWER _____

APPLY IT Show your work

- 1** You have \$12 saved for a pair of headphones that costs \$60. You earn \$8 each week. Let x be the number of weeks you work. Write and solve an equation to find how many weeks you need.

WORK SPACE

ANSWER _____

- 2** An online video challenge has $V = 3^x$ shares, where x is the number of hours after posting. How many hours will it take for the video to reach 243 shares?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A T-shirt printer charges a fixed design fee of \$36 plus \$4 for each shirt. If x shirts are ordered, the cost per shirt is $36/x + 4$ dollars. The club wants the cost per shirt to be no more than \$10. Write and solve an inequality for x .

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Three identical concert tickets cost \$24. Let x be the price of one ticket. Write and solve an equation.	$3x = 24$; $x = 8$
2	The product of a number and 5, increased by 1, is 21. Write and solve an equation.	$5x + 1 = 21$; $x = 4$
3	A rectangular poster has an area of 30 square inches. Its width is x inches, and its length is $x + 1$ inches. Write and solve an equation for the width.	$x(x + 1) = 30$; $x = 5$
4	A club splits a \$30 fee equally among x members. Each member pays \$5. Write and solve an equation.	$30/x = 5$; $x = 6$
5	Solve the exponential equation $3^x = 81$.	$x = 4$
6	A game gives 4 points for each win and 6 bonus points. You need more than 18 points. Write and solve an inequality for x wins.	$4x + 6 > 18$; $x > 3$, so the minimum whole-number number of wins is 4

PART 2 • APPLY IT

- $12 + 8x = 60$; $x = 6$ weeks Subtract 12 from both sides to get $8x = 48$. Divide by 8, so the student needs 6 weeks.
- $3^x = 243$; $x = 5$ hours Write 243 as 3^5 . Therefore, the exponent x must equal 5.

CHALLENGE

$36/x + 4 \leq 10$; $x \geq 6$, so the club must order at least 6 shirts

Accept equivalent equation forms and correct solution steps. For context problems, students should reject values that are not possible counts, dimensions, or positive numbers of items.