

Equation Quest

Build equations from real situations and solve for x .

GRADE 7 • 7.PAR.3.1

7.PAR.3.1 "Construct algebraic equations to solve practical problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Interpret the solution based on the situation."

NAME _____

DATE _____

TURN WORDS INTO EQUATIONS

Use x for the unknown amount. Multiply when a rate is repeated, add or subtract any fixed amount, then undo the operations to find x . Check that your answer makes sense in the situation.

WORKED EXAMPLE

A photo-printing website charges \$7/9 per print plus an \$11 upload fee. The total cost is \$25. How many prints did you order?

1. Write an equation: $(7/9)x + 11 = 25$.
2. Subtract 11: $(7/9)x = 14$.
3. Multiply by $9/7$: $x = 18$.

Answer: $x = 18$, so you ordered 18 prints.

PRACTICE 6 problems

- 1** A streaming service charges \$3 per month plus a \$4 setup fee. Your total bill is \$22. Write and solve an equation for x , the number of months.

ANSWER _____

- 2** A game club makes 5 prize bags. Each bag has x cards and 2 bonus cards. There are 30 cards altogether. Write and solve an equation for x .

ANSWER _____

- 3** You earn \$1/2 for each bottle you recycle and receive a \$6 bonus. You earn \$12 total. Write and solve an equation for x , the number of bottles.

ANSWER _____

- 4** A craft store charges \$3/4 for each of $x + 4$ beads. Your bill is \$12. Write and solve an equation for x .

ANSWER _____

- 5** A fundraiser earns \$5 for each bracelet sold and pays a \$10 booth fee. Its profit is \$20. Write and solve an equation for x , the number of bracelets.

ANSWER _____

- 6** A print shop charges \$3/5 for each of $x + 5$ posters. The bill is \$12. Write and solve an equation for x .

ANSWER _____

APPLY IT Show your work

- 1** You want to buy tickets for a school concert. Each ticket costs \$6, and there is one \$5 service fee for the order. You have \$35. Write and solve an equation for x , the number of tickets you can buy. Interpret your answer.

WORK SPACE

ANSWER _____

- 2** A student orders $x + 2$ custom stickers for a laptop. Each sticker costs $\$3/4$, and the total cost is \$6. Write and solve an equation for x . Interpret your answer.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A club says it collected 31 bottles by filling 4 bags with the same whole number of bottles. It models the number of bottles in each bag as $x + 1$. Write and solve an equation. Is the club's claim possible? Explain.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A streaming service charges \$3 per month plus a \$4 setup fee. Your total bill is \$22. Write and solve an equation for x , the number of months.	$3x + 4 = 22$; $x = 6$ months
2	A game club makes 5 prize bags. Each bag has x cards and 2 bonus cards. There are 30 cards altogether. Write and solve an equation for x .	$5(x + 2) = 30$; $x = 4$ cards
3	You earn \$1/2 for each bottle you recycle and receive a \$6 bonus. You earn \$12 total. Write and solve an equation for x , the number of bottles.	$(1/2)x + 6 = 12$; $x = 12$ bottles
4	A craft store charges \$3/4 for each of $x + 4$ beads. Your bill is \$12. Write and solve an equation for x .	$(3/4)(x + 4) = 12$; $x = 12$
5	A fundraiser earns \$5 for each bracelet sold and pays a \$10 booth fee. Its profit is \$20. Write and solve an equation for x , the number of bracelets.	$5x - 10 = 20$; $x = 6$ bracelets
6	A print shop charges \$3/5 for each of $x + 5$ posters. The bill is \$12. Write and solve an equation for x .	$(3/5)(x + 5) = 12$; $x = 15$

PART 2 • APPLY IT

- $6x + 5 = 35$; $x = 5$. **You can buy 5 tickets.** Subtract the service fee from the total, then divide the remaining amount by the cost of one ticket.
- $(3/4)(x + 2) = 6$; $x = 6$. **The student orders 8 stickers total.** Divide the total cost by the cost per sticker to find the total number of stickers, then subtract 2.

CHALLENGE

$4(x + 1) = 31$; $x = 27/4$. **No, the claim is not possible because each bag would need $31/4$ bottles, which is not a whole number.**

Accept equivalent equation forms and equivalent fraction notation. For context problems, accept answers that include both the value of x and a correct interpretation of what that value represents.