

Equation Escape

Expand, combine, and solve for x.

GRADE 8 • NY-8.EE.7.b

NY-8.EE.7.b "Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms."

NAME _____

DATE _____

CLEAR THE PARENTHESES

First distribute the number outside each set of parentheses to every term inside. Then combine like terms and use inverse operations to get x alone.

WORKED EXAMPLE

Solve: $(11/13)(26x - 39) + 17 = 138$

1. Distribute: $22x - 33 + 17 = 138$
2. Combine constants: $22x - 16 = 138$
3. Add 16: $22x = 154$
4. Divide by 22: $x = 7$

Answer: $x = 7$

PRACTICE 6 problems

1 Solve: $(1/3)(9x + 6) = 20$

ANSWER _____

2 Solve: $8x - 1/5 = 3x + 14/5$

ANSWER _____

3 Solve: $-4(3x - 5) + 9 = -19$

ANSWER _____

4 Solve: $(4/9)(18x + 27) - 8 = 10$

ANSWER _____

5 Solve: $5(x - 4) + 4x = 6(x + 8) + 9$

ANSWER _____

6 Solve: $(2/5)(15x - 10) + 4 = 3(x + 6) - 8$

ANSWER _____

APPLY IT Show your work

- 1** A streaming service charges x dollars each month plus a \$1.50 fee each month. For 4 months, a promo code takes \$5 off the total, and the final cost is \$21. What is the monthly charge, x ?

WORK SPACE

ANSWER _____

- 2** Five friends buy identical snack bundles for a concert. Each bundle costs $(3x - 2)$ dollars, and there is a \$7 delivery fee. The total cost is \$42. What value of x makes the total correct?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Without solving for one specific value of x , decide whether the equation has one solution, no solution, or infinitely many solutions. Explain your reasoning: $(\frac{3}{4})(8x - 20) - (\frac{2}{3})(9x + 6) = -19$

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Solve: $(1/3)(9x + 6) = 20$	x = 6
2	Solve: $8x - 1/5 = 3x + 14/5$	x = 3/5
3	Solve: $-4(3x - 5) + 9 = -19$	x = 4
4	Solve: $(4/9)(18x + 27) - 8 = 10$	x = 3/4
5	Solve: $5(x - 4) + 4x = 6(x + 8) + 9$	x = 77/3
6	Solve: $(2/5)(15x - 10) + 4 = 3(x + 6) - 8$	x = 10/3

PART 2 • APPLY IT

- x = 5, so the monthly charge is \$5.** Write $4(x + 3/2) - 5 = 21$. Distribute and combine to get $4x + 1 = 21$, so $x = 5$.
- x = 3** Write $5(3x - 2) + 7 = 42$. Distribute and combine to get $15x - 3 = 42$, so $x = 3$.

CHALLENGE

Infinitely many solutions. The left side simplifies to $6x - 15 - 6x - 4$, which is -19 , so the equation is true for every value of x .

Accept equivalent fraction forms and correct work that uses a different order of valid inverse operations. For the challenge, accept "all real numbers" in place of "infinitely many solutions."