

Special Cases

Sometimes when solving an equation, you will end up with equations like

$$6 = 8 \quad \text{or} \quad -3 = -3$$

Are these equations true always, sometimes, or never?

The equation $6 = 8$ is **NEVER** true, suggesting that the original equation is also **NEVER** true (no solutions).

The equation $-3 = -3$ is **ALWAYS** true, suggesting that the original equation is also **ALWAYS** true (all numbers are solutions).

The following questions will all be multiple choice. For some questions the answer will be a number; for others it will be "no solution" or "all numbers"

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1 Solve the equation.

$$6(x+3) = (6x+18)$$

- A 0
- B -2
- C 1
- D 4
- E All numbers are solutions
- F No solution

$$6x+18 = 6x+18$$

$$6x+18 + -6x = 6x+18 + -6x$$

$$18 = 18$$



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2 Solve the equation.

$$-0.90(20) + 0.60x = 0.30(20 + x)$$

- A 40
- B 70
- C 80
- D 90
- E All numbers are solutions
- F No solution

$$-18 + 0.6x = 6 + 0.3x$$

$$-18 + 0.6x + -0.3x = 6 + 0.3x + -0.3x$$

$$-18 + 0.3x = 6$$

$$-18 + 0.3x + 18 = 6 + 18$$

$$\frac{0.3x}{0.3} = \frac{24}{0.3}$$

$$x = 80$$

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A very nice trick

$$-18 + 0.6x = 6 + 0.3x$$

$$10(-18 + 0.6x) = 10(6 + 0.3x)$$

$$-180 + 6x = 60 + 3x$$

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3 Solve the equation.

$$0.07(4x - 5) = 0.28(x + 7) - 2.31$$

- A -2.31
- B -0.35
- C 2.31
- D 0.35
- E All numbers are solutions
- F No solution

$$0.28x - 0.35 = 0.28x + 1.96 - 2.31$$

$$0.28x - 0.35 = 0.28x + -0.35$$

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4 Solve the equation.

$$\frac{2}{5}x - \frac{1}{3}x = 3$$

- A 45
- B 90
- C -45
- D -90
- E All numbers are solutions
- F No solution

LCD : 15

$$\frac{15}{1} \left(\frac{2}{5}x - \frac{1}{3}x \right) = 15(3)$$

$$6x - 5x = 45$$

$$x = 45$$

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5 Solve the equation.

$$0.05y + 0.13(3000 - y) = 0.42y$$

- A 2340
- B 195
- C 780
- D 1950
- E All numbers are solutions
- F No solution

$$0.05y + 390 - 0.13y = 0.42y$$

$$390 - 0.08y = 0.42y$$

$$390 - 0.08y + 0.08y = 0.42y + 0.08y$$

$$390 = 0.5y$$

$$2(390) = 2(0.5y)$$

$$780 = y$$

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6 Solve the equation.

$$\frac{1}{2}x - \frac{1}{2} = -4$$

- LCD: 2
- A 9
 - B 7
 - C -9
 - D -7
 - E All numbers are solutions
 - F No solution

$$2 \left(\frac{1}{2}x - \frac{1}{2} \right) = 2(-4)$$

$$x - 1 = -8$$

$$x - 1 + 1 = -8 + 1$$

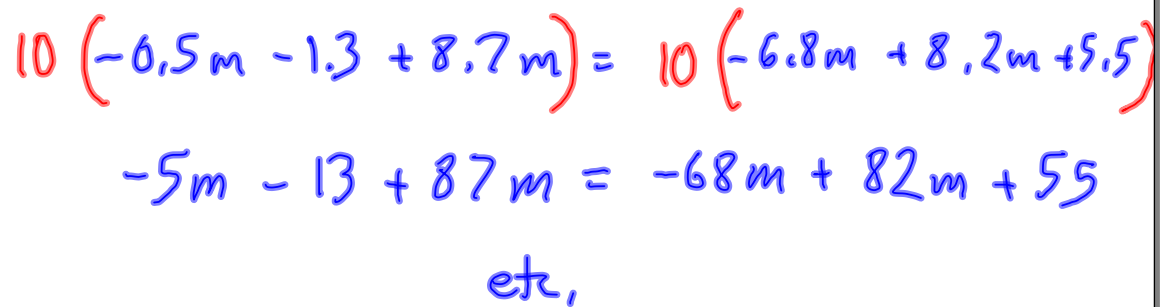
$$x = -7$$

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7 Solve the equation.

$$-0.5m - 1.3 + 8.7m = -6.8 + 8.2m + 5.5$$

- A 0
- B 12.3
- C 6.8
- D -5.1
- E All numbers are solutions
- F No solution



Handwritten solution for problem 7:

$$10(-0.5m - 1.3 + 8.7m) = 10(-6.8 + 8.2m + 5.5)$$
$$-5m - 13 + 87m = -68 + 82m + 55$$

etc,

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8 Solve the equation.

$$6x + 4 - 3x + 8 = 6x - 3x + 9$$

- A -96
- B 96
- C 28
- D -28
- E All numbers are solutions
- F No solution

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9 Solve the equation.

$$4(x + 3) + 57 = 7x - 3(x - 9)$$

- A 84
- B 30
- C -84
- D -30
- E All numbers are solutions
- F No solution

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10 Solve the equation.

$$\frac{x}{6} - 10 = -5$$

- A 30
- B 32
- C -30
- D -32
- E All numbers are solutions
- F No solution

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11 Solve the equation.

$$0.80x - 0.30(20 + x) = 0.95(20)$$

- A 50
- B 40
- C 25
- D 60
- E All numbers are solutions
- F No solution

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12 Solve the equation.

$$\frac{1}{3}x - 3 = 1$$

- A 6
- B -6
- C 12
- D -12
- E All numbers are solutions
- F No solution

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13 Solve the equation.

$$\frac{2(7 - x)}{5} = x$$

- A 2
- B 14
- C -2
- D -14
- E All numbers are solutions
- F No solution

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14 Solve the equation.

$$1.2x + 4.4 = 0.6x + 2.36$$

- A 0.294
- B -3.41
- C -3.4
- D -3.434
- E All numbers are solutions
- F No solution

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15 Solve the equation.

$$\frac{x}{9} - 6 = \frac{x}{9}$$

- A 27
- B 5
- C -27
- D -5
- E All numbers are solutions
- F No solution

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16 Solve the equation.

$$\frac{2(9 - x)}{3} = -x$$

- A -2
- B 2
- C -18
- D 18
- E All numbers are solutions
- F No solution

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