

Solving Equations and Inequations - Lesson 2

Equations with Brackets and Fractions

LI

- Solve equations with brackets and fractions.

SC

- Expand brackets.
- Eliminate fractions.
- Simplify.

- Eliminate fractions.
- Break brackets.
- Collect like terms.
- Solve.

Example 1

$$\frac{x}{7} = 6$$

$$\times 7 \quad \frac{x}{7} = 6 \quad \times 7$$

$$x = 42$$

Example 2

$$\frac{3x + 2}{6} = 8$$

$$\times 6 \quad \frac{3x + 2}{6} = 8 \quad \times 6$$

$$3x + 2 = 48$$

$$3x = 46$$

$$x = \frac{46}{3}$$

Example 3

$$\frac{3}{4} (2x - 1) = 9$$

$$\frac{3^{x4}}{4} (2x - 1) = 9^{x4}$$

$$3(2x - 1) = 36$$

$$6x - 3 = 36$$

$$6x = 39$$

$$x = \frac{39}{6}$$

$$x = \frac{13}{2}$$

Example 4

$$\frac{5x + 2}{4} - \frac{2x - 3}{7} = -1$$

$$\frac{5x + 2}{4} \times 28 - \frac{2x - 3}{7} \times 28 = -1 \times 28$$

$$7(5x + 2) - 4(2x - 3) = -28$$

$$35x + 14 - 8x + 12 = -28$$

$$27x + 26 = -28$$

$$27x = -54$$

$$x = -\frac{54}{27}$$

$$x = -2$$

Questions

1 Solve the following.

a $\frac{x}{6} = 5$

b $\frac{x}{9} = -4$

c $\frac{x+7}{3} = 5$

d $\frac{x-4}{5} = 2$

e $\frac{1}{5}x = 8$

f $\frac{1}{9}x = 6$

g $\frac{3}{4}x = 18$

h $\frac{3x+9}{5} = 6$

i $\frac{2}{3}(9-4x) = 14$

2 Solve the following, giving your answer as a fraction or mixed number where necessary.

a $\frac{x}{2} + \frac{x}{4} = 5$

b $\frac{x}{2} - \frac{x}{3} = 4$

c $\frac{5x}{3} + \frac{x}{6} = 1$

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

e $\frac{1}{4}x + \frac{1}{5}x = 20$

f $\frac{x}{8} = 2 + \frac{3x}{4}$

3 Solve the following, giving your answer as a fraction or mixed number where necessary.

a $\frac{x-3}{2} + \frac{4x}{3} = 15$

b $\frac{x+1}{5} - \frac{x-1}{6} = 2$

c $\frac{2x-1}{3} + \frac{3x+1}{4} = 1$

d $\frac{4x+1}{3} + \frac{x+2}{5} = -2$

e $2x - \frac{(3x-1)}{4} = 4$

f $\frac{3(x+1)}{4} - \frac{4(x-2)}{3} = -1$

g $\frac{1}{5}(2x-3) - \frac{2}{3}(4-x) = -4$

h $\frac{x+3}{2} - \frac{5}{6}(1-2x) = 1$

4 There are x biscuits in a family-sized tin. At a party, 45 of them are eaten, and three eighths of the biscuits remain. Set up an equation and solve it to find how many biscuits were in the tin to start with.

5 I think of a number. I multiply this number by 3, add 5 and divide the result by 8. My answer is four ninths of the original number. Form an equation and solve it to find the original number.

Answers

1 a $x = 30$	2 a $x = 6\frac{2}{3}$	3 a $x = 9$
b $x = -36$	b $x = 24$	b $x = 49$
c $x = 8$	c $x = \frac{6}{11}$	c $x = \frac{13}{17}$
d $x = 14$	d $x = -30$	d $x = -1\frac{18}{23}$
e $x = 40$	e $x = 44\frac{4}{9}$	e $x = 3$
f $x = 54$	f $x = -3\frac{1}{5}$	f $x = 7\frac{4}{7}$
g $x = 24$		g $x = -\frac{11}{16}$
h $x = 7$		h $x = \frac{2}{13}$
i $x = -3$		4 $x = 72$ biscuits.
		5 Original number is 9.