Linear Equations

Ex 1

$$x + 2 = 6$$

$$\cancel{x + 2 - 2 = 6 - 2}$$

$$x = 6 - 2$$

$$x = 4$$

Ex 2

$$y - 3 = 5$$

$$\cancel{y - 3 + 3 = 5 + 3}$$

$$y = 5 + 3$$

$$y = 8$$

Ex 3

$$2x = 10$$

$$\cancel{\frac{2x}{2} = \frac{10}{2}}$$

$$x = \frac{10}{2}$$

$$x = 5$$

Ex 4

$$\frac{x}{3} = 2$$

$$\cancel{\frac{x}{3} \times 3 = 2 \times 3}$$

$$x = 2 \times 3$$

$$x = 6$$

Exercise

1) $x + 7 = 10$

$x = 10 - 7$

$x = 3$

2) $x - 1 = 7$

$x = 7 + 1$

$x = 8$

3) $4x = 12$

$x = \frac{12}{4}$

4) $\frac{x}{2} = 4$

$\underline{x = 3}$

$x = 4 \times 2$

$\underline{x = 8}$

5) $y + 9 = 11$

$y = 11 - 9$

$\underline{y = 2}$

6) $p - 5 = 1$

$p = 1 + 5$

$\underline{p = 6}$

7) $10x = 50$

$x = \frac{50}{10}$

$\underline{x = 5}$

8) $\frac{x}{10} = 3$

$x = 3 \times 10$

$\underline{x = 30}$

Examples (5 line equations)

1) $2x + 3 = 11$

$2x = 11 - 3$

$2x = 8$

$x = \frac{8}{2}$

$\underline{x = 4}$

2) $3x - 4 = 11$

$3x = 11 + 4$

$3x = 15$

$x = \frac{15}{3}$

$\underline{x = 5}$

Exercise

1) $2x - 1 = 5$

2) $2x + 7 = 17$

6) $6x - 7 = 5$

7) $7x + 3 = 24$

3) $3x + 8 = 20$

4) $4x - 5 = 19$

5) $5x + 5 = 55$

8) $8x - 9 = 31$

9) $9x - 7 = 83$

10) $10x + 4 = 46$

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1) $2x - 1 = 5$

$2x = 5 + 1$

$2x = 6$

$x = \frac{6}{2}$

$\underline{x = 3}$

2) $2x + 7 = 17$

$2x = 17 - 7$

$2x = 10$

$x = \frac{10}{2}$

$\underline{x = 5}$

3) $3x + 8 = 20$

$3x = 20 - 8$

$3x = 12$

$x = \frac{12}{3}$

$\underline{x = 4}$

4) $4x - 5 = 19$

$4x = 19 + 5$

$4x = 24$

$x = \frac{24}{4}$

$\underline{x = 6}$

5) $5x + 5 = 55$

$5x = 55 - 5$

$5x = 50$

$x = \frac{50}{5}$

$\underline{x = 10}$

6) $6x - 7 = 5$

$6x = 5 + 7$

$6x = 12$

$x = \frac{12}{6}$

$\underline{x = 2}$

7) $7x + 3 = 24$

$7x = 24 - 3$

$7x = 21$

$x = \frac{21}{7}$

$\underline{x = 3}$

8) $8x - 9 = 31$

$8x = 31 + 9$

$8x = 40$

$x = \frac{40}{8}$

$\underline{x = 5}$

9) $9x - 7 = 83$

$9x = 83 + 7$

$9x = 90$

$x = \frac{90}{9}$

$\underline{x = 10}$

10) $10x + 4 = 46$

$10x = 46 - 4$

$10x = 42$

$x = \frac{42}{10}$

$x = 4 \cdot 2$

or $x = 4\frac{2}{10}$

or $x = 4\frac{1}{5}$

Bill is twice as old as Alan.

Colin is 5 years older than Bill.

Colin is 17 years old.

How old is Alan?

Let Alan be x years old

Bill is $2x$

Colin is $2x + 5$

However, $2x + 5 = 17$

$2x = 17 - 5$

$2x = 12$

$x = \frac{12}{2}$

$\underline{x = 6}$

Alan is 6 years old

Mixed Number Answers

Ex1

$3x + 11 = 24$

$3x = 24 - 11$

$3x = 13$

$x = \frac{13}{3}$

$x = 4\frac{1}{3}$

Ex2

$7x - 9 = 50$

$7x = 50 + 9$

$7x = 59$

$x = \frac{59}{7}$

$x = 8\frac{3}{7}$

Exercise Solve

1) $2x + 10 = 17$

2) $2x - 3 = 14$

3) $3x + 1 = 23$

6) $6x - 3 = 18$

7) $7x + 5 = 14$

8) $8x + 1 = 80$

4) $4x - 7 = 20$

5) $5x + 6 = 20$

9) $9x + 3 = 20$

10) $10x - 5 = 30$

1)

$2x + 10 = 17$

$2x = 17 - 10$

$2x = 7$

$x = \frac{7}{2}$

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

2)

$2x - 3 = 14$

$2x = 14 + 3$

$2x = 17$

$x = \frac{17}{2}$

$x = 8\frac{1}{2}$

3)

$3x + 1 = 23$

$3x = 23 - 1$

$3x = 22$

$x = \frac{22}{3}$

$x = 7\frac{1}{3}$

4)

$4x - 7 = 20$

$4x = 20 + 7$

$4x = 27$

$x = \frac{27}{4}$

$x = 6\frac{3}{4}$

5)

$5x + 6 = 20$

$5x = 20 - 6$

$5x = 14$

$x = \frac{14}{5}$

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

6)

$6x - 3 = 18$

$6x = 18 + 3$

$6x = 21$

$x = \frac{21}{6}$

$x = 3\frac{3}{6}$ or $3\frac{1}{2}$

7) $7x + 5 = 14$

$7x = 14 - 5$

$7x = 9$

$x = \frac{9}{7}$

$x = 1\frac{2}{7}$

8) $8x + 1 = 80$

$8x = 80 - 1$

$8x = 79$

$x = 9\frac{7}{8}$

9) $9x + 3 = 20$

$9x = 20 - 3$

$9x = 17$

$x = \frac{17}{9}$

$x = 1\frac{8}{9}$

10) $10x - 5 = 30$

$10x = 30 + 5$

$10x = 35$

$x = \frac{35}{10}$

$x = 3\frac{5}{10}$

or $x = 3\frac{1}{2}$

Equations With x on Both Sides

Ex 1

$8x - 5 = 5x + 16$

$8x - 5x = +16 + 5$

$3x = 21$

$x = \frac{21}{3}$

$x = 7$

Ex2

$$5x + 1 = 19 - 4x$$

$$5x + 4x = 19 - 1$$

$$9x = 18$$

$$x = \frac{18}{9}$$

$$\underline{x = 2}$$

3)

$$5x - 7 = x + 9$$

$$5x - x = 9 + 7$$

$$4x = 16$$

$$x = \frac{16}{4}$$

$$\underline{x = 4}$$