

1.) Add/subtract the following (without a calculator).

a.) $\frac{3}{5} + \frac{9}{4} =$

b.) $\frac{22}{7} - 12 =$

c.) $\frac{13}{15} - \frac{3}{10} =$

2.) Multiply/divide the following (without a calculator).

a.) $9\left(\frac{16}{3}\right) =$

b.) $\frac{5}{8} \div \frac{15}{2} =$

c.) $\frac{\frac{4}{7}}{3} =$

3.) Simplify each numerical expression (without a calculator).

a.) $\frac{6 \cdot 2 - 1}{9 + 2}$

b.) $6 \times (4 + 10 \div 2)$

c.) $2 + 3^2 - 4 \times 5$

4.) Evaluate each expression.

a.) $a - 7 \cdot 2$ for $a = 15$

b.) $2\left(\frac{5d-6}{3}\right)$ for $d = 9$

c.) $(-2x)^3$ for $x = 3$

5.) Evaluate each expression for $x = -3$, $y = 5$ and $z = 1$.

a.) $3x + 2y - z$

b.) $\frac{y^2 + 2z}{x}$

c.) $z^0 - x^3 + y$

6.) Solve the following equations for x .

a.) $10 = -\frac{x}{2}$

b.) $-5\frac{1}{3} = x + \frac{1}{2}$

c.) $6x = -\frac{1}{4}$

d.) $7 - 3x = 16$

e.) $\frac{x}{5} + 15 = 30$

f.) $14 + \frac{x}{5} = 2$

g.) $x - 7 + 3x = 29$

h.) $x - \frac{20}{3} + x = \frac{13}{3}$

i.) $x + x + 2 + 3x - 6 = 31$

j.) $x + 5(x - 1) = 1$

k.) $8x - (2x - 3) = 9$

l.) $\frac{3}{4}(8x - 4) = -2$

m.) $\frac{x}{4} + \frac{3x}{5} = 17$

n.) $\frac{7}{8}x = 14$

o.) $\frac{3x}{2} - \frac{3x}{4} = \frac{3}{2}$

7.) A rectangle has a perimeter of 42 cm. The length is 3 cm greater than the width. Find the length and width of the rectangle.

8.) Find each percent of change (positive or negative).

a.) \$26 to \$20

b.) 21 in to 54 in

c.) \$24000 to \$25000

9.) Solve each of the following equations for x .

a.) $4x - 7 = x + 3(5 - x)$

b.) $\frac{3}{4}x = \frac{1}{2} + \frac{2}{3}x$

c.) $-\frac{37}{24} = \frac{x}{6}$

d.) $|x - 2| = 6$

e.) $|7x| = 14$

f.) $12.9 = |3x|$

10.) A truck traveling 45 mi/h and a train traveling 60 mi/h cover the same distance. The truck travels 2 h longer than the train.

a.) How many hours did each travel?

b.) How many miles did each travel?

11.) Solve the following equations for y .

a.) $\frac{x+y}{z} = \frac{w}{4}$

b.) $V = \frac{1}{3}\pi r^2 y$

c.) $ax + by = c$

12.) Solve the following inequalities for x .

a.) $24 < -3x$

b.) $\frac{3}{2}x \geq -45$

c.) $-\frac{3x}{7} \leq -\frac{12}{35}$

d.) $5 \leq 11 + 3x$

e.) $3 + 5x \geq 6(x - 1) - x$

f.) $7 - (9x + 1) > 5$

13.) Find the slope of a line passing through each pair of points.

a.) $(8, 3); (-4, 3)$

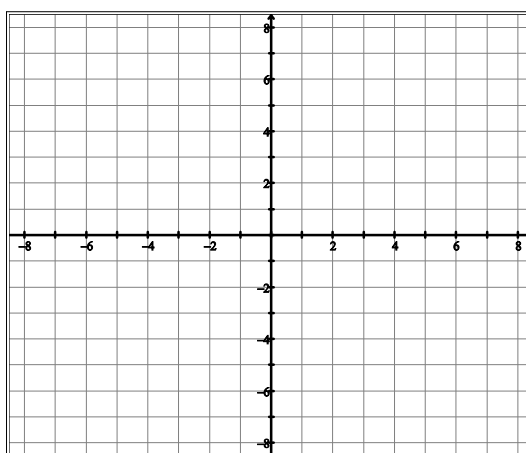
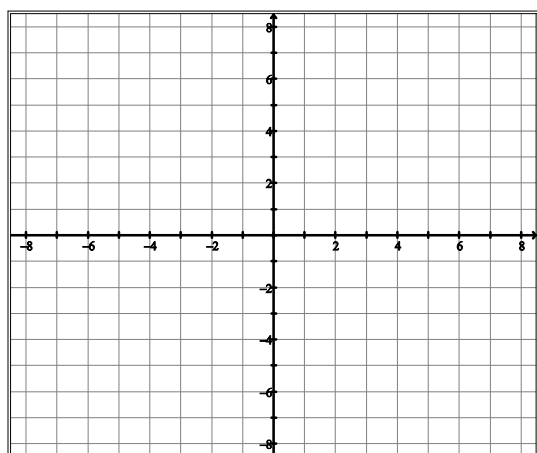
b.) $(9, -2); (3, -4)$

c.) $\left(\frac{1}{2}, 8\right); (1, -2)$

14.) Graph each of the following equations.

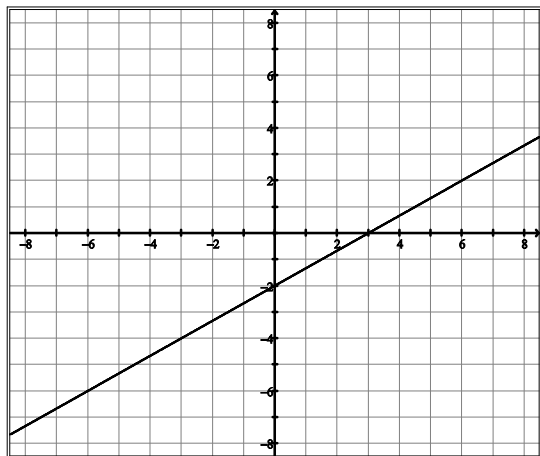
a.) $y = 2x - 1$

b.) $y + \frac{3}{4}x = 2$

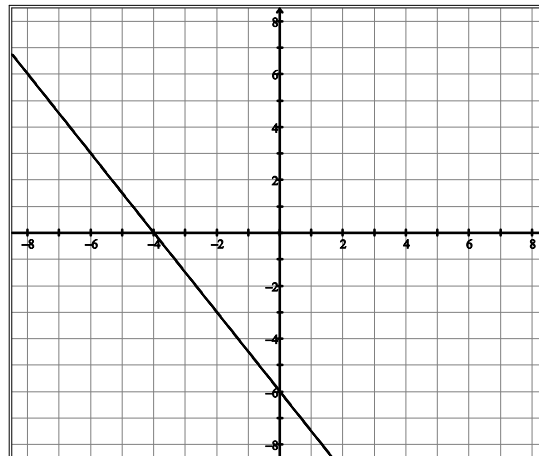


15.) Write a *slope – intercept* form equation for each of the following lines.

a.)



b.)



16.) Write an equation of a line, in slope-intercept form, through the following pairs of points.

a.) $(3, -3); (-3, 1)$

b.) $(-8, 2); (1, 3)$

c.) $(1, -8); (-4, -7)$

17.) a.) Find the equation of a line parallel to $y = -\frac{2}{3}x + 12$ going through $(5, -3)$.

b.) Find the equation of a line perpendicular to $y = -4x - \frac{5}{2}$ going through $(1, 6)$.

18.) Solve the following systems of equation using *substitution*.

a.) $y = 3x + 1$
 $y = 3x - \frac{5}{2}$

b.) $x - 3y = 1$
 $2x + 5y = 13$

19.) Solve the following systems of equation using *elimination*.

a.) $3x + 4y = 9$
 $-3x - 2y = -3$

b.) $3x + 4y = 6$
 $-6x + y = 6$

20.) The sum of two numbers is 169. Twice one number plus three times the other number is -4 . Write a system of equations to model the problem, and find the two numbers.

21.) There were a total of 153 students and adults at the movie theatre on Friday night. Adult tickets cost \$9.00 each and student tickets cost \$3.50 each. The theatre collected a total of \$766.50 from ticket purchase. How many students attended the movie on Friday night?

22.) Solve the following equations for x .

a.) $x^2 = 49$

b.) $3x^2 - 7 = 41$

c.) $49x^2 - 16 = -7$

23.) Use the *quadratic formula* to solve the following equations for x .

a.) $3x^2 - 3x - 1 = 0$

b.) $x^2 - 12x = 13$

24.) Simplify each of the following expressions (answers must use positive exponents only).

a.) $3x^3 \cdot 4x^4$

b.) $(5x^5)(3y^6)(-3x^3y^2)$

c.) $(4x^{-3})(-2x^5)(-x^4)$

d.) $(a^2b^4)^3$

e.) $(4xy^2)^4(2y)^{-3}$

f.) $(2xy)^3(-x^2)^3(-y^3)^2$

g.) $\frac{(2a^7)(3a^2)}{6a^3}$

h.) $\frac{12x^7y^3z^2}{9x^2y^6z^2}$

i.) $\left(\frac{5m^3n}{m^5}\right)^{-2}$

25.) Find the distance and mid-point between $A(4, -3)$ and $B(8, -6)$.

26.) Simplify each radical expression.

a.) $5\sqrt{320}$

b.) $\sqrt{12} \cdot \sqrt{75}$

c.) $\sqrt{\frac{120}{121}}$

d.) $\sqrt{12x^3y^2}$

e.) $\sqrt{\frac{18x}{81}}$

f.) $\sqrt{20a^6b^5c^9}$

g.) $2\sqrt{12} - 7\sqrt{3}$

h.) $3\sqrt{7} - \sqrt{28}$

i.) $\sqrt{2}(\sqrt{8} - 4)$

j.) $3\sqrt{10}(\sqrt{10} + 4\sqrt{5})$

k.) $\frac{\sqrt{50} + \sqrt{32}}{\sqrt{2}}$

l.) $\sqrt{(x+3)^2}$

27.) Solve each radical equation.

a.) $\sqrt{5x+10} = 5$

b.) $\sqrt{x} = \frac{7}{8}$

c.) $20 = \sqrt{x} - 5$

d.) $\sqrt{3x+1} = \sqrt{x}$

e.) $\sqrt{7x+5} = \sqrt{x-3}$

f.) $\frac{x}{2} = \sqrt{3x}$

g.) $x = \sqrt{x+2}$

h.) $\sqrt{2x-15} = \frac{x}{4}$

28.) Simplify the following polynomials - write answers in standard form.

a.) $(3 - 2x + 3x^2) + (7 + 6x - 2x^2)$

b.) $(-2x^2 + x - 6) - (1 + 2x - 4x^2)$

c.) $-4w^2(3w^2 + 3 - 4w)$

d.) $x^2(x+1) - x(x^2 - 1)$

29.) Factor the following polynomials (GCF).

a.) $6m^6 - 24m^4 + 6m^2$

b.) $15k^3 + 3k^2 - 12k$

c.) $56x^4 - 32x^3 - 2x^2$

30.) Find each product (FOIL).

a.) $(x + 3)(x + 5)$

b.) $(2z + 5)(z - 3)$

c.) $(2x + 1)(3x + 4)$

d.) $(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2})$

e.) $(2x - 3)^2$

f.) $(x + 3)(x^2 - 2x - 8)$

31.) Factor the following trinomials into a product of two binomials (un-FOIL).

a.) $x^2 + 6x + 8$

b.) $x^2 - 7x + 12$

c.) $x^2 - 2x - 24$

d.) $2x^2 - 15x + 7$

e.) $3x^2 + 13x - 10$

f.) $6x^2 + 13x - 5$

32.) If $a^2 + b^2 = 9$ and $ab = 6$, what does $(a + b)^2$ equal?

33.) Solve the following equations by factoring.

a.) $x^2 + 3x - 4 = 0$

b.) $z^2 - 5z = -6$

c.) $6x^2 + 12x + 13 = 2x^2 + 4$

d.) $-8x^2 - 20x = 0$

e.) $x^3 - 10x^2 + 24x = 0$

f.) $x^2 - 13x - 48 = 0$

g.) $7x^2 + 22x + 26 = x^2 - 12x - 22$

34.) Simplify each expression - factor and cancel.

a.) $\frac{2x^2 + 2x}{3x^2 + 3x}$

b.) $\frac{3x^2 - 9x}{x - 3}$

c.) $\frac{x^2 + 2x + 1}{x + 1}$

d.) $\frac{7}{3x} + \frac{2}{5x}$

e.) $\frac{3}{8m^3} + \frac{1}{12m^2}$

f.) $\frac{17}{x + 1} + \frac{12}{x - 1}$

g.) $\frac{4}{x - 5} - \frac{3}{x + 5}$

h.) $\frac{5}{x + 2} + \frac{4}{x^2 - x - 6}$

i.) $\frac{1}{x - 2} - \frac{4}{2 - x}$