

Absolute Value Equations

Solve each equation.

1) $|6m| = 42$

2) $|-6x| = 30$

3) $|k - 10| = 3$

4) $\left|\frac{x}{7}\right| = 3$

5) $|7 + p| = 7$

6) $|-3p| = 15$

7) $7|n| = 56$

8) $\frac{|m|}{5} = 3$

9) $-3|p| = -12$

10) $|m| + 2 = 11$

11) $|n| + 1 = 2$

12) $\frac{|x|}{7} = 5$

13) $\frac{|a - 5|}{8} = 5$

14) $4|n + 8| = 56$

15) $|7m| + 3 = 73$

16) $\left|\frac{x}{7}\right| - 8 = -7$

17) $\frac{|-9 + v|}{8} = 3$

18) $-10|v + 2| = -70$

Absolute Value Equations

Solve each equation.

1) $|6m| = 42$

 $\{7, -7\}$

2) $|-6x| = 30$

 $\{-5, 5\}$

3) $|k - 10| = 3$

 $\{13, 7\}$

4) $\left|\frac{x}{7}\right| = 3$

 $\{21, -21\}$

5) $|7 + p| = 7$

 $\{0, -14\}$

6) $|-3p| = 15$

 $\{-5, 5\}$

7) $7|n| = 56$

 $\{8, -8\}$

8) $\frac{|m|}{5} = 3$

 $\{15, -15\}$

9) $-3|p| = -12$

 $\{4, -4\}$

10) $|m| + 2 = 11$

 $\{9, -9\}$

11) $|n| + 1 = 2$

 $\{1, -1\}$

12) $\frac{|x|}{7} = 5$

 $\{35, -35\}$

13) $\frac{|a - 5|}{8} = 5$

 $\{45, -35\}$

14) $4|n + 8| = 56$

 $\{6, -22\}$

15) $|7m| + 3 = 73$

 $\{10, -10\}$

16) $\left|\frac{x}{7}\right| - 8 = -7$

 $\{7, -7\}$

17) $\frac{|-9 + v|}{8} = 3$

 $\{33, -15\}$

18) $-10|v + 2| = -70$

 $\{5, -9\}$

Adding and Subtracting Polynomials

Simplify each expression.

1) $(5p^2 - 3) + (2p^2 - 3p^3)$

2) $(a^3 - 2a^2) - (3a^2 - 4a^3)$

3) $(4 + 2n^3) + (5n^3 + 2)$

4) $(4n - 3n^3) - (3n^3 + 4n)$

5) $(3a^2 + 1) - (4 + 2a^2)$

6) $(4r^3 + 3r^4) - (r^4 - 5r^3)$

7) $(5a + 4) - (5a + 3)$

8) $(3x^4 - 3x) - (3x - 3x^4)$

9) $(-4k^4 + 14 + 3k^2) + (-3k^4 - 14k^2 - 8)$

10) $(3 - 6n^5 - 8n^4) - (-6n^4 - 3n - 8n^5)$

11) $(12a^5 - 6a - 10a^3) - (10a - 2a^5 - 14a^4)$

12) $(8n - 3n^4 + 10n^2) - (3n^2 + 11n^4 - 7)$

13) $(-x^4 + 13x^5 + 6x^3) + (6x^3 + 5x^5 + 7x^4)$

14) $(9r^3 + 5r^2 + 11r) + (-2r^3 + 9r - 8r^2)$

15) $(13n^2 + 11n - 2n^4) + (-13n^2 - 3n - 6n^4)$

16) $(-7x^5 + 14 - 2x) + (10x^4 + 7x + 5x^5)$

17) $(7 - 13x^3 - 11x) - (2x^3 + 8 - 4x^5)$

18) $(13a^2 - 6a^5 - 2a) - (-10a^2 - 11a^5 + 9a)$

19) $(3v^5 + 8v^3 - 10v^2) - (-12v^5 + 4v^3 + 14v^2)$

20) $(8b^3 - 6 + 3b^4) - (b^4 - 7b^3 - 3)$

21) $(k^4 - 3 - 3k^3) + (-5k^4 + 6k^3 - 8k^5)$

22) $(-10k^2 + 7k + 6k^4) + (-14 - 4k^4 - 14k)$

23) $(-7n^2 + 8n - 4) - (-11n + 2 - 14n^2)$

24) $(14p^4 + 11p^2 - 9p^5) - (-14 + 5p^5 - 11p^2)$

25) $(8k + k^2 - 6) - (-10k + 7 - 2k^2)$

26) $(-9v^2 - 8u) + (-2uv - 2u^2 + v^2) + (-v^2 + 4uv)$

27) $(4x^2 + 7x^3y^2) - (-6x^2 - 7x^3y^2 - 4x) - (10x + 9x^2)$

28) $(-5u^3v^4 + 9u) + (-5u^3v^4 - 8u + 8u^2v^2) + (-8u^4v^2 + 8u^3v^4)$

29) $(-9xy^3 - 9x^4y^3) + (3xy^3 + 7y^4 - 8x^4y^4) + (3x^4y^3 + 2xy^3)$

30) $(y^3 - 7x^4y^4) + (-10x^4y^3 + 6y^3 + 4x^4y^4) - (x^4y^3 + 6x^4y^4)$

Adding and Subtracting Polynomials

Simplify each expression.

1) $(5p^2 - 3) + (2p^2 - 3p^3)$

$-3p^3 + 7p^2 - 3$

2) $(a^3 - 2a^2) - (3a^2 - 4a^3)$

$5a^3 - 5a^2$

3) $(4 + 2n^3) + (5n^3 + 2)$

$7n^3 + 6$

4) $(4n - 3n^3) - (3n^3 + 4n)$

$-6n^3$

5) $(3a^2 + 1) - (4 + 2a^2)$

$a^2 - 3$

6) $(4r^3 + 3r^4) - (r^4 - 5r^3)$

$2r^4 + 9r^3$

7) $(5a + 4) - (5a + 3)$

1

8) $(3x^4 - 3x) - (3x - 3x^4)$

$6x^4 - 6x$

9) $(-4k^4 + 14 + 3k^2) + (-3k^4 - 14k^2 - 8)$

$-7k^4 - 11k^2 + 6$

10) $(3 - 6n^5 - 8n^4) - (-6n^4 - 3n - 8n^5)$

$2n^5 - 2n^4 + 3n + 3$

11) $(12a^5 - 6a - 10a^3) - (10a - 2a^5 - 14a^4)$

$14a^5 + 14a^4 - 10a^3 - 16a$

12) $(8n - 3n^4 + 10n^2) - (3n^2 + 11n^4 - 7)$

$-14n^4 + 7n^2 + 8n + 7$

13) $(-x^4 + 13x^5 + 6x^3) + (6x^3 + 5x^5 + 7x^4)$

$18x^5 + 6x^4 + 12x^3$

14) $(9r^3 + 5r^2 + 11r) + (-2r^3 + 9r - 8r^2)$

$7r^3 - 3r^2 + 20r$

15) $(13n^2 + 11n - 2n^4) + (-13n^2 - 3n - 6n^4)$

$-8n^4 + 8n$

16) $(-7x^5 + 14 - 2x) + (10x^4 + 7x + 5x^5)$

$-2x^5 + 10x^4 + 5x + 14$

17) $(7 - 13x^3 - 11x) - (2x^3 + 8 - 4x^5)$

$4x^5 - 15x^3 - 11x - 1$

18) $(13a^2 - 6a^5 - 2a) - (-10a^2 - 11a^5 + 9a)$

$5a^5 + 23a^2 - 11a$

19) $(3v^5 + 8v^3 - 10v^2) - (-12v^5 + 4v^3 + 14v^2)$

$15v^5 + 4v^3 - 24v^2$

20) $(8b^3 - 6 + 3b^4) - (b^4 - 7b^3 - 3)$

$2b^4 + 15b^3 - 3$

21) $(k^4 - 3 - 3k^3) + (-5k^4 + 6k^3 - 8k^5)$

$-8k^5 - 4k^4 + 3k^3 - 3$

22) $(-10k^2 + 7k + 6k^4) + (-14 - 4k^4 - 14k)$

$2k^4 - 10k^2 - 7k - 14$

23) $(-7n^2 + 8n - 4) - (-11n + 2 - 14n^2)$

$7n^2 + 19n - 6$

24) $(14p^4 + 11p^2 - 9p^5) - (-14 + 5p^5 - 11p^2)$

$-14p^5 + 14p^4 + 22p^2 + 14$

25) $(8k + k^2 - 6) - (-10k + 7 - 2k^2)$

$3k^2 + 18k - 13$

26) $(-9v^2 - 8u) + (-2uv - 2u^2 + v^2) + (-v^2 + 4uv)$

$-9v^2 + 2uv - 2u^2 - 8u$

27) $(4x^2 + 7x^3y^2) - (-6x^2 - 7x^3y^2 - 4x) - (10x + 9x^2)$

$14x^3y^2 + x^2 - 6x$

28) $(-5u^3v^4 + 9u) + (-5u^3v^4 - 8u + 8u^2v^2) + (-8u^4v^2 + 8u^3v^4)$

$-2u^3v^4 - 8u^4v^2 + 8u^2v^2 + u$

29) $(-9xy^3 - 9x^4y^3) + (3xy^3 + 7y^4 - 8x^4y^4) + (3x^4y^3 + 2xy^3)$

$-8x^4y^4 - 6x^4y^3 + 7y^4 - 4xy^3$

30) $(y^3 - 7x^4y^4) + (-10x^4y^3 + 6y^3 + 4x^4y^4) - (x^4y^3 + 6x^4y^4)$

$-9x^4y^4 - 11x^4y^3 + 7y^3$

Exponents and Division

Simplify. Your answer should contain only positive exponents.

1) $\frac{5^4}{5}$

2) $\frac{3}{3^3}$

3) $\frac{2^2}{2^3}$

4) $\frac{2^4}{2^2}$

5) $\frac{3r^3}{2r}$

6) $\frac{7k^2}{4k^3}$

7) $\frac{10p^4}{6p}$

8) $\frac{3b}{10b^3}$

9) $\frac{8m^3}{10m^3}$

10) $\frac{7n^3}{2n^5}$

11) $\frac{2n^2}{n}$

12) $\frac{8x^3}{10x^5}$

13) $\frac{12x^3}{9y^8}$

14) $\frac{14x^4y^7}{6x^5y^4}$

15) $\frac{11u^4}{17u^7v^9}$

16) $\frac{4y^4}{14yx^8}$

17) $\frac{12yx^4}{10yx^8}$

18) $\frac{18x^8y^8}{10x^3}$

19) $\frac{5n^8}{20n^8}$

20) $\frac{16yx^4}{9x^8y^2}$

Exponents and Division

Simplify. Your answer should contain only positive exponents.

1) $\frac{5^4}{5}$

5^3

2) $\frac{3}{3^3}$

$\frac{1}{3^2}$

3) $\frac{2^2}{2^3}$

$\frac{1}{2}$

4) $\frac{2^4}{2^2}$

2^2

5) $\frac{3r^3}{2r}$

$\frac{3r^2}{2}$

6) $\frac{7k^2}{4k^3}$

$\frac{7}{4k}$

7) $\frac{10p^4}{6p}$

$\frac{5p^3}{3}$

8) $\frac{3b}{10b^3}$

$\frac{3}{10b^2}$

9) $\frac{8m^3}{10m^3}$

$\frac{4}{5}$

10) $\frac{7n^3}{2n^5}$

$\frac{7}{2n^2}$

$$11) \frac{2n^2}{n}$$
$$2n$$

$$12) \frac{8x^3}{10x^5}$$
$$\frac{4}{5x^2}$$

$$13) \frac{12x^3}{9y^8}$$
$$\frac{4x^3}{3y^8}$$

$$14) \frac{14x^4y^7}{6x^5y^4}$$
$$\frac{7y^3}{3x}$$

$$15) \frac{11u^4}{17u^7v^9}$$
$$\frac{11}{17u^3v^9}$$

$$16) \frac{4y^4}{14yx^8}$$
$$\frac{2y^3}{7x^8}$$

$$17) \frac{12yx^4}{10yx^8}$$
$$\frac{6}{5x^4}$$

$$18) \frac{18x^8y^8}{10x^3}$$
$$\frac{9x^5y^8}{5}$$

$$19) \frac{5n^8}{20n^8}$$
$$\frac{1}{4}$$

$$20) \frac{16yx^4}{9x^8y^2}$$
$$\frac{16}{9x^4y}$$

Exponents and Multiplication

Simplify. Your answer should contain only positive exponents.

1) $4^2 \cdot 4^2$

2) $4 \cdot 4^2$

3) $3^2 \cdot 3^2$

4) $2 \cdot 2^2 \cdot 2^2$

5) $2n^4 \cdot 5n^4$

6) $6r \cdot 5r^2$

7) $2n^4 \cdot 6n^4$

8) $6k^2 \cdot k$

9) $5b^2 \cdot 8b$

10) $4x^2 \cdot 3x$

11) $6x \cdot 2x^2$

12) $6x \cdot 6x^3$

$$13) 7v^3 \cdot 10u^3v^5 \cdot 8uv^3$$

$$14) 9xy^2 \cdot 9x^5y^2$$

$$15) 6m^3n^3 \cdot 8m^2n^3$$

$$16) 6x^2 \cdot 6x^3y^4$$

$$17) 7u^2v^5 \cdot 9uv^3$$

$$18) uv \cdot 4uv^5$$

$$19) 10xy^3 \cdot 8x^5y^3$$

$$20) 3u^4v^5 \cdot 7u^2v^3$$

$$21) (2x^2)^2$$

$$22) (p^4)^4$$

$$23) (k^3)^4$$

$$24) (7k)^2$$

$$25) (x^2)^3$$

$$26) (2b^2)^4$$

Exponents and Multiplication

Simplify. Your answer should contain only positive exponents.

1) $4^2 \cdot 4^2$

4^4

2) $4 \cdot 4^2$

4^3

3) $3^2 \cdot 3^2$

3^4

4) $2 \cdot 2^2 \cdot 2^2$

2^5

5) $2n^4 \cdot 5n^4$

$10n^8$

6) $6r \cdot 5r^2$

$30r^3$

7) $2n^4 \cdot 6n^4$

$12n^8$

8) $6k^2 \cdot k$

$6k^3$

9) $5b^2 \cdot 8b$

$40b^3$

10) $4x^2 \cdot 3x$

$12x^3$

11) $6x \cdot 2x^2$

$12x^3$

12) $6x \cdot 6x^3$

$36x^4$

$$13) 7v^3 \cdot 10u^3v^5 \cdot 8uv^3$$
$$560v^{11}u^4$$

$$14) 9xy^2 \cdot 9x^5y^2$$
$$81x^6y^4$$

$$15) 6m^3n^3 \cdot 8m^2n^3$$
$$48m^5n^6$$

$$16) 6x^2 \cdot 6x^3y^4$$
$$36x^5y^4$$

$$17) 7u^2v^5 \cdot 9uv^3$$
$$63u^3v^8$$

$$18) uv \cdot 4uv^5$$
$$4u^2v^6$$

$$19) 10xy^3 \cdot 8x^5y^3$$
$$80x^6y^6$$

$$20) 3u^4v^5 \cdot 7u^2v^3$$
$$21u^6v^8$$

$$21) (2x^2)^2$$
$$4x^4$$

$$22) (p^4)^4$$
$$p^{16}$$

$$23) (k^3)^4$$
$$k^{12}$$

$$24) (7k)^2$$
$$49k^2$$

$$25) (x^2)^3$$
$$x^6$$

$$26) (2b^2)^4$$
$$16b^8$$

Factoring Special Cases

Factor each completely.

1) $16n^2 - 9$

2) $4m^2 - 25$

3) $16b^2 - 40b + 25$

4) $4x^2 - 4x + 1$

5) $9x^2 - 1$

6) $n^2 - 25$

7) $n^4 - 100$

8) $a^4 - 9$

9) $k^4 - 36$

10) $n^4 - 49$

$$11) 98n^2 - 200$$

$$12) 3 + 6b + 3b^2$$

$$13) 400 - 36v^2$$

$$14) 100x^2 + 180x + 81$$

$$15) 10n^2 + 100n + 250$$

$$16) 49n^2 - 56n + 16$$

$$17) 49x^2 - 100$$

$$18) 1 - r^2$$

$$19) 10p^3 - 1960p$$

$$20) 343b^2 - 7b^4$$

$$21) 81v^4 - 900v^2$$

$$22) 200m^4 + 80m^3 + 8m^2$$

Factoring Special Cases

Factor each completely.

1) $16n^2 - 9$

$(4n + 3)(4n - 3)$

2) $4m^2 - 25$

$(2m + 5)(2m - 5)$

3) $16b^2 - 40b + 25$

$(4b - 5)^2$

4) $4x^2 - 4x + 1$

$(2x - 1)^2$

5) $9x^2 - 1$

$(3x + 1)(3x - 1)$

6) $n^2 - 25$

$(n + 5)(n - 5)$

7) $n^4 - 100$

$(n^2 + 10)(n^2 - 10)$

8) $a^4 - 9$

$(a^2 + 3)(a^2 - 3)$

9) $k^4 - 36$

$(k^2 + 6)(k^2 - 6)$

10) $n^4 - 49$

$(n^2 + 7)(n^2 - 7)$

11) $98n^2 - 200$

$2(7n + 10)(7n - 10)$

12) $3 + 6b + 3b^2$

$3(1 + b)^2$

13) $400 - 36v^2$

$4(10 + 3v)(10 - 3v)$

14) $100x^2 + 180x + 81$

$(10x + 9)^2$

15) $10n^2 + 100n + 250$

$10(n + 5)^2$

16) $49n^2 - 56n + 16$

$(7n - 4)^2$

17) $49x^2 - 100$

$(7x + 10)(7x - 10)$

18) $1 - r^2$

$(1 + r)(1 - r)$

19) $10p^3 - 1960p$

$10p(p + 14)(p - 14)$

20) $343b^2 - 7b^4$

$7b^2(7 + b)(7 - b)$

21) $81v^4 - 900v^2$

$9v^2(3v + 10)(3v - 10)$

22) $200m^4 + 80m^3 + 8m^2$

$8m^2(5m + 1)^2$

Factoring Trinomials (a = 1)

Factor each completely.

1) $b^2 + 8b + 7$

2) $n^2 - 11n + 10$

3) $m^2 + m - 90$

4) $n^2 + 4n - 12$

5) $n^2 - 10n + 9$

6) $b^2 + 16b + 64$

7) $m^2 + 2m - 24$

8) $x^2 - 4x + 24$

9) $k^2 - 13k + 40$

10) $a^2 + 11a + 18$

11) $n^2 - n - 56$

12) $n^2 - 5n + 6$

13) $b^2 - 6b + 8$

14) $n^2 + 6n + 8$

15) $2n^2 + 6n - 108$

16) $5n^2 + 10n + 20$

17) $2k^2 + 22k + 60$

18) $a^2 - a - 90$

19) $p^2 + 11p + 10$

20) $5v^2 - 30v + 40$

21) $2p^2 + 2p - 4$

22) $4v^2 - 4v - 8$

23) $x^2 - 15x + 50$

24) $v^2 - 7v + 10$

25) $p^2 + 3p - 18$

26) $6v^2 + 66v + 60$

Factoring Trinomials (a = 1)

Factor each completely.

1) $b^2 + 8b + 7$

$(b + 7)(b + 1)$

2) $n^2 - 11n + 10$

$(n - 10)(n - 1)$

3) $m^2 + m - 90$

$(m - 9)(m + 10)$

4) $n^2 + 4n - 12$

$(n - 2)(n + 6)$

5) $n^2 - 10n + 9$

$(n - 1)(n - 9)$

6) $b^2 + 16b + 64$

$(b + 8)^2$

7) $m^2 + 2m - 24$

$(m + 6)(m - 4)$

8) $x^2 - 4x + 24$

Not factorable

9) $k^2 - 13k + 40$

$(k - 5)(k - 8)$

10) $a^2 + 11a + 18$

$(a + 2)(a + 9)$

11) $n^2 - n - 56$

$(n + 7)(n - 8)$

12) $n^2 - 5n + 6$

$(n - 2)(n - 3)$

$$13) b^2 - 6b + 8$$
$$(b - 4)(b - 2)$$

$$14) n^2 + 6n + 8$$
$$(n + 2)(n + 4)$$

$$15) 2n^2 + 6n - 108$$
$$2(n + 9)(n - 6)$$

$$16) 5n^2 + 10n + 20$$
$$5(n^2 + 2n + 4)$$

$$17) 2k^2 + 22k + 60$$
$$2(k + 5)(k + 6)$$

$$18) a^2 - a - 90$$
$$(a - 10)(a + 9)$$

$$19) p^2 + 11p + 10$$
$$(p + 10)(p + 1)$$

$$20) 5v^2 - 30v + 40$$
$$5(v - 2)(v - 4)$$

$$21) 2p^2 + 2p - 4$$
$$2(p - 1)(p + 2)$$

$$22) 4v^2 - 4v - 8$$
$$4(v + 1)(v - 2)$$

$$23) x^2 - 15x + 50$$
$$(x - 10)(x - 5)$$

$$24) v^2 - 7v + 10$$
$$(v - 5)(v - 2)$$

$$25) p^2 + 3p - 18$$
$$(p - 3)(p + 6)$$

$$26) 6v^2 + 66v + 60$$
$$6(v + 10)(v + 1)$$

Powers of Products and Quotients

Simplify. Your answer should contain only positive exponents.

1) $(3a^2)^3$

2) $(2n^4)^4$

3) $(3x^4)^4$

4) $(6b^2)^2$

5) $(7y^4)^2$

6) $(3ab^4)^4$

7) $(2x^4y^4)^3$

8) $(5mn^3)^3$

9) $(x^2y^2)^2$

10) $(6yx^4)^2$

11) $(u^4v^3)^2$

12) $(2x^4y^4)^4$

13) $(3x^2 \cdot 2x^2)^2$

14) $(2p^3 \cdot 2p)^2$

15) $(4n^3 \cdot n^2)^2$

16) $(3x \cdot 2x)^2$

17) $(4x^4 \cdot x^4)^3$

18) $(4n^4 \cdot n)^2$

Powers of Products and Quotients

Simplify. Your answer should contain only positive exponents.

1) $(3a^2)^3$

$27a^6$

2) $(2n^4)^4$

$16n^{16}$

3) $(3x^4)^4$

$81x^{16}$

4) $(6b^2)^2$

$36b^4$

5) $(7y^4)^2$

$49y^8$

6) $(3ab^4)^4$

$81a^4b^{16}$

7) $(2x^4y^4)^3$

$8x^{12}y^{12}$

8) $(5mn^3)^3$

$125m^3n^9$

9) $(x^2y^2)^2$

x^4y^4

10) $(6yx^4)^2$

$36y^2x^8$

11) $(u^4v^3)^2$

u^8v^6

12) $(2x^4y^4)^4$

$16x^{16}y^{16}$

13) $(3x^2 \cdot 2x^2)^2$

$36x^8$

14) $(2p^3 \cdot 2p)^2$

$16p^8$

15) $(4n^3 \cdot n^2)^2$

$16n^{10}$

16) $(3x \cdot 2x)^2$

$36x^4$

17) $(4x^4 \cdot x^4)^3$

$64x^{24}$

18) $(4n^4 \cdot n)^2$

$16n^{10}$

Factoring Trinomials ($a > 1$)**Factor each completely.**

1) $3p^2 - 2p - 5$

2) $2n^2 + 3n - 9$

3) $3n^2 - 8n + 4$

4) $5n^2 + 19n + 12$

5) $2v^2 + 11v + 5$

6) $2n^2 + 5n + 2$

7) $7a^2 + 53a + 28$

8) $9k^2 + 66k + 21$

9) $15n^2 - 27n - 6$

10) $5x^2 - 18x + 9$

11) $4n^2 - 15n - 25$

12) $4x^2 - 35x + 49$

13) $4n^2 - 17n + 4$

14) $6x^2 + 7x - 49$

15) $6x^2 + 37x + 6$

16) $-6a^2 - 25a - 25$

17) $6n^2 + 5n - 6$

18) $16b^2 + 60b - 100$

Factoring Trinomials ($a > 1$)**Factor each completely.**

1) $3p^2 - 2p - 5$

$(3p - 5)(p + 1)$

2) $2n^2 + 3n - 9$

$(2n - 3)(n + 3)$

3) $3n^2 - 8n + 4$

$(3n - 2)(n - 2)$

4) $5n^2 + 19n + 12$

$(5n + 4)(n + 3)$

5) $2v^2 + 11v + 5$

$(2v + 1)(v + 5)$

6) $2n^2 + 5n + 2$

$(2n + 1)(n + 2)$

7) $7a^2 + 53a + 28$

$(7a + 4)(a + 7)$

8) $9k^2 + 66k + 21$

$3(3k + 1)(k + 7)$

$$9) 15n^2 - 27n - 6$$
$$3(5n + 1)(n - 2)$$

$$10) 5x^2 - 18x + 9$$
$$(5x - 3)(x - 3)$$

$$11) 4n^2 - 15n - 25$$
$$(n - 5)(4n + 5)$$

$$12) 4x^2 - 35x + 49$$
$$(x - 7)(4x - 7)$$

$$13) 4n^2 - 17n + 4$$
$$(n - 4)(4n - 1)$$

$$14) 6x^2 + 7x - 49$$
$$(3x - 7)(2x + 7)$$

$$15) 6x^2 + 37x + 6$$
$$(x + 6)(6x + 1)$$

$$16) -6a^2 - 25a - 25$$
$$-(2a + 5)(3a + 5)$$

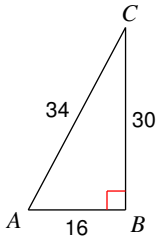
$$17) 6n^2 + 5n - 6$$
$$(2n + 3)(3n - 2)$$

$$18) 16b^2 + 60b - 100$$
$$4(b + 5)(4b - 5)$$

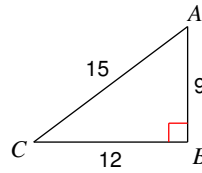
Finding Trigonometric Ratios

Find the value of each trigonometric ratio to the nearest ten-thousandth.

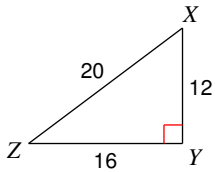
1) $\tan A$



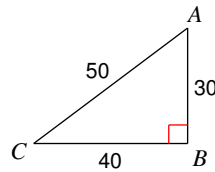
2) $\cos C$



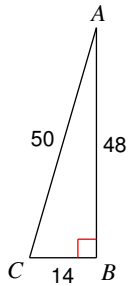
3) $\sin Z$



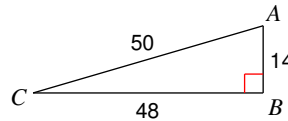
4) $\sin C$



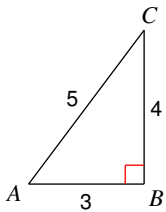
5) $\sin C$



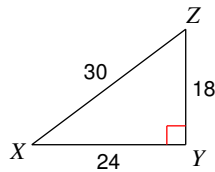
6) $\sin C$



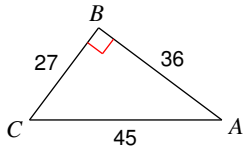
7) $\cos A$



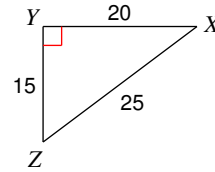
8) $\cos X$



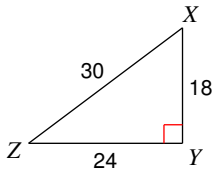
9) $\cos A$



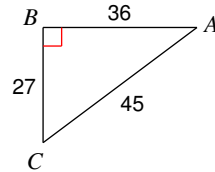
10) $\cos Z$



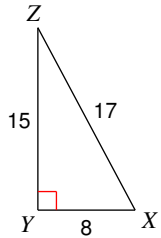
11) $\sin Z$



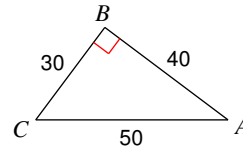
12) $\sin C$



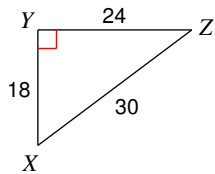
13) $\cos X$



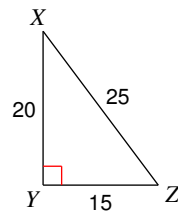
14) $\tan A$



15) $\tan X$



16) $\tan X$



Use a calculator to find the value of each to the nearest ten-thousandth.

17) $\sin 21^\circ$

18) $\tan 22^\circ$

19) $\cos 20^\circ$

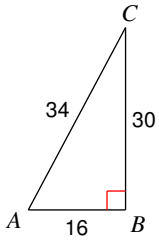
20) $\sin 77^\circ$

21) $\tan 17^\circ$

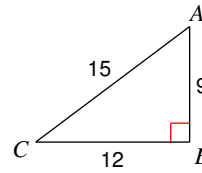
22) $\cos 87^\circ$

Finding Trigonometric Ratios

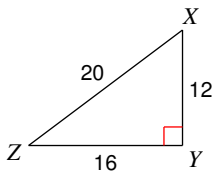
Find the value of each trigonometric ratio to the nearest ten-thousandth.

1) $\tan A$ 

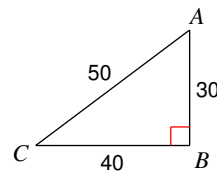
1.8750

2) $\cos C$ 

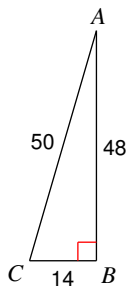
0.8000

3) $\sin Z$ 

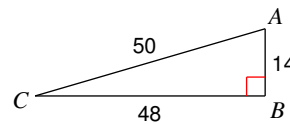
0.6000

4) $\sin C$ 

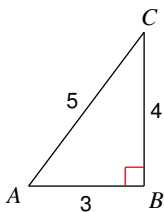
0.6000

5) $\sin C$ 

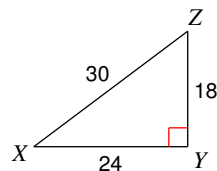
0.9600

6) $\sin C$ 

0.2800

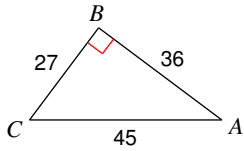
7) $\cos A$ 

0.6000

8) $\cos X$ 

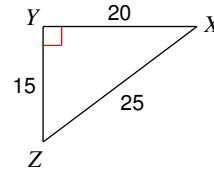
0.8000

9) $\cos A$



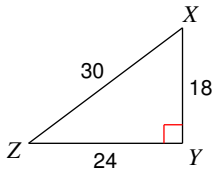
0.8000

10) $\cos Z$



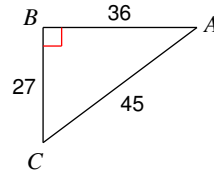
0.6000

11) $\sin Z$



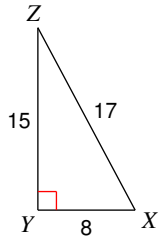
0.6000

12) $\sin C$



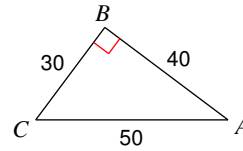
0.8000

13) $\cos X$



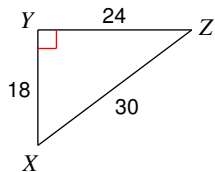
0.4706

14) $\tan A$



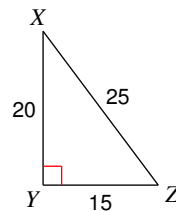
0.7500

15) $\tan X$



1.3333

16) $\tan X$



0.7500

Use a calculator to find the value of each to the nearest ten-thousandth.

17) $\sin 21^\circ$

0.3584

18) $\tan 22^\circ$

0.4040

19) $\cos 20^\circ$

0.9397

20) $\sin 77^\circ$

0.9744

21) $\tan 17^\circ$

0.3057

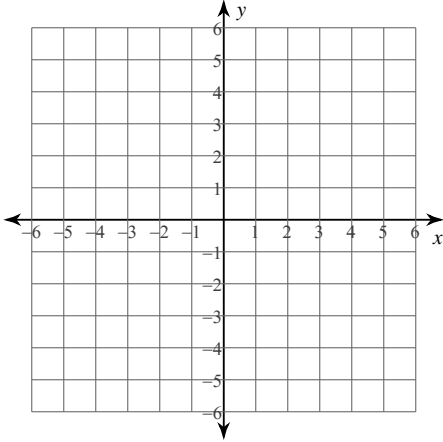
22) $\cos 87^\circ$

0.0523

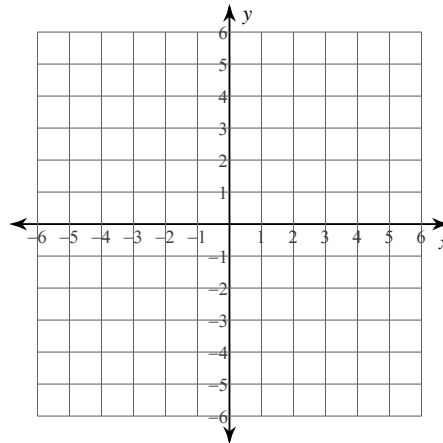
Graphing Lines in Slope-Intercept Form

Sketch the graph of each line.

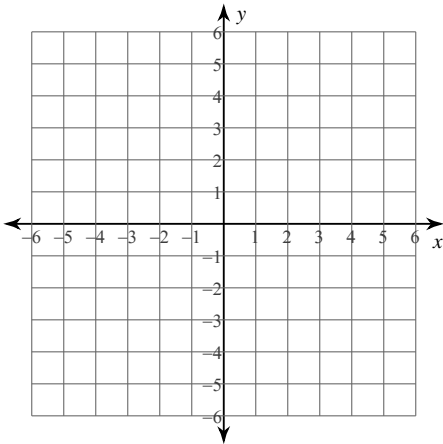
1) $y = \frac{1}{4}x - 1$



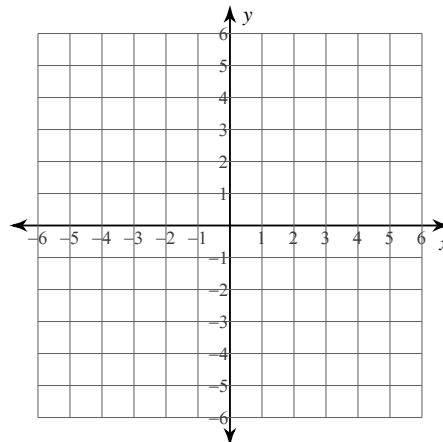
2) $y = -x + 2$



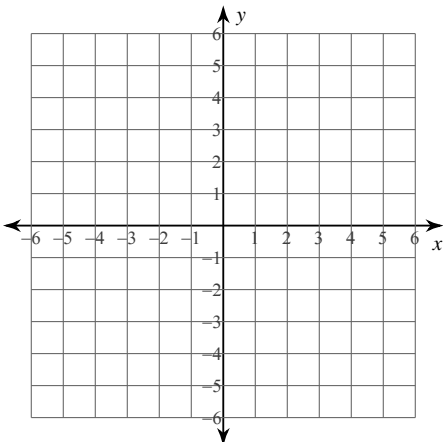
3) $y = x + 1$



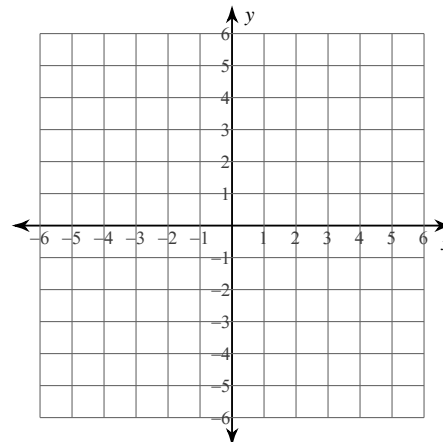
4) $y = \frac{4}{3}x - 4$



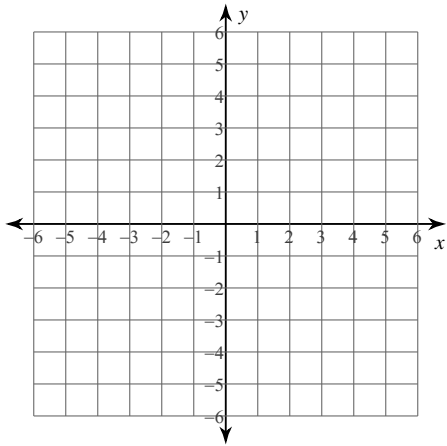
5) $y = -3x - 3$



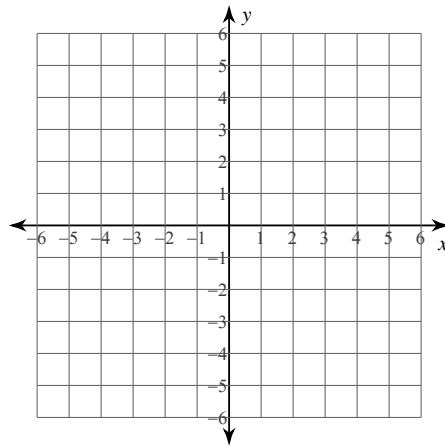
6) $y = 4$



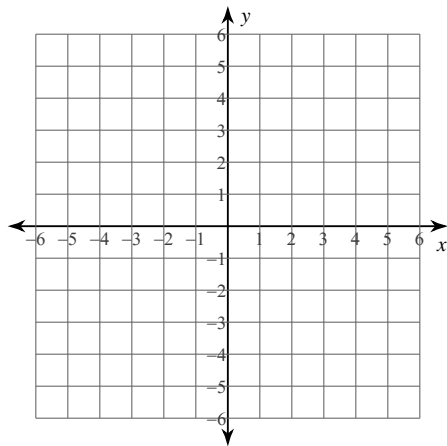
7) $y = \frac{3}{5}x - 1$



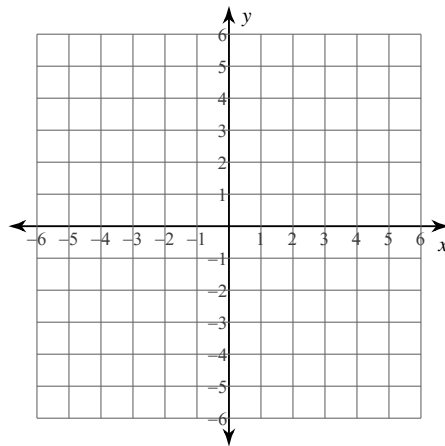
8) $x = 5$



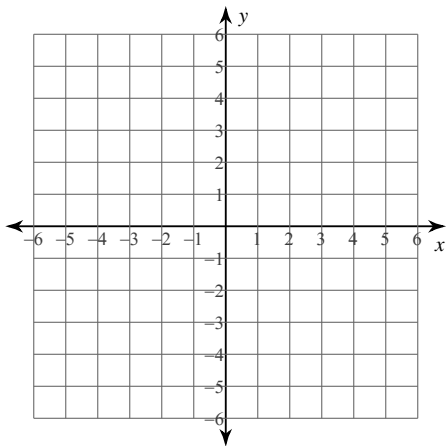
9) $y = 3$



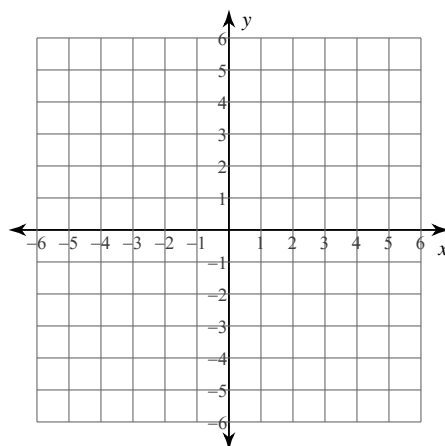
10) $y = 3x - 2$



11) $y = 4x + 3$



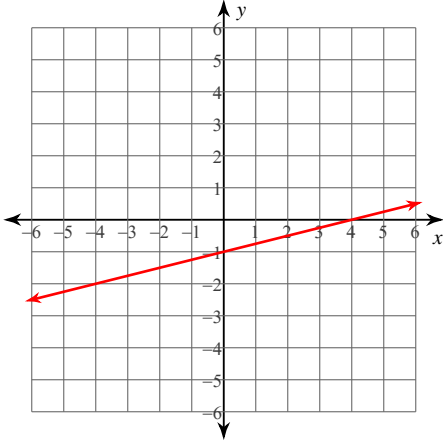
12) $y = \frac{6}{5}x + 5$



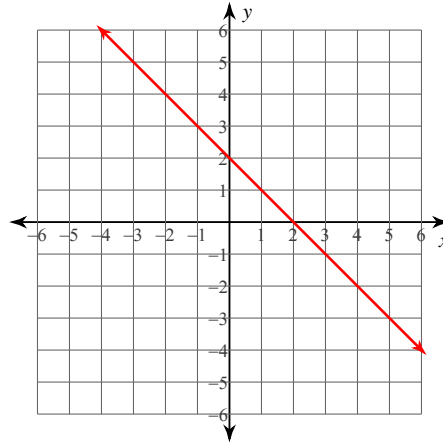
Graphing Lines in Slope-Intercept Form

Sketch the graph of each line.

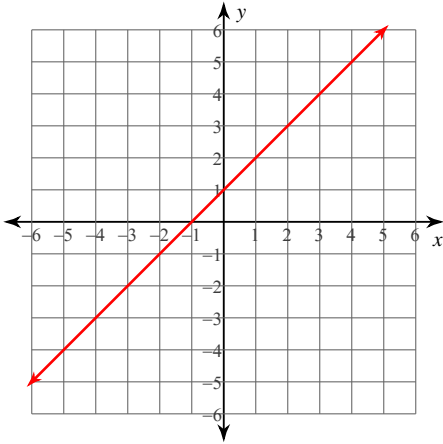
1) $y = \frac{1}{4}x - 1$



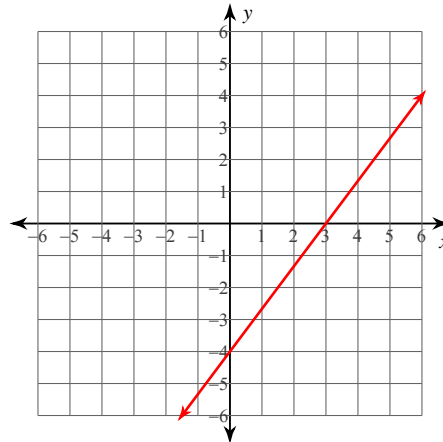
2) $y = -x + 2$



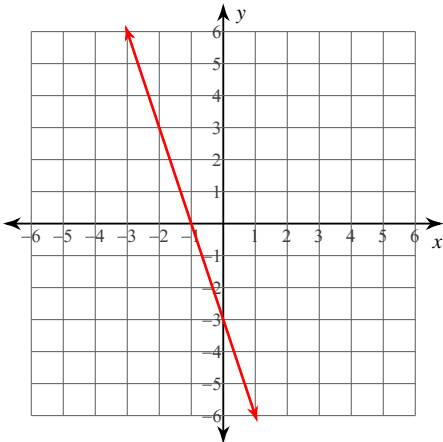
3) $y = x + 1$



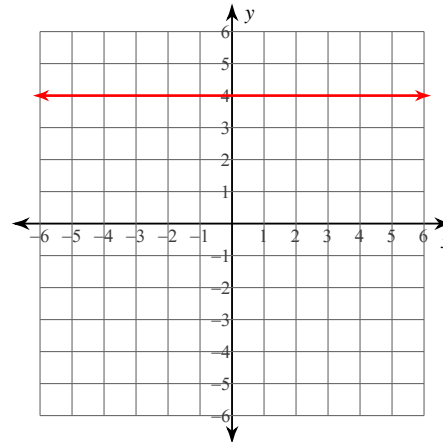
4) $y = \frac{4}{3}x - 4$



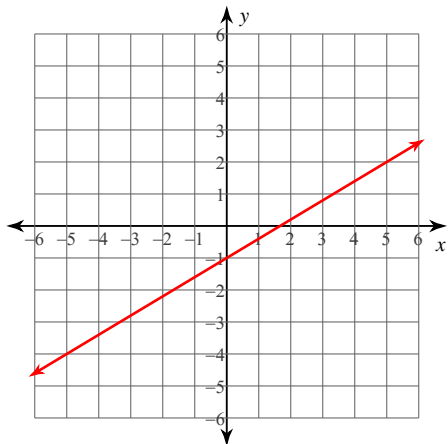
5) $y = -3x - 3$



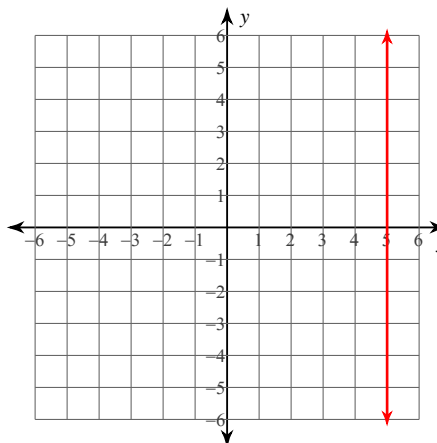
6) $y = 4$



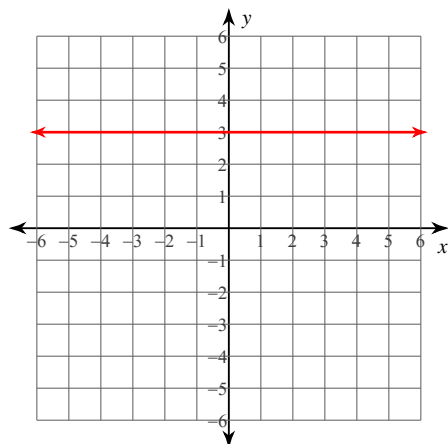
7) $y = \frac{3}{5}x - 1$



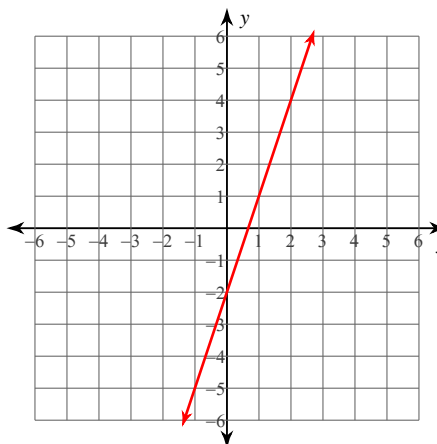
8) $x = 5$



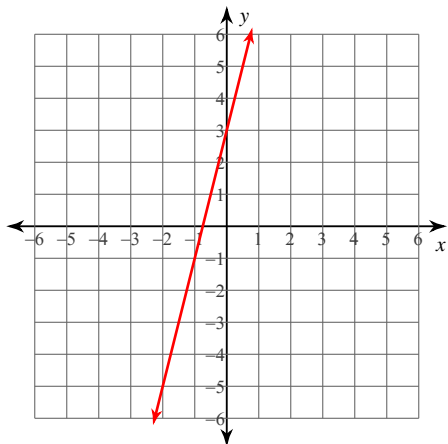
9) $y = 3$



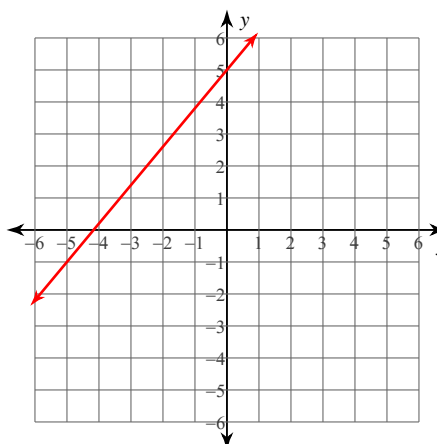
10) $y = 3x - 2$



11) $y = 4x + 3$



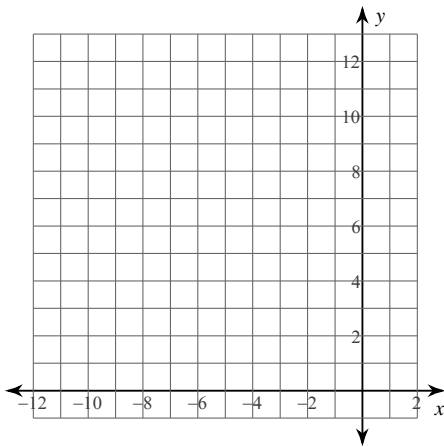
12) $y = \frac{6}{5}x + 5$



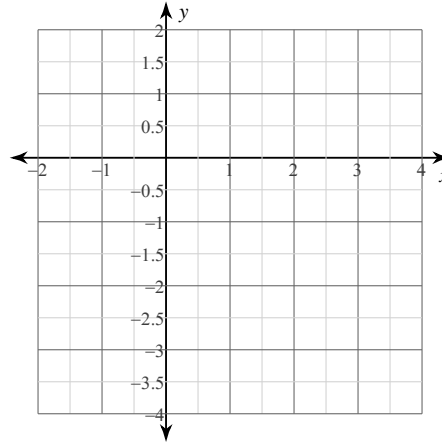
Graphing Quadratic Functions

Sketch the graph of each function.

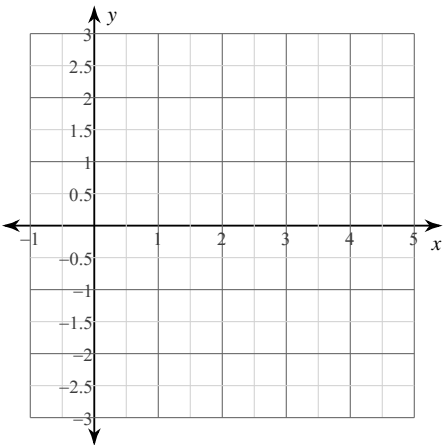
1) $y = 3x^2$



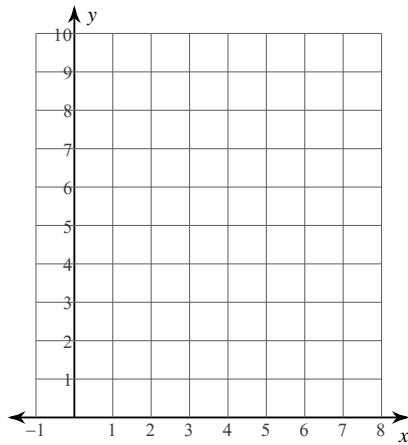
2) $y = -\frac{1}{2}x^2$



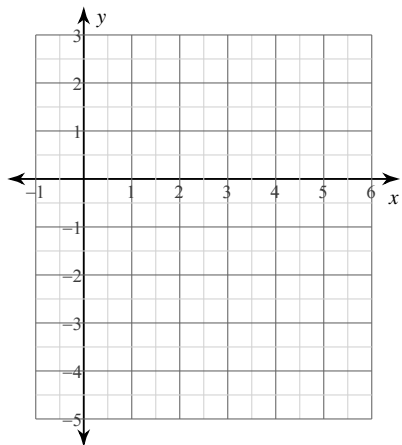
3) $y = -x^2 + 2x + 1$



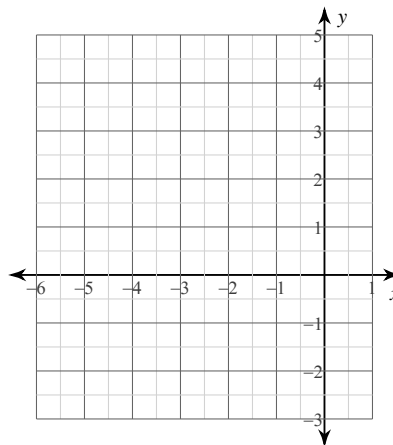
4) $y = 2x^2 - 16x + 33$



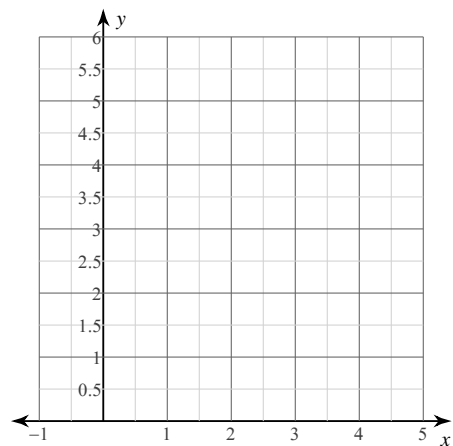
5) $y = x^2 - 8x + 13$



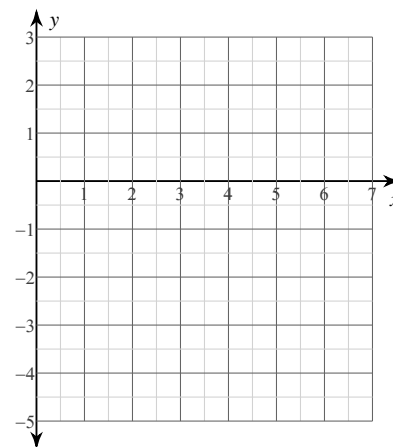
6) $y = -x^2 - 8x - 13$



7) $y = (x - 3)^2 + 1$



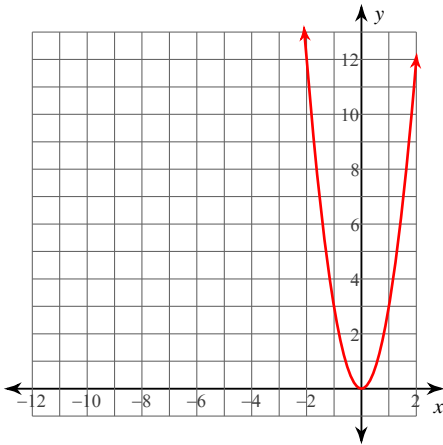
8) $y = \frac{1}{2}(x - 4)^2 - 2$



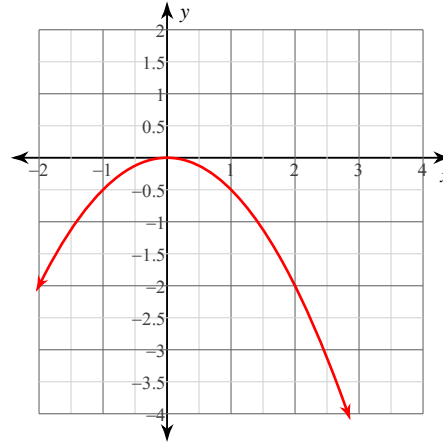
Graphing Quadratic Functions

Sketch the graph of each function.

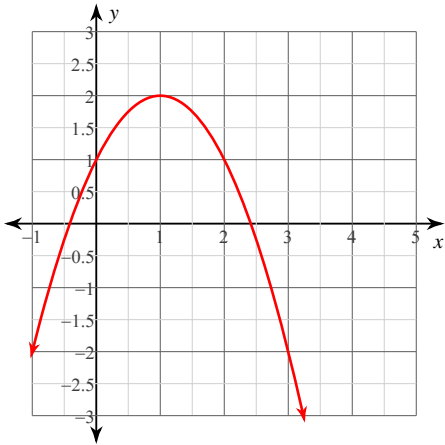
1) $y = 3x^2$



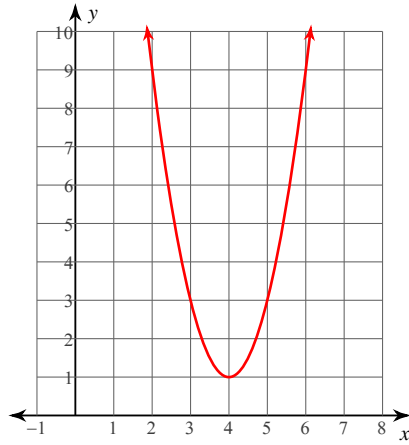
2) $y = -\frac{1}{2}x^2$



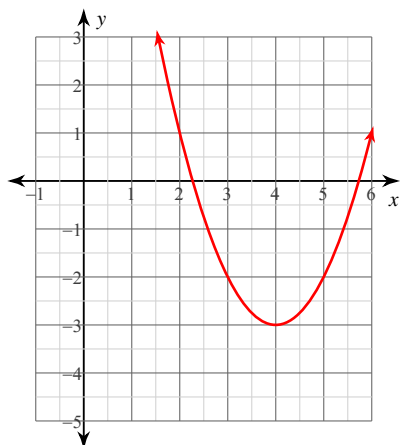
3) $y = -x^2 + 2x + 1$



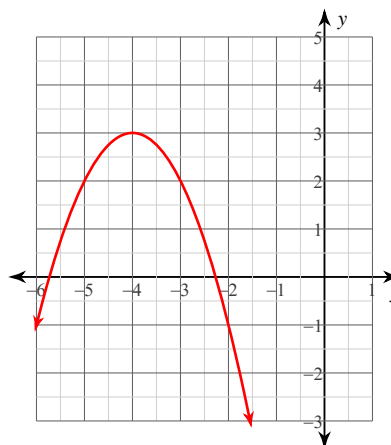
4) $y = 2x^2 - 16x + 33$



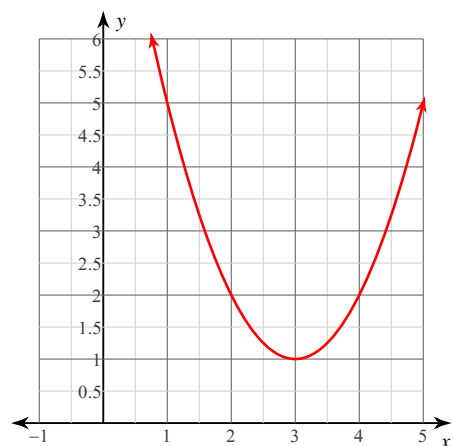
5) $y = x^2 - 8x + 13$



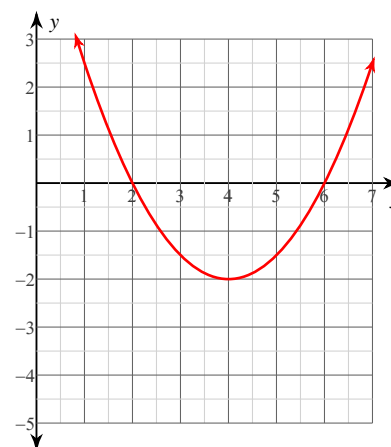
6) $y = -x^2 - 8x - 13$



7) $y = (x - 3)^2 + 1$



8) $y = \frac{1}{2}(x - 4)^2 - 2$



Literal Equations

Solve each equation for the indicated variable.

1) $g = 6x$, for x

2) $u = 2x - 2$, for x

3) $z = m - x$, for x

4) $g = ca$, for a

5) $u = x - k$, for x

6) $g = c + x$, for x

7) $u = \frac{k}{a}$, for a

8) $g = xc$, for x

9) $12am = 4$, for a

10) $-3x + 2c = -3$, for x

11) $am = n + p$, for a

12) $u = \frac{ak}{b}$, for a

13) $a - c = d - r$, for a

14) $xm = np$, for x

$$15) z = b + \frac{m}{a}, \text{ for } a$$

$$16) g = x - c + y, \text{ for } x$$

$$17) g = b - ca, \text{ for } a$$

$$18) g = ca - b, \text{ for } a$$

$$19) 2x + 4 = xg, \text{ for } x$$

$$20) g = \frac{1 + 2a}{a}, \text{ for } a$$

$$21) g = \frac{x - c}{x}, \text{ for } x$$

$$22) xm = x + z, \text{ for } x$$

$$23) u + ka = ba, \text{ for } a$$

$$24) u = kx + yx, \text{ for } x$$

$$25) u = 3b - 2a + 2, \text{ for } a$$

$$26) z = 9a - 9 - 3b, \text{ for } a$$

$$27) g = 4ca - 3ba, \text{ for } a$$

$$28) -3a - 3 = -2n + 3p, \text{ for } a$$

$$29) 4x = -4r + 2d, \text{ for } x$$

$$30) u = \frac{-2a - 3}{ka}, \text{ for } a$$

Literal Equations

Solve each equation for the indicated variable.

1) $g = 6x$, for x

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

2) $u = 2x - 2$, for x

$$x = \frac{u + 2}{2}$$

3) $z = m - x$, for x

$$x = -z + m$$

4) $g = ca$, for a

$$a = \frac{g}{c}$$

5) $u = x - k$, for x

$$x = u + k$$

6) $g = c + x$, for x

$$x = g - c$$

7) $u = \frac{k}{a}$, for a

$$a = \frac{k}{u}$$

8) $g = xc$, for x

$$x = \frac{g}{c}$$

9) $12am = 4$, for a

$$a = \frac{1}{3m}$$

10) $-3x + 2c = -3$, for x

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

11) $am = n + p$, for a

$$a = \frac{n + p}{m}$$

12) $u = \frac{ak}{b}$, for a

$$a = \frac{ub}{k}$$

13) $a - c = d - r$, for a

$$a = c + d - r$$

14) $xm = np$, for x

$$x = \frac{np}{m}$$

$$15) z = b + \frac{m}{a}, \text{ for } a$$

$$a = \frac{m}{z - b}$$

$$17) g = b - ca, \text{ for } a$$

$$a = \frac{-g + b}{c}$$

$$19) 2x + 4 = xg, \text{ for } x$$

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

$$21) g = \frac{x - c}{x}, \text{ for } x$$

$$x = -\frac{c}{g - 1}$$

$$23) u + ka = ba, \text{ for } a$$

$$a = -\frac{u}{k - b}$$

$$25) u = 3b - 2a + 2, \text{ for } a$$

$$a = \frac{-u + 3b + 2}{2}$$

$$27) g = 4ca - 3ba, \text{ for } a$$

$$a = -\frac{g}{-4c + 3b}$$

$$29) 4x = -4r + 2d, \text{ for } x$$

$$x = \frac{-2r + d}{2}$$

$$16) g = x - c + y, \text{ for } x$$

$$x = g + c - y$$

$$18) g = ca - b, \text{ for } a$$

$$a = \frac{g + b}{c}$$

$$20) g = \frac{1 + 2a}{a}, \text{ for } a$$

$$a = \frac{1}{g - 2}$$

$$22) xm = x + z, \text{ for } x$$

$$x = \frac{z}{m - 1}$$

$$24) u = kx + yx, \text{ for } x$$

$$x = -\frac{u}{-k - y}$$

$$26) z = 9a - 9 - 3b, \text{ for } a$$

$$a = \frac{z + 9 + 3b}{9}$$

$$28) -3a - 3 = -2n + 3p, \text{ for } a$$

$$a = \frac{-3 + 2n - 3p}{3}$$

$$30) u = \frac{-2a - 3}{ka}, \text{ for } a$$

$$a = -\frac{3}{uk + 2}$$

Multiplying Polynomials

Find each product.

1) $6v(2v + 3)$

2) $7(-5v - 8)$

3) $2x(-2x - 3)$

4) $-4(v + 1)$

5) $(2n + 2)(6n + 1)$

6) $(4n + 1)(2n + 6)$

7) $(x - 3)(6x - 2)$

8) $(8p - 2)(6p + 2)$

9) $(6p + 8)(5p - 8)$

10) $(3m - 1)(8m + 7)$

11) $(2a - 1)(8a - 5)$

12) $(5n + 6)(5n - 5)$

$$13) (4p - 1)^2$$

$$14) (7x - 6)(5x + 6)$$

$$15) (6n + 3)(6n - 4)$$

$$16) (8n + 1)(6n - 3)$$

$$17) (6k + 5)(5k + 5)$$

$$18) (3x - 4)(4x + 3)$$

$$19) (4a + 2)(6a^2 - a + 2)$$

$$20) (7k - 3)(k^2 - 2k + 7)$$

$$21) (7r^2 - 6r - 6)(2r - 4)$$

$$22) (n^2 + 6n - 4)(2n - 4)$$

$$23) (6n^2 - 6n - 5)(7n^2 + 6n - 5)$$

$$24) (m^2 - 7m - 6)(7m^2 - 3m - 7)$$

Multiplying Polynomials

Find each product.

1) $6v(2v + 3)$

$12v^2 + 18v$

2) $7(-5v - 8)$

$-35v - 56$

3) $2x(-2x - 3)$

$-4x^2 - 6x$

4) $-4(v + 1)$

$-4v - 4$

5) $(2n + 2)(6n + 1)$

$12n^2 + 14n + 2$

6) $(4n + 1)(2n + 6)$

$8n^2 + 26n + 6$

7) $(x - 3)(6x - 2)$

$6x^2 - 20x + 6$

8) $(8p - 2)(6p + 2)$

$48p^2 + 4p - 4$

9) $(6p + 8)(5p - 8)$

$30p^2 - 8p - 64$

10) $(3m - 1)(8m + 7)$

$24m^2 + 13m - 7$

11) $(2a - 1)(8a - 5)$

$16a^2 - 18a + 5$

12) $(5n + 6)(5n - 5)$

$25n^2 + 5n - 30$

$$13) (4p - 1)^2$$
$$16p^2 - 8p + 1$$

$$14) (7x - 6)(5x + 6)$$
$$35x^2 + 12x - 36$$

$$15) (6n + 3)(6n - 4)$$
$$36n^2 - 6n - 12$$

$$16) (8n + 1)(6n - 3)$$
$$48n^2 - 18n - 3$$

$$17) (6k + 5)(5k + 5)$$
$$30k^2 + 55k + 25$$

$$18) (3x - 4)(4x + 3)$$
$$12x^2 - 7x - 12$$

$$19) (4a + 2)(6a^2 - a + 2)$$
$$24a^3 + 8a^2 + 6a + 4$$

$$20) (7k - 3)(k^2 - 2k + 7)$$
$$7k^3 - 17k^2 + 55k - 21$$

$$21) (7r^2 - 6r - 6)(2r - 4)$$
$$14r^3 - 40r^2 + 12r + 24$$

$$22) (n^2 + 6n - 4)(2n - 4)$$
$$2n^3 + 8n^2 - 32n + 16$$

$$23) (6n^2 - 6n - 5)(7n^2 + 6n - 5)$$
$$42n^4 - 6n^3 - 101n^2 + 25$$

$$24) (m^2 - 7m - 6)(7m^2 - 3m - 7)$$

$$7m^4 - 52m^3 - 28m^2 + 67m + 42$$

Using the Quadratic Formula

Solve each equation with the quadratic formula.

1) $m^2 - 5m - 14 = 0$

2) $b^2 - 4b + 4 = 0$

3) $2m^2 + 2m - 12 = 0$

4) $2x^2 - 3x - 5 = 0$

5) $x^2 + 4x + 3 = 0$

6) $2x^2 + 3x - 20 = 0$

7) $4b^2 + 8b + 7 = 4$

8) $2m^2 - 7m - 13 = -10$

$$9) 2x^2 - 3x - 15 = 5$$

$$10) x^2 + 2x - 1 = 2$$

$$11) 2k^2 + 9k = -7$$

$$12) 5r^2 = 80$$

$$13) 2x^2 - 36 = x$$

$$14) 5x^2 + 9x = -4$$

$$15) k^2 - 31 - 2k = -6 - 3k^2 - 2k$$

$$16) 9n^2 = 4 + 7n$$

$$17) 8n^2 + 4n - 16 = -n^2$$

$$18) 8n^2 + 7n - 15 = -7$$

Using the Quadratic Formula

Solve each equation with the quadratic formula.

1) $m^2 - 5m - 14 = 0$

$\{7, -2\}$

2) $b^2 - 4b + 4 = 0$

$\{2\}$

3) $2m^2 + 2m - 12 = 0$

$\{2, -3\}$

4) $2x^2 - 3x - 5 = 0$

$\left\{\frac{5}{2}, -1\right\}$

5) $x^2 + 4x + 3 = 0$

$\{-1, -3\}$

6) $2x^2 + 3x - 20 = 0$

$\left\{\frac{5}{2}, -4\right\}$

7) $4b^2 + 8b + 7 = 4$

$\left\{-\frac{1}{2}, -\frac{3}{2}\right\}$

8) $2m^2 - 7m - 13 = -10$

$\left\{\frac{7 + \sqrt{73}}{4}, \frac{7 - \sqrt{73}}{4}\right\}$

9) $2x^2 - 3x - 15 = 5$

$$\left\{4, -\frac{5}{2}\right\}$$

10) $x^2 + 2x - 1 = 2$

$$\{1, -3\}$$

11) $2k^2 + 9k = -7$

$$\left\{-1, -\frac{7}{2}\right\}$$

12) $5r^2 = 80$

$$\{4, -4\}$$

13) $2x^2 - 36 = x$

$$\left\{\frac{9}{2}, -4\right\}$$

14) $5x^2 + 9x = -4$

$$\left\{-\frac{4}{5}, -1\right\}$$

15) $k^2 - 31 - 2k = -6 - 3k^2 - 2k$

$$\left\{\frac{5}{2}, -\frac{5}{2}\right\}$$

16) $9n^2 = 4 + 7n$

$$\left\{\frac{7 + \sqrt{193}}{18}, \frac{7 - \sqrt{193}}{18}\right\}$$

17) $8n^2 + 4n - 16 = -n^2$

$$\left\{\frac{-2 + 2\sqrt{37}}{9}, \frac{-2 - 2\sqrt{37}}{9}\right\}$$

18) $8n^2 + 7n - 15 = -7$

$$\left\{\frac{-7 + \sqrt{305}}{16}, \frac{-7 - \sqrt{305}}{16}\right\}$$

Simplifying Radical Expressions

Simplify.

1) $\sqrt{125n}$

2) $\sqrt{216v}$

3) $\sqrt{512k^2}$

4) $\sqrt{512m^3}$

5) $\sqrt{216k^4}$

6) $\sqrt{100v^3}$

7) $\sqrt{80p^3}$

8) $\sqrt{45p^2}$

9) $\sqrt{147m^3n^3}$

10) $\sqrt{200m^4n}$

11) $\sqrt{75x^2y}$

12) $\sqrt{64m^3n^3}$

13) $\sqrt{16u^4v^3}$

14) $\sqrt{28x^3y^3}$

15) $\sqrt{36x^2y^3}$

16) $\sqrt{384x^4y^3}$

17) $7\sqrt{96m^3}$

18) $6\sqrt{72x^2}$

19) $-6\sqrt{150r}$

20) $5\sqrt{80a^2}$

21) $2\sqrt{125v}$

22) $-8\sqrt{24k^3}$

23) $-4\sqrt{192x}$

24) $2\sqrt{8p^2q^3r}$

25) $-4\sqrt{216x^2y^2z}$

26) $-3\sqrt{24a^4b^2c^3}$

27) $3\sqrt{16x^4y^4z}$

28) $-2\sqrt{48a^3b^4c^2}$

29) $6\sqrt{75mp^2q^3}$

30) $4\sqrt{36x^2y^3z^4}$

Simplifying Radical Expressions

Simplify.

1) $\sqrt{125n}$
 $5\sqrt{5n}$

2) $\sqrt{216v}$
 $6\sqrt{6v}$

3) $\sqrt{512k^2}$
 $16k\sqrt{2}$

4) $\sqrt{512m^3}$
 $16m\sqrt{2m}$

5) $\sqrt{216k^4}$
 $6k^2\sqrt{6}$

6) $\sqrt{100v^3}$
 $10v\sqrt{v}$

7) $\sqrt{80p^3}$
 $4p\sqrt{5p}$

8) $\sqrt{45p^2}$
 $3p\sqrt{5}$

9) $\sqrt{147m^3n^3}$
 $7m \cdot n\sqrt{3mn}$

10) $\sqrt{200m^4n}$
 $10m^2\sqrt{2n}$

11) $\sqrt{75x^2y}$
 $5x\sqrt{3y}$

12) $\sqrt{64m^3n^3}$
 $8m \cdot n\sqrt{mn}$

13) $\sqrt{16u^4v^3}$
 $4u^2 \cdot v\sqrt{v}$

14) $\sqrt{28x^3y^3}$
 $2x \cdot y\sqrt{7xy}$

$$15) \sqrt{36x^2y^3}$$
$$6x \cdot y\sqrt{y}$$

$$16) \sqrt{384x^4y^3}$$
$$8x^2 \cdot y\sqrt{6y}$$

$$17) 7\sqrt{96m^3}$$
$$28m\sqrt{6m}$$

$$18) 6\sqrt{72x^2}$$
$$36x\sqrt{2}$$

$$19) -6\sqrt{150r}$$
$$-30\sqrt{6r}$$

$$20) 5\sqrt{80a^2}$$
$$20a\sqrt{5}$$

$$21) 2\sqrt{125v}$$
$$10\sqrt{5v}$$

$$22) -8\sqrt{24k^3}$$
$$-16k\sqrt{6k}$$

$$23) -4\sqrt{192x}$$
$$-32\sqrt{3x}$$

$$24) 2\sqrt{8p^2q^3r}$$
$$4p \cdot q\sqrt{2qr}$$

$$25) -4\sqrt{216x^2y^2z}$$
$$-24x \cdot y\sqrt{6z}$$

$$26) -3\sqrt{24a^4b^2c^3}$$
$$-6a^2 \cdot b \cdot c\sqrt{6c}$$

$$27) 3\sqrt{16x^4y^4z}$$
$$12x^2y^2\sqrt{z}$$

$$28) -2\sqrt{48a^3b^4c^2}$$
$$-8b^2 \cdot a \cdot c\sqrt{3a}$$

$$29) 6\sqrt{75mp^2q^3}$$
$$30p \cdot q\sqrt{3mq}$$

$$30) 4\sqrt{36x^2y^3z^4}$$
$$24z^2 \cdot x \cdot y\sqrt{y}$$

Solving Equations by Completing the Square

Solve each equation by completing the square.

1) $a^2 + 2a - 3 = 0$

2) $a^2 - 2a - 8 = 0$

3) $p^2 + 16p - 22 = 0$

4) $k^2 + 8k + 12 = 0$

5) $r^2 + 2r - 33 = 0$

6) $a^2 - 2a - 48 = 0$

7) $m^2 - 12m + 26 = 0$

8) $x^2 + 12x + 20 = 0$

9) $k^2 - 8k - 48 = 0$

10) $p^2 + 2p - 63 = 0$

11) $m^2 + 2m - 48 = -6$

12) $p^2 - 8p + 21 = 6$

$$13) m^2 + 10m + 14 = -7$$

$$14) v^2 - 2v = 3$$

$$15) 5v^2 - 21 = 10v$$

$$16) 4v^2 + 16v = 65$$

$$17) 7b^2 - 14b - 56 = 0$$

$$18) 2n^2 + 12n + 10 = 0$$

$$19) n^2 + 13n + 22 = 7$$

$$20) 5n^2 + 19n - 68 = -2$$

$$21) r^2 - 9r - 38 = -9$$

$$22) 3x^2 + 20x + 36 = 4$$

$$23) x^2 + 7x - 45 = 7$$

$$24) n^2 + 19n + 66 = 6$$

Solving Equations by Completing the Square

Solve each equation by completing the square.

1) $a^2 + 2a - 3 = 0$

 $\{1, -3\}$

2) $a^2 - 2a - 8 = 0$

 $\{4, -2\}$

3) $p^2 + 16p - 22 = 0$

 $\{1.273, -17.273\}$

4) $k^2 + 8k + 12 = 0$

 $\{-2, -6\}$

5) $r^2 + 2r - 33 = 0$

 $\{4.83, -6.83\}$

6) $a^2 - 2a - 48 = 0$

 $\{8, -6\}$

7) $m^2 - 12m + 26 = 0$

 $\{9.162, 2.837\}$

8) $x^2 + 12x + 20 = 0$

 $\{-2, -10\}$

9) $k^2 - 8k - 48 = 0$

 $\{12, -4\}$

10) $p^2 + 2p - 63 = 0$

 $\{7, -9\}$

11) $m^2 + 2m - 48 = -6$

 $\{5.557, -7.557\}$

12) $p^2 - 8p + 21 = 6$

 $\{5, 3\}$

13) $m^2 + 10m + 14 = -7$

$\{-3, -7\}$

14) $v^2 - 2v = 3$

$\{3, -1\}$

15) $5v^2 - 21 = 10v$

$\{3.28, -1.28\}$

16) $4v^2 + 16v = 65$

$\{2.5, -6.5\}$

17) $7b^2 - 14b - 56 = 0$

$\{4, -2\}$

18) $2n^2 + 12n + 10 = 0$

$\{-1, -5\}$

19) $n^2 + 13n + 22 = 7$

$\{-1.279, -11.72\}$

20) $5n^2 + 19n - 68 = -2$

$\{2.2, -6\}$

21) $r^2 - 9r - 38 = -9$

$\{11.517, -2.517\}$

22) $3x^2 + 20x + 36 = 4$

$\{-2.666, -4\}$

23) $x^2 + 7x - 45 = 7$

$\{4.515, -11.515\}$

24) $n^2 + 19n + 66 = 6$

$\{-4, -15\}$

Solving Quadratic Equations by Factoring

Solve each equation by factoring.

1) $(k + 1)(k - 5) = 0$

2) $(a + 1)(a + 2) = 0$

3) $(4k + 5)(k + 1) = 0$

4) $(2m + 3)(4m + 3) = 0$

5) $x^2 - 11x + 19 = -5$

6) $n^2 + 7n + 15 = 5$

7) $n^2 - 10n + 22 = -2$

8) $n^2 + 3n - 12 = 6$

9) $6n^2 - 18n - 18 = 6$

10) $7r^2 - 14r = -7$

$$11) n^2 + 8n = -15$$

$$12) 5r^2 - 44r + 120 = -30 + 11r$$

$$13) -4k^2 - 8k - 3 = -3 - 5k^2$$

$$14) b^2 + 5b - 35 = 3b$$

$$15) 3r^2 - 16r - 7 = 5$$

$$16) 6b^2 - 13b + 3 = -3$$

$$17) 7k^2 - 6k + 3 = 3$$

$$18) 35k^2 - 22k + 7 = 4$$

$$19) 7x^2 + 2x = 0$$

$$20) 10b^2 = 27b - 18$$

$$21) 8x^2 + 21 = -59x$$

$$22) 15a^2 - 3a = 3 - 7a$$

Solving Quadratic Equations by Factoring

Solve each equation by factoring.

1) $(k + 1)(k - 5) = 0$

$\{-1, 5\}$

2) $(a + 1)(a + 2) = 0$

$\{-1, -2\}$

3) $(4k + 5)(k + 1) = 0$

$\left\{-\frac{5}{4}, -1\right\}$

4) $(2m + 3)(4m + 3) = 0$

$\left\{-\frac{3}{2}, -\frac{3}{4}\right\}$

5) $x^2 - 11x + 19 = -5$

$\{3, 8\}$

6) $n^2 + 7n + 15 = 5$

$\{-5, -2\}$

7) $n^2 - 10n + 22 = -2$

$\{6, 4\}$

8) $n^2 + 3n - 12 = 6$

$\{3, -6\}$

9) $6n^2 - 18n - 18 = 6$

$\{4, -1\}$

10) $7r^2 - 14r = -7$

$\{1\}$

11) $n^2 + 8n = -15$

$\{-5, -3\}$

12) $5r^2 - 44r + 120 = -30 + 11r$

$\{6, 5\}$

13) $-4k^2 - 8k - 3 = -3 - 5k^2$

$\{8, 0\}$

14) $b^2 + 5b - 35 = 3b$

$\{-7, 5\}$

15) $3r^2 - 16r - 7 = 5$

$\left\{-\frac{2}{3}, 6\right\}$

16) $6b^2 - 13b + 3 = -3$

$\left\{\frac{2}{3}, \frac{3}{2}\right\}$

17) $7k^2 - 6k + 3 = 3$

$\left\{\frac{6}{7}, 0\right\}$

18) $35k^2 - 22k + 7 = 4$

$\left\{\frac{1}{5}, \frac{3}{7}\right\}$

19) $7x^2 + 2x = 0$

$\left\{-\frac{2}{7}, 0\right\}$

20) $10b^2 = 27b - 18$

$\left\{\frac{6}{5}, \frac{3}{2}\right\}$

21) $8x^2 + 21 = -59x$

$\left\{-\frac{3}{8}, -7\right\}$

22) $15a^2 - 3a = 3 - 7a \left\{\frac{1}{3}, -\frac{3}{5}\right\}$

Solving Systems of Equations by Elimination

Solve each system by elimination.

1)
$$\begin{aligned} -4x - 2y &= -12 \\ 4x + 8y &= -24 \end{aligned}$$

2)
$$\begin{aligned} 4x + 8y &= 20 \\ -4x + 2y &= -30 \end{aligned}$$

3)
$$\begin{aligned} x - y &= 11 \\ 2x + y &= 19 \end{aligned}$$

4)
$$\begin{aligned} -6x + 5y &= 1 \\ 6x + 4y &= -10 \end{aligned}$$

5)
$$\begin{aligned} -2x - 9y &= -25 \\ -4x - 9y &= -23 \end{aligned}$$

6)
$$\begin{aligned} 8x + y &= -16 \\ -3x + y &= -5 \end{aligned}$$

7)
$$\begin{aligned} -6x + 6y &= 6 \\ -6x + 3y &= -12 \end{aligned}$$

8)
$$\begin{aligned} 7x + 2y &= 24 \\ 8x + 2y &= 30 \end{aligned}$$

9)
$$\begin{aligned} 5x + y &= 9 \\ 10x - 7y &= -18 \end{aligned}$$

10)
$$\begin{aligned} -4x + 9y &= 9 \\ x - 3y &= -6 \end{aligned}$$

11)
$$\begin{aligned} -3x + 7y &= -16 \\ -9x + 5y &= 16 \end{aligned}$$

12)
$$\begin{aligned} -7x + y &= -19 \\ -2x + 3y &= -19 \end{aligned}$$

$$\begin{aligned} 13) \quad & 16x - 10y = 10 \\ & -8x - 6y = 6 \end{aligned}$$

$$\begin{aligned} 14) \quad & 8x + 14y = 4 \\ & -6x - 7y = -10 \end{aligned}$$

$$\begin{aligned} 15) \quad & -4x - 15y = -17 \\ & -x + 5y = -13 \end{aligned}$$

$$\begin{aligned} 16) \quad & -x - 7y = 14 \\ & -4x - 14y = 28 \end{aligned}$$

$$\begin{aligned} 17) \quad & -7x - 8y = 9 \\ & -4x + 9y = -22 \end{aligned}$$

$$\begin{aligned} 18) \quad & 5x + 4y = -30 \\ & 3x - 9y = -18 \end{aligned}$$

$$\begin{aligned} 19) \quad & -4x - 2y = 14 \\ & -10x + 7y = -25 \end{aligned}$$

$$\begin{aligned} 20) \quad & 3x - 2y = 2 \\ & 5x - 5y = 10 \end{aligned}$$

$$\begin{aligned} 21) \quad & 5x + 4y = -14 \\ & 3x + 6y = 6 \end{aligned}$$

$$\begin{aligned} 22) \quad & 2x + 8y = 6 \\ & -5x - 20y = -15 \end{aligned}$$

$$\begin{aligned} 23) \quad & -14 = -20y - 7x \\ & 10y + 4 = 2x \end{aligned}$$

$$\begin{aligned} 24) \quad & 3 + 2x - y = 0 \\ & -3 - 7y = 10x \end{aligned}$$

Solving Systems of Equations by Elimination

Solve each system by elimination.

1) $-4x - 2y = -12$
 $4x + 8y = -24$

 $(6, -6)$

2) $4x + 8y = 20$
 $-4x + 2y = -30$

 $(7, -1)$

3) $x - y = 11$
 $2x + y = 19$

 $(10, -1)$

4) $-6x + 5y = 1$
 $6x + 4y = -10$

 $(-1, -1)$

5) $-2x - 9y = -25$
 $-4x - 9y = -23$

 $(-1, 3)$

6) $8x + y = -16$
 $-3x + y = -5$

 $(-1, -8)$

7) $-6x + 6y = 6$
 $-6x + 3y = -12$

 $(5, 6)$

8) $7x + 2y = 24$
 $8x + 2y = 30$

 $(6, -9)$

9) $5x + y = 9$
 $10x - 7y = -18$

 $(1, 4)$

10) $-4x + 9y = 9$
 $x - 3y = -6$

 $(9, 5)$

11) $-3x + 7y = -16$
 $-9x + 5y = 16$

 $(-4, -4)$

12) $-7x + y = -19$
 $-2x + 3y = -19$

 $(2, -5)$

$$\begin{aligned} 13) \quad & 16x - 10y = 10 \\ & -8x - 6y = 6 \end{aligned}$$

$$(0, -1)$$

$$\begin{aligned} 14) \quad & 8x + 14y = 4 \\ & -6x - 7y = -10 \end{aligned}$$

$$(4, -2)$$

$$\begin{aligned} 15) \quad & -4x - 15y = -17 \\ & -x + 5y = -13 \end{aligned}$$

$$(8, -1)$$

$$\begin{aligned} 16) \quad & -x - 7y = 14 \\ & -4x - 14y = 28 \end{aligned}$$

$$(0, -2)$$

$$\begin{aligned} 17) \quad & -7x - 8y = 9 \\ & -4x + 9y = -22 \end{aligned}$$

$$(1, -2)$$

$$\begin{aligned} 18) \quad & 5x + 4y = -30 \\ & 3x - 9y = -18 \end{aligned}$$

$$(-6, 0)$$

$$\begin{aligned} 19) \quad & -4x - 2y = 14 \\ & -10x + 7y = -25 \end{aligned}$$

$$(-1, -5)$$

$$\begin{aligned} 20) \quad & 3x - 2y = 2 \\ & 5x - 5y = 10 \end{aligned}$$

$$(-2, -4)$$

$$\begin{aligned} 21) \quad & 5x + 4y = -14 \\ & 3x + 6y = 6 \end{aligned}$$

$$(-6, 4)$$

$$\begin{aligned} 22) \quad & 2x + 8y = 6 \\ & -5x - 20y = -15 \end{aligned}$$

Infinite number of solutions

$$\begin{aligned} 23) \quad & -14 = -20y - 7x \\ & 10y + 4 = 2x \end{aligned}$$

$$(2, 0)$$

$$\begin{aligned} 24) \quad & 3 + 2x - y = 0 \\ & -3 - 7y = 10x \end{aligned}$$

$$(-1, 1)$$

Solving Systems of Equations by Substitution

Solve each system by substitution.

1) $y = 6x - 11$
 $-2x - 3y = -7$

2) $2x - 3y = -1$
 $y = x - 1$

3) $y = -3x + 5$
 $5x - 4y = -3$

4) $-3x - 3y = 3$
 $y = -5x - 17$

5) $y = -2$
 $4x - 3y = 18$

6) $y = 5x - 7$
 $-3x - 2y = -12$

7) $-4x + y = 6$
 $-5x - y = 21$

8) $-7x - 2y = -13$
 $x - 2y = 11$

9) $-5x + y = -2$
 $-3x + 6y = -12$

10) $-5x + y = -3$
 $3x - 8y = 24$

$$\begin{aligned} 11) \quad x + 3y &= 1 \\ -3x - 3y &= -15 \end{aligned}$$

$$\begin{aligned} 12) \quad -3x - 8y &= 20 \\ -5x + y &= 19 \end{aligned}$$

$$\begin{aligned} 13) \quad -3x + 3y &= 4 \\ -x + y &= 3 \end{aligned}$$

$$\begin{aligned} 14) \quad -3x + 3y &= 3 \\ -5x + y &= 13 \end{aligned}$$

$$\begin{aligned} 15) \quad 6x + 6y &= -6 \\ 5x + y &= -13 \end{aligned}$$

$$\begin{aligned} 16) \quad 2x + y &= 20 \\ 6x - 5y &= 12 \end{aligned}$$

$$\begin{aligned} 17) \quad -3x - 4y &= 2 \\ 3x + 3y &= -3 \end{aligned}$$

$$\begin{aligned} 18) \quad -2x + 6y &= 6 \\ -7x + 8y &= -5 \end{aligned}$$

$$\begin{aligned} 19) \quad -5x - 8y &= 17 \\ 2x - 7y &= -17 \end{aligned}$$

$$\begin{aligned} 20) \quad -2x - y &= -9 \\ 5x - 2y &= 18 \end{aligned}$$

Solving Systems of Equations by Substitution

Solve each system by substitution.

1) $y = 6x - 11$
 $-2x - 3y = -7$

 $(2, 1)$

2) $2x - 3y = -1$
 $y = x - 1$

 $(4, 3)$

3) $y = -3x + 5$
 $5x - 4y = -3$

 $(1, 2)$

4) $-3x - 3y = 3$
 $y = -5x - 17$

 $(-4, 3)$

5) $y = -2$
 $4x - 3y = 18$

 $(3, -2)$

6) $y = 5x - 7$
 $-3x - 2y = -12$

 $(2, 3)$

7) $-4x + y = 6$
 $-5x - y = 21$

 $(-3, -6)$

8) $-7x - 2y = -13$
 $x - 2y = 11$

 $(3, -4)$

9) $-5x + y = -2$
 $-3x + 6y = -12$

 $(0, -2)$

10) $-5x + y = -3$
 $3x - 8y = 24$

 $(0, -3)$

$$\begin{aligned} 11) \quad x + 3y &= 1 \\ -3x - 3y &= -15 \end{aligned}$$

$(7, -2)$

$$\begin{aligned} 12) \quad -3x - 8y &= 20 \\ -5x + y &= 19 \end{aligned}$$

$(-4, -1)$

$$\begin{aligned} 13) \quad -3x + 3y &= 4 \\ -x + y &= 3 \end{aligned}$$

No solution

$$\begin{aligned} 14) \quad -3x + 3y &= 3 \\ -5x + y &= 13 \end{aligned}$$

$(-3, -2)$

$$\begin{aligned} 15) \quad 6x + 6y &= -6 \\ 5x + y &= -13 \end{aligned}$$

$(-3, 2)$

$$\begin{aligned} 16) \quad 2x + y &= 20 \\ 6x - 5y &= 12 \end{aligned}$$

$(7, 6)$

$$\begin{aligned} 17) \quad -3x - 4y &= 2 \\ 3x + 3y &= -3 \end{aligned}$$

$(-2, 1)$

$$\begin{aligned} 18) \quad -2x + 6y &= 6 \\ -7x + 8y &= -5 \end{aligned}$$

$(3, 2)$

$$\begin{aligned} 19) \quad -5x - 8y &= 17 \\ 2x - 7y &= -17 \end{aligned}$$

$(-5, 1)$

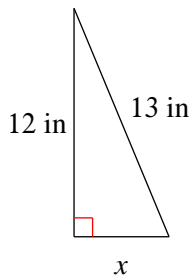
$$\begin{aligned} 20) \quad -2x - y &= -9 \\ 5x - 2y &= 18 \end{aligned}$$

$(4, 1)$

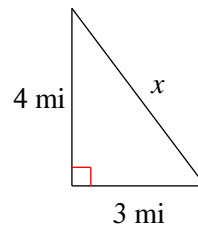
The Pythagorean Theorem and Its Converse

Find the missing side of each triangle. Round your answers to the nearest tenth if necessary.

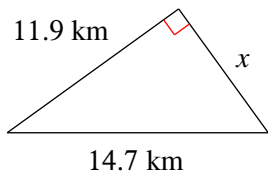
1)



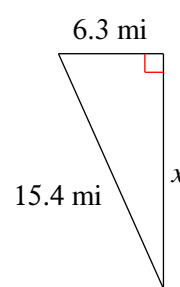
2)



3)

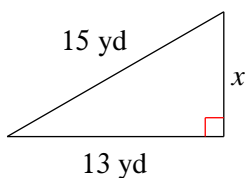


4)

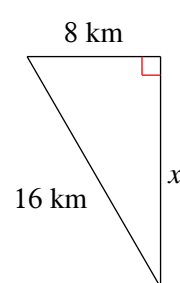


Find the missing side of each triangle. Leave your answers in simplest radical form.

5)



6)



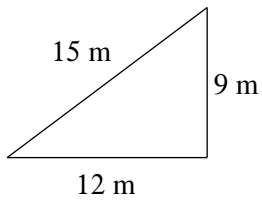
Find the missing side of each right triangle. Side c is the hypotenuse. Sides a and b are the legs. Leave your answers in simplest radical form.

7) $a = 11$ m, $c = 15$ m

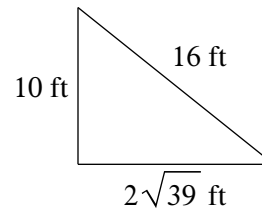
8) $b = \sqrt{6}$ yd, $c = 4$ yd

State if each triangle is a right triangle.

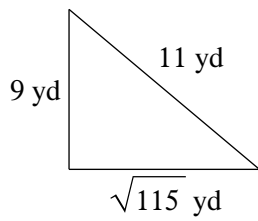
9)



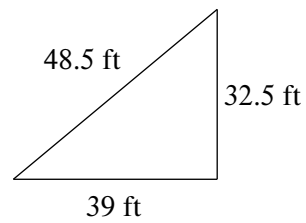
10)



11)



12)



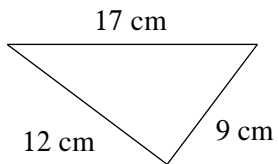
State if the three sides lengths form a right triangle.

13) 10 cm, 49.5 cm, 50.5 cm

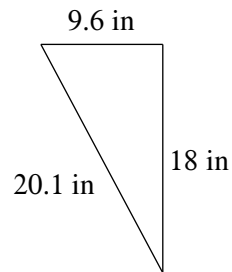
14) 9 in, 12 in, 15 in

State if each triangle is acute, obtuse, or right.

15)



16)



State if the three side lengths form an acute, obtuse, or right triangle.

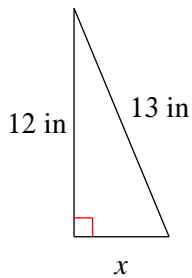
17) 6 mi, $2\sqrt{55}$ mi, 17 mi

18) 4.8 km, 28.6 km, 29 km

The Pythagorean Theorem and Its Converse

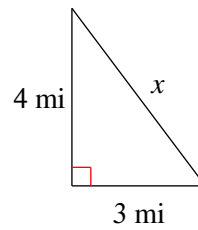
Find the missing side of each triangle. Round your answers to the nearest tenth if necessary.

1)



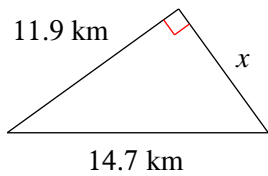
5 in

2)



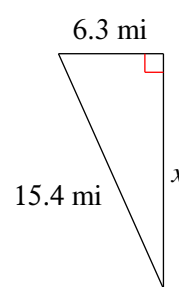
5 mi

3)



8.6 km

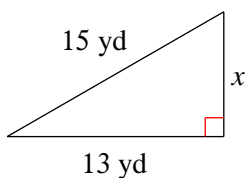
4)



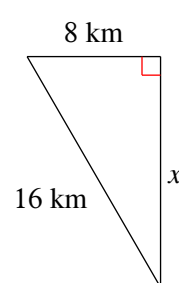
14.1 mi

Find the missing side of each triangle. Leave your answers in simplest radical form.

5)

 $2\sqrt{14}$ yd

6)

 $8\sqrt{3}$ km

Find the missing side of each right triangle. Side c is the hypotenuse. Sides a and b are the legs. Leave your answers in simplest radical form.

7) $a = 11$ m, $c = 15$ m

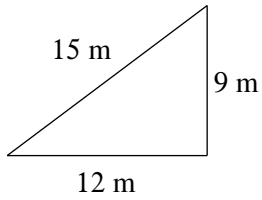
 $2\sqrt{26}$ m

8) $b = \sqrt{6}$ yd, $c = 4$ yd

 $\sqrt{10}$ yd

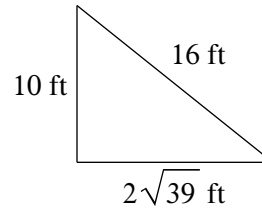
State if each triangle is a right triangle.

9)



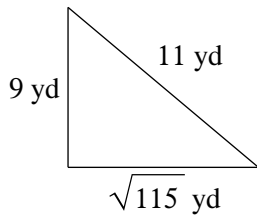
Yes

10)



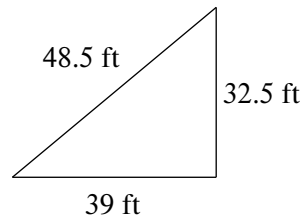
Yes

11)



No

12)



No

State if the three sides lengths form a right triangle.

13) 10 cm, 49.5 cm, 50.5 cm

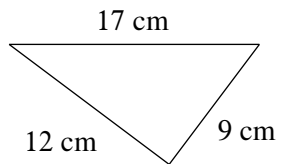
Yes

14) 9 in, 12 in, 15 in

Yes

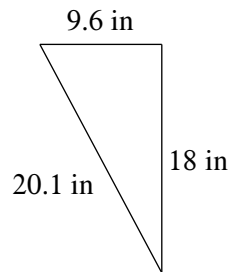
State if each triangle is acute, obtuse, or right.

15)



Obtuse

16)



Acute

State if the three side lengths form an acute, obtuse, or right triangle.

17) 6 mi, $2\sqrt{55}$ mi, 17 mi

Obtuse

18) 4.8 km, 28.6 km, 29 km

Right

Using Trigonometry to Find Angle Measures

Find each angle measure to the nearest degree.

1) $\tan A = 2.0503$

2) $\cos Z = 0.1219$

3) $\tan Y = 0.6494$

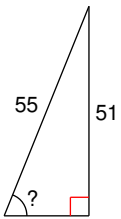
4) $\sin U = 0.8746$

5) $\cos V = 0.6820$

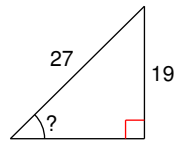
6) $\sin C = 0.2756$

Find the measure of the indicated angle to the nearest degree.

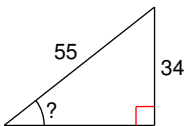
7)



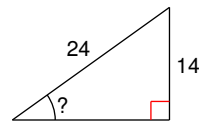
8)



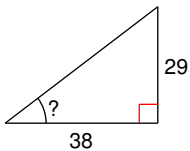
9)



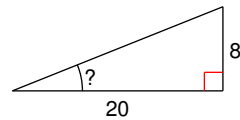
10)



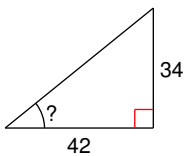
11)



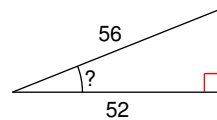
12)



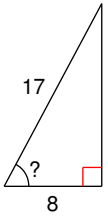
13)



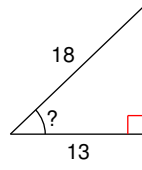
14)



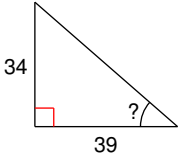
15)



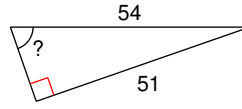
16)



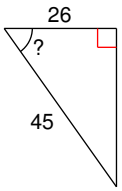
17)



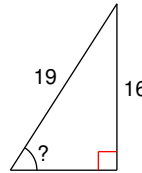
18)



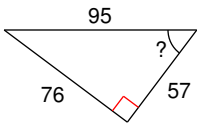
19)



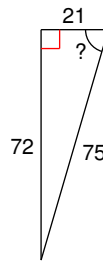
20)



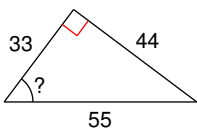
21)



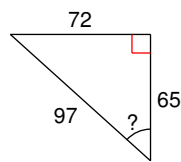
22)



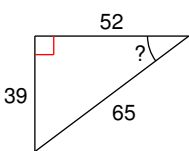
23)



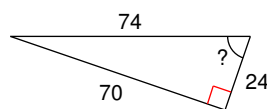
24)



25)



26)



Using Trigonometry to Find Angle Measures

Find each angle measure to the nearest degree.

1) $\tan A = 2.0503$

64°

2) $\cos Z = 0.1219$

83°

3) $\tan Y = 0.6494$

33°

4) $\sin U = 0.8746$

61°

5) $\cos V = 0.6820$

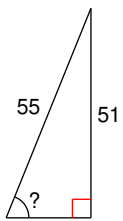
47°

6) $\sin C = 0.2756$

16°

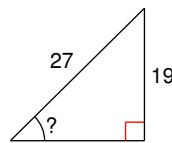
Find the measure of the indicated angle to the nearest degree.

7)



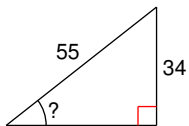
68°

8)



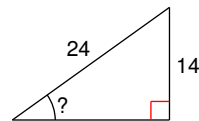
45°

9)



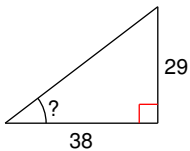
38°

10)



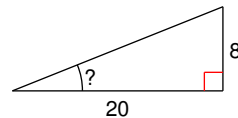
36°

11)



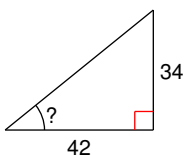
37°

12)



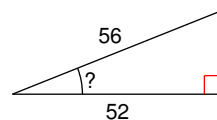
22°

13)



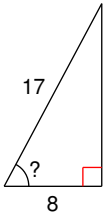
39°

14)



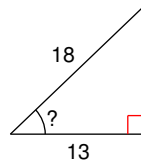
22°

15)



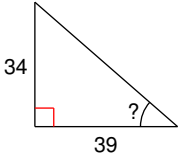
62°

16)



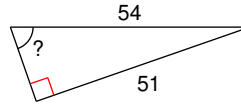
44°

17)



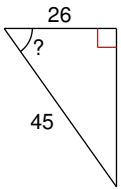
41°

18)



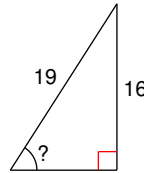
71°

19)



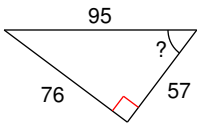
55°

20)



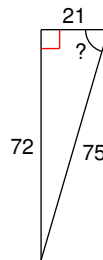
57°

21)



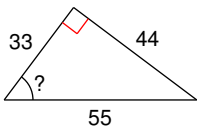
53°

22)



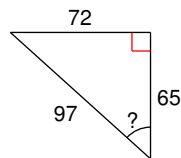
74°

23)



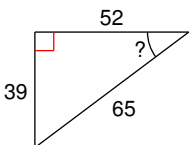
53°

24)



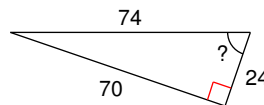
48°

25)



37°

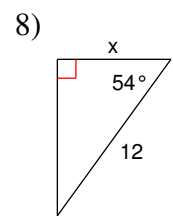
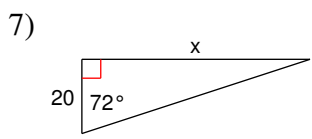
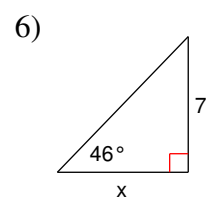
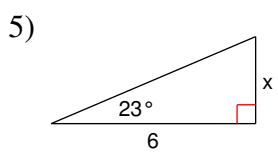
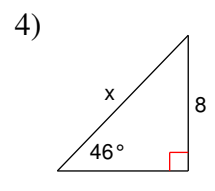
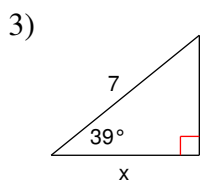
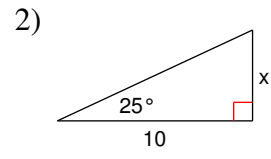
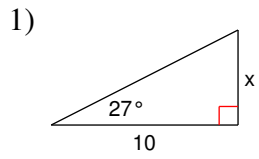
26)



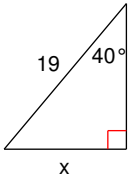
71°

Using Trigonometry To Find Lengths

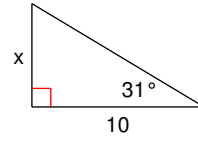
Find the missing side. Round to the nearest tenth.



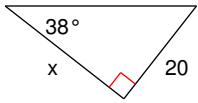
9)



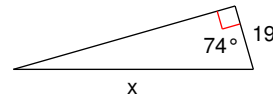
10)



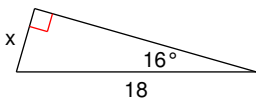
11)



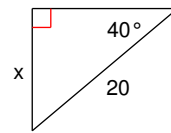
12)



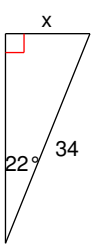
13)



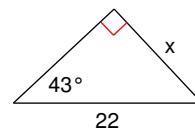
14)



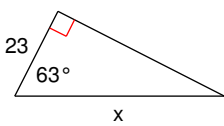
15)



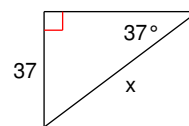
16)



17)

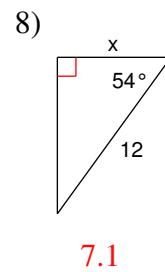
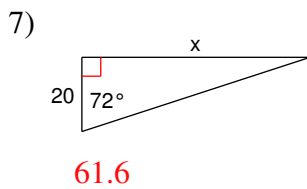
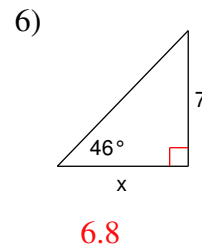
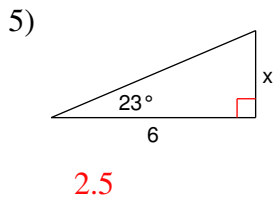
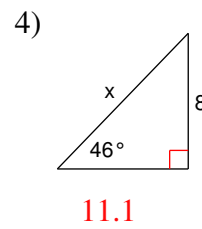
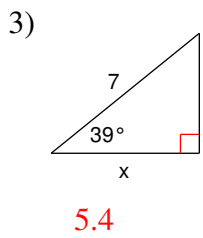
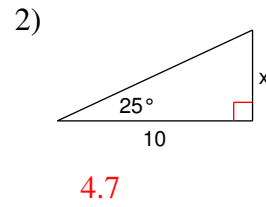
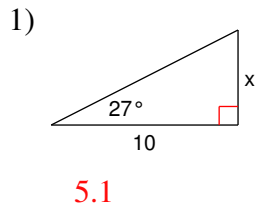


18)

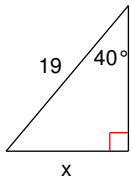


Using Trigonometry To Find Lengths

Find the missing side. Round to the nearest tenth.

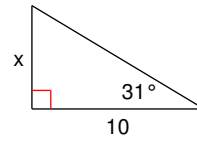


9)



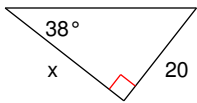
12.2

10)



6.0

11)



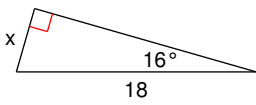
25.6

12)



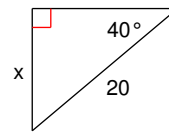
68.9

13)



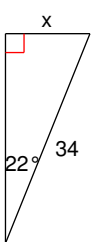
5.0

14)



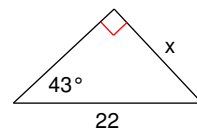
12.9

15)



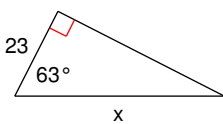
12.7

16)



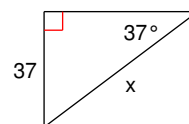
15.0

17)



50.7

18)



61.5