

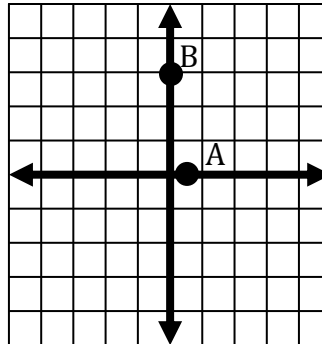
1. If $x > 0$, $y \geq 0$, each of the following MUST be a real number EXCEPT:
- A. xy
 - B. $|xy|$
 - C. $\frac{y}{x}$
 - D. $\frac{x}{y}$
 - E. \sqrt{xy}
2. If x and y are rational, $x \neq 0$, $y \neq 0$, each of the following is a rational number EXCEPT:
- F. $x + y$
 - G. xy
 - H. $x - y$
 - J. $\frac{x}{y}$
 - K. \sqrt{xy}
3. The product of two irrational numbers is always:
- A. irrational
 - B. rational
 - C. positive
 - D. negative
 - E. none of the above
4. For the complex number i such that $i^2 = -1$, what is the value of $i^4 + 2i^2$?
- A. -2
 - B. -1
 - C. 0
 - J. 1
 - K. 2
5. In the complex numbers, where $i^2 = -1$, $\frac{1}{1+i} \cdot \frac{1-i}{1-i} = ?$
- A. $i - 1$
 - B. $i + 1$
 - C. $1 - i$
 - D. $\frac{1-i}{2}$
 - E. $\frac{1+i}{2}$

6. What is the y-intercept of the line $3x - 3y = 5$?

- A. $\frac{5}{3}$
- B. $\frac{3}{5}$
- C. $-\frac{5}{3}$
- D. $-\frac{3}{5}$
- E. 1

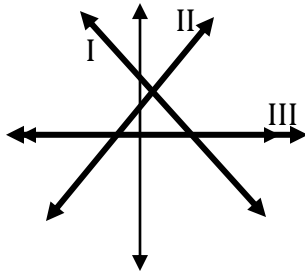
7. What is the slope of \overline{AB} ?

- F. 0
- G. 6
- H. -6
- J. $\frac{1}{6}$
- K. $-\frac{1}{6}$



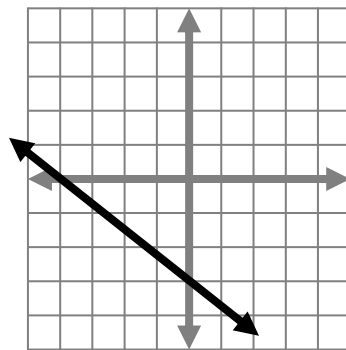
8. Which of the lines shown below has a negative slope?

- A. I only
- B. II only
- C. I & II only
- D. II & III only
- E. I, II, & III



9. Which of the following is the equation of the line below?

- F. $y = \frac{4}{3}x - 3$
- G. $y = \frac{3}{4}x + 3$
- H. $y = -\frac{3}{4}x + 3$
- J. $y = \frac{3}{4}x - 3$
- K. $y = -\frac{3}{4}x - 3$



1. Which of these points lies on the line $y = -2x + 5$?
 - A. (2, 1)
 - B. (2, -1)
 - C. (2, 9)
 - D. (2, -9)
 - E. (2, 10)

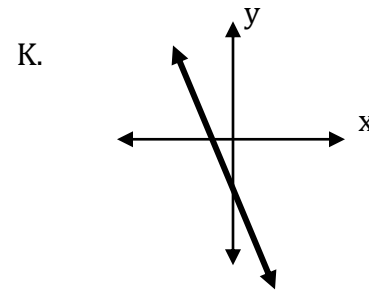
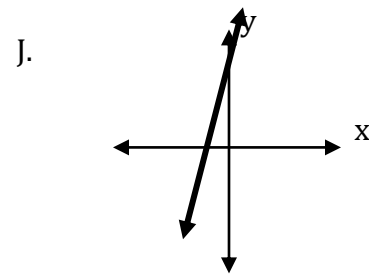
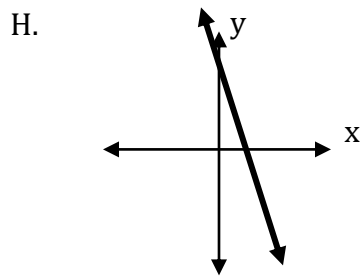
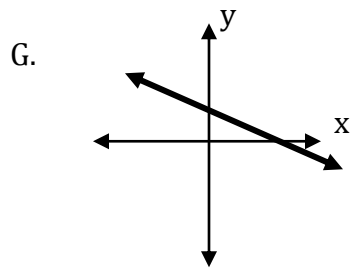
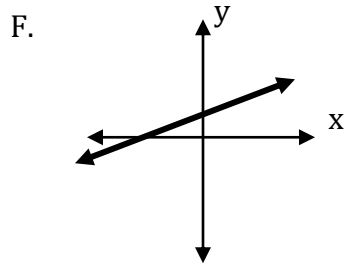
2. Which of these is parallel to the line $x - 2y = 4$ and passes through the point (-4, -1)?
 - F. $x - 2y = 2$
 - G. $2y - x = 2$
 - H. $x - 2y = 7$
 - J. $2y - x = 7$
 - K. $2x - y = 4$

3. Which of the following has a y-intercept of 2 and passes through the point (1, -3)?
 - A. $y = \frac{2}{3}x + 2$
 - B. $y = \frac{-2}{3}x + 2$
 - C. $y = 5x + 2$
 - D. $y = -5x + 2$
 - E. $y = 6x + 2$

4. What is the equation of the line passing through (-1,3) with a slope of zero?
 - A. $x = 3$
 - B. $y = 3$
 - C. $x = 3y$
 - D. $y = 3x$
 - E. $y = 3x - 1$

5. If the line, $y = 2x - 1$, is moved 2 units to the left, what is the equation of the new line?
 - F. $y = 2x + 3$
 - G. $y = 2x - 2$
 - H. $y = 2x + 1$
 - J. $y = 2x + 2$
 - K. $y = 2x$

6. Which of the following is the graph of $y = -3x + 9$?



7. If k is any real number, the equation, $y = kx - 2$, will represent all lines with:

- A. a slope of -2
- B. a slope of 2
- C. a y -intercept of -2
- D. a y -intercept of 2
- E. all of the above

8. $(2\sqrt{12})(\sqrt{24}) = ?$

- A. $8\sqrt{6}$
- B. $12\sqrt{2}$
- C. $12\sqrt{3}$
- D. $12\sqrt{6}$
- E. $24\sqrt{2}$

1. $3^4 3^{-9} = ?$

- F. 3^5
- G. 3^{13}
- H. 3^{-5}
- J. 3^{-13}
- K. 3^{-36}

2. $\sqrt{2+6 \cdot 8} = ?$

- A. $2\sqrt{5}$
- B. $5\sqrt{2}$
- C. $2\sqrt{15}$
- D. $4\sqrt{15}$
- E. $15\sqrt{2}$

3. If $x = 2\sqrt{2}$, $2x^2 - 3x + 2 = ?$

- F. $18 - 6\sqrt{2}$
- G. $30 - 6\sqrt{2}$
- H. $34 - 6\sqrt{2}$
- J. $62 - 6\sqrt{2}$
- K. $66 - 6\sqrt{2}$

4. $(\sqrt{2} + 2\sqrt{5})(2\sqrt{2} - 3\sqrt{5}) =$

- A. -142
- B. -26
- C. $-142 + \sqrt{10}$
- D. $-26 + \sqrt{10}$
- E. 0

5. $3\sqrt{20} + 2\sqrt{45} =$

- F. $5\sqrt{65}$
- G. $2\sqrt{5}$
- H. $6\sqrt{5}$
- J. $12\sqrt{5}$
- K. $12\sqrt{10}$

6. $\sqrt{7+\sqrt{x}}=2+\sqrt{3}$

- A. 48
- B. 32
- C. 24
- D. 16
- E. 12

7. $(3\sqrt{3}-2\sqrt{5})(3\sqrt{3}+2\sqrt{5})=$

- F. 7
- G. 47
- H. $7+12\sqrt{15}$
- J. $47+12\sqrt{15}$
- K. $7-12\sqrt{15}$

8. If $a \neq 0$, $\frac{a^{\frac{1}{2}}}{\frac{1}{a^3}}=$

- A. $a^{\frac{3}{2}}$
- B. $a^{\frac{1}{6}}$
- C. $a^{\frac{2}{3}}$
- D. $a^{\frac{5}{6}}$
- E. a^6

9. $16^{\frac{-3}{4}}+8^{\frac{2}{3}}=$

- F. 32
- G. 12
- H. $4\frac{1}{8}$
- J. 4
- K. $-6\frac{2}{3}$

1. For $x > 0, y > 0$ then $\frac{\sqrt{x} - \sqrt{y}}{\sqrt{x} + \sqrt{y}} =$

A. $\frac{x+y}{x-y}$

B. $\frac{x-y}{x+y}$

C. -1

D. $\frac{x - 2\sqrt{xy} + y}{x - y}$

E. $\frac{x + 2\sqrt{xy} + y}{x + y}$

2. There are 8 blocks in a box. Each one has a different number on it from 1 to 8. If two blocks are drawn from the box, which of the following CANNOT be the sum?

A. 2

B. 5

C. 10

D. 12

E. 15

3. To have flyers printed, costs \$50 for the first 100 and \$10 for each additional 100. How many can be printed for \$100?

F. 500

G. 600

H. 700

J. 800

K. 900

4. If the ruler below is marked in inches, what is the length of the nail to the nearest inch?

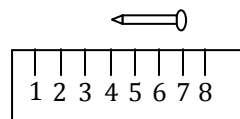
A. 7

B. 6

C. 5

D. 4

E. 3



5. Two buildings appear to be the same height. One is 50 feet tall. If the other is 5 times as far away, how tall is it?
- F. 10 feet
 - G. 50 feet
 - H. 100 feet
 - J. 250 feet
 - K. 2500 feet
6. If a car gets 33 miles per gallon of gasoline and gasoline costs \$1.08 per gallon, what would it cost to go 300 miles?
- A. \$8.73
 - B. \$9.82
 - C. \$11.21
 - D. \$35.64
 - E. \$106.92
7. Which of the following is equivalent to 15.5×10^{-4} ?
- F. .0000155
 - G. .000155
 - H. .00155
 - J. 155,000
 - K. 1,550,000
8. Points X, Y, and Z, are on the same line in that order. If the distance from X to Z is 8.32×10^6 and the distance from Y to Z is 25.3×10^3 , how far is it from X to Y?
- A. 5,790,000
 - B. 8,067,000
 - C. 8,294,700
 - D. 8,345,300
 - E. 8,573,000
9. The sun is about 150,000,000 km away. Light travels about 300,000 km per second. About how many seconds does it take for sunlight to reach earth?
- F. 5.0×10^{-1}
 - G. 5.0×10^0
 - H. 5.0×10^1
 - J. 5.0×10^2
 - K. 5.0×10^3

1. What is the total cost of 3.5 pounds of peaches at 86 cents per pound and 4.5 pounds of pears at 68 cents per pound?
- A. \$3.01
B. \$3.06
C. \$6.01
D. \$6.07
E. \$7.60
2. Bob is buying a car for \$ 6300. He gets a trade-in allowance of \$1250 for his old car, but has to pay \$ 480 for sales tax and license. How much does he need to borrow to cover the balance?
- F. \$4570
G. \$5530
H. \$6830
J. \$7070
K. \$8030
3.
$$\frac{(7.5 \times 10^6)(2 \times 10^2)}{(3 \times 10^4)(2.5 \times 10^9)}$$
- A. 3.5×10^{-4}
B. 3.0×10^5
C. 2.0×10^{-4}
D. 2.0×10^{-5}
E. 2.0×10^5
4. If $x \neq 0, z \neq 0$, simplify $\frac{32x^5y^4z^8}{-16x^3z^2}$.
- A. $16x^2y^4z^6$
B. $16x^2y^4z^4$
C. $2x^2y^4z^6$
D. $-2x^2y^4z^4$
E. $-2x^2y^4z^6$
5. For which nonnegative value of x is $\frac{1}{9-x^2}$ undefined?
- F. 61
G. 18
H. 9
J. 3
K. 0

6. $\frac{2x}{x^2 - 2x - 3}$ is defined except for which 2 values of x ?

- A. -2 and -3
- B. -1 and 3
- C. 0 and -2
- D. 0 and 2
- E. 1 and -3

7. Which is simplified form of $\frac{4}{x} + \frac{6x+2}{x^2}$

F. $\frac{6(x+1)}{x}$

G. $\frac{6(x+1)}{x^2}$

H. $\frac{6x+6}{x^3}$

J. $\frac{10x+2}{x^2}$

K. $\frac{12}{x}$

8. Which is a simplified version equivalent to $\frac{3+6x}{9x}$?

A. $\frac{2x+1}{3x}$

B. $\frac{1+6x}{3x}$

C. 1

D. 2

E. $\frac{7}{3}$

9. For all x in its domain, $\frac{x+1}{x^3 - x}$ is equivalent to:

F. $\frac{1}{x^2} - \frac{1}{x^3}$

G. $\frac{1}{x^3} - \frac{1}{x}$

H. $\frac{1}{x^2 - 1}$

J. $\frac{1}{x^2 - x}$

K. $\frac{1}{x^3}$

1. For all positive integers x , y , and z , $\frac{x}{y}$ is equivalent to:

A. $\frac{xz}{yz}$

B. $\frac{xx}{yy}$

C. $\frac{yx}{xy}$

D. $\frac{x-z}{y-z}$

E. $\frac{x+z}{y+z}$

2. For all $x > 3$, $\frac{3x - x^2}{x^2 + 3x - 18} =$

A. $\frac{-x}{x+6}$

B. $\frac{x}{x-6}$

C. $\frac{1}{x+6}$

D. $-\frac{1}{18}$

E. $\frac{1}{18}$

3. For all nonzero r , t , and z values, $\frac{16r^3tz^5}{-4rt^3z^2}$

F. $-\frac{4z^3}{r^2t^2}$

G. $-\frac{4r^2z^3}{t^2}$

H. $-\frac{4rz}{t}$

J. $-4r^4t^4z^7$

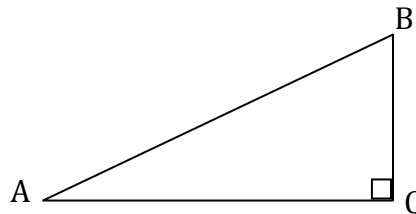
K. $-4r^2t^2z^3$

4. For all nonzero a and b , $\frac{(10a^2b^2)(-9a^2b^3)}{6a^2b^4} =$

- A. $-15b$
- B. $-15a^2b$
- C. $-15a^2b^2$
- D. $\frac{a^2b^2}{15}$
- E. $\frac{12}{15}$

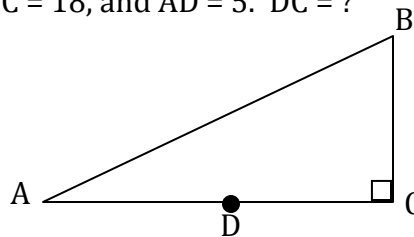
5. ABC is a right triangle. If $BC = 9$ and $AB = 12$, then $AC = ?$

- A. $9\sqrt{7}$
- B. $3\sqrt{7}$
- C. 15
- D. 63
- E. 225



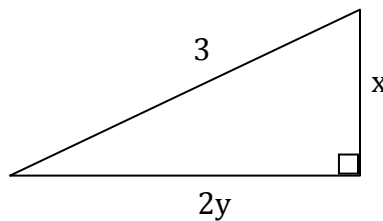
6. ABC is a right triangle. $AB = 30$, $BC = 18$, and $AD = 5$. $DC = ?$

- F. 19
- G. 20
- H. 21
- J. 24
- K. 29



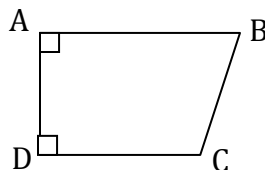
7. In the right triangle below, find the length of x in terms of y .

- A. $3 + 2y$
- B. $3 - 2y$
- C. $2y - 3$
- D. $\sqrt{9 + 4y^2}$
- E. $\sqrt{9 - 4y^2}$

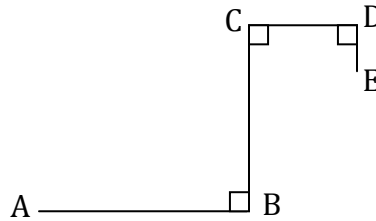


8. In trapezoid ABCD below, $m\angle A = m\angle D = 90^\circ$. If $BC = 26$, $DC = 36$, $AB = 46$, then $AD = ?$

- F. $2\sqrt{194}$
- G. $4\sqrt{194}$
- H. 22
- J. 23
- K. 24

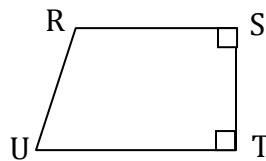


1. In the figure below, the angles are all right angles as marked. $AB = 24$, $BC = 19$, $CD = 12$, and $DE = 4$. $AE = ?$



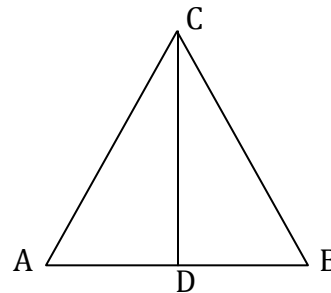
- A. 31
- B. 33
- C. 37
- D. 39
- E. 41

2. In trapezoid RSTU, $RS = 18$, $RU = 12$, $m\angle S = m\angle T = 90^\circ$, and $m\angle U = 60^\circ$. What is the perimeter of the trapezoid?



- F. 6
- G. $6\sqrt{3}$
- H. 54
- J. $54 + 6\sqrt{3}$
- K. $54 + 12\sqrt{3}$

3. $\triangle ABC$ is equilateral. If altitude $CD = 9$, then $AC = ?$

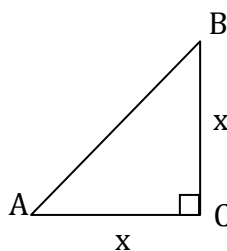


- A. $6\sqrt{3}$
- B. $3\sqrt{3}$
- C. $\sqrt{3}$
- D. 9
- E. 4.5

4. A 16-foot ladder is leaning against a house. The top of the ladder is about 15 feet above the ground. The base of the ladder is about how far from the house?

- F. 4 feet 8 inches
- G. 5 feet 2 inches
- H. 5 feet 7 inches
- J. 6 feet 3 inches
- K. 6 feet 9 inches

5. Below is an isosceles right triangle. If $AB=8$, $x=?$



- A. 8
- B. 4
- C. $4\sqrt{2}$
- D. $2\sqrt{2}$
- E. $8\sqrt{2}$

6. Evaluate $2x^2 - 2x - 5$ when $x = -3$.
- A. 7
B. 18
C. 19
D. 25
E. 37
7. If $a = -1$ and $b = 2$, then $2a^3 + 3a^2b - ab^2 - 3b = ?$
- F. 0
G. -10
H. -12
J. 12
K. 2
8. Find the value of $2 - (2a^2 + 3ab)$ when $a = -2$ and $b = 1$?
- A. -20
B. -12
C. -8
D. 4
E. 0
9. For all x , $x(2x - 3) - 2(5 - x) = ?$
- F. $2x^2 - 5x - 10$
G. $2x^2 - x - 10$
H. $2x^2 + x - 13$
J. $2x^2 - x - 13$
K. $2x^2 - 5x - 13$
10. For all x and all N , $(4x^2 + 3) - (x^2 + Nx - 3) = ?$
- A. $3x^2 + Nx$
B. $3x^2 - Nx$
C. $3x^2 - Nx + 6$
D. $3x^2 + Nx + 6$
E. $3x^2 - Nx - 6$

1. For all $x < 0, y > 0$, $(2x + y)(3x) - 4xy = ?$
 - F. $6x^2 - xy$
 - G. $6x^2 - 7xy$
 - H. $6x^2 + 7xy$
 - J. $6x^2 + 3y^2 - 4xy$
 - K. $6x^2 + 3xy^2 - 4xy$

2. For variables a and b , $x = 2a^2, y = -2a^2 - 3b$. Which of the following represents the product of xy ?
 - A. $4a^4 - 6a^2b$
 - B. $-4a^4 - 6a^2b$
 - C. $-4a^4 + 6a^2b$
 - D. $-2a^4 - 6a^2b$
 - E. $-2a^2 - 6a^2b$

3. Which of the following is a factor of $3x^2 + x - 24$?
 - F. $x - 3$
 - G. $x - 6$
 - H. $3x - 6$
 - J. $3x - 8$
 - K. $3x - 2$

4. If $x > 0, y \leq 0$, $y^2 - x^2$?
 - A. $(x - y)(x + y)$
 - B. $(y - x)(y + x)$
 - C. $(x - y)(x - y)$
 - D. $(y - x)(y - x)$
 - E. $y - x$

5. What is the greatest common factor of $12x^3y$ and $8x^2y^2$?
 - F. $2x^2$
 - G. $4x^2$
 - H. $4x^2y$
 - J. $4x^2y^2$
 - K. $4x^3y^2$

6. Which is the complete factorization of $6x^3y^2 + 15x^2y^2 - 36xy^2$
- A. $3xy^2(2x^2 + 5x - 12)$
 - B. $3xy^2(2x^2 - 5x + 12)$
 - C. $3xy^2(2x - 4)(x + 3)$
 - D. $3xy^2(2x + 4)(x - 3)$
 - E. $3xy^2(2x - 3)(x + 4)$
7. For all x , $(x - 3)^2 + (x + 1)^2 =$
- F. $2x^2 + 10$
 - G. $2x^2 - 10$
 - J. $2x^2 + 2x + 10$
 - K. $2x^2 - 2x + 10$
 - L. $2x^2 - 4x + 10$
8. If $x \neq 0, z \neq 0$, simplify $\frac{32x^5y^4z^8}{-16x^3z^2}$
- A. $16x^2y^4z^6$
 - B. $-16x^2y^4z^4$
 - C. $2x^2y^4z^6$
 - D. $-2x^2y^4z^4$
 - E. $-2x^2y^4z^6$
9. A rectangle has a length of $(4x - 1)$ and a width of $(x + 5)$. What is the area?
- F. $5x + 4$
 - G. $10x + 8$
 - H. $4x^2 - 5$
 - J. $4x^2 + 19x - 5$
 - K. $4x^2 + 21x - 5$