

Basic Algebra 1 & Inequalities Practice Questions

NOTE: Do NOT work these practice problems by plugging in the answers choices. Our purpose is practicing your Algebra. Use Basic Algebra to *solve* each equation step by step. I repeat - do *not* just plug in all the choices to see which ones work - yes, you may get the right answers, but it's a waste of your valuable time and you won't learn anything useful!

DO NOT USE A CALCULATOR ON ANY OF THE FOLLOWING QUESTIONS.

1. Solve for the value of x in the equation

$$4x - 7 = 5 - 2x.$$

- (A) -2
- (B) -1
- (C) 1
- (D) 2

2. Solve for the value of n in the equation

$$-4n - 18 = -7n + 9.$$

- (A) -9
- (B) -3
- (C) 3
- (D) 9

3. Solve for the value of x in the equation

$$4x + 4 + 8x + 8 = 8 + x + 3x - 12.$$

- (A) -2
- (B) -1
- (C) 1
- (D) 2

4. Solve for t in the equation

$$4(t + 7) = 2(3(2 + t)).$$

- (A) -8
- (B) 2.5
- (C) 8
- (D) 20

5. Solve for the value of x in the equation below:

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

- (A) 2
- (B) 11
- (C) 15
- (D) 20

6. Consider the equation below:

$$\frac{21n+18+24n}{4+n} = 3(1+5)$$

What is the value of $3n$?

- (A) 2
- (B) 4
- (C) 6
- (D) 12

7. What is a possible value of y in the inequality below?

$$y+7 < 2y+4$$

- (A) 4
- (B) 2
- (C) -2
- (D) -4

8. Which of the following values is a solution to the inequality below?

$$7-x < \frac{-4x-2}{2}$$

- (A) -9
- (B) -8
- (C) -7
- (D) -6

9. Which of the following values is a possible solution to the inequality below?

$$1-x < 5+3x < 17-x$$

- (A) -3
- (B) 1
- (C) 3
- (D) 5

10. Which of the following values is a solution for the inequality below?

$$2(6n-4) \leq 4(4+2n) \leq 6(2+2n)$$

- (A) 10
- (B) 5
- (C) -1
- (D) -6

Advanced Algebra 1 Practice Questions

DO NOT USE A CALCULATOR ON ANY OF THE FOLLOWING QUESTIONS.

1. What is the value of x in the equation below?

$$\frac{2.5x + 3.5}{4} = \frac{1.25 + 2.25x}{2}$$

- (A) -1
- (B) $-.5$
- (C) $.5$
- (D) 2.5

$$10a - 25b > 25$$

2. Which of the following inequalities is equivalent to the inequality above?

- (A) $5a - 5b > 5$
- (B) $2a - 5b > 5$
- (C) $2a - 5b > 25$
- (D) $5a - 5b > 25$

3. What is the set of all solutions to the equation

$$\sqrt{3x + 4} = -x?$$

- (A) $\{-1, 4\}$
- (B) $\{-1\}$
- (C) $\{4\}$
- (D) There are no solutions to the given equation.

4. If a is a constant and $y = ax$ when $y = 4$ and $x = 2$, what is the value of $y + 2$ when $x = 4$?

- (A) 2
- (B) 4
- (C) 8
- (D) 10

$$\frac{t - z}{z} = q$$

5. In the equation above, if t is positive and z is negative, which of the following must be true?

- (A) $q < 0$
- (B) $q = -1$
- (C) $q = 1$
- (D) $q > 0$

6. What is the set of all solutions to the equation

$$\sqrt{10 - 3x} = x?$$

- (A) $\{-5, 2\}$
- (B) $\{-5\}$
- (C) $\{2\}$
- (D) There are no solutions to the given equation.

7. The estimated mass m in tons of a certain extinct dinosaur can be calculated by the equation below, where h is the estimated height in feet of the dinosaur at its shoulders, l is the length in feet of its tail, and b is the constant of dinosaur mass.

$$m = \frac{h(h^3 + l)}{b\sqrt{2h + 2l}}$$

Which of the following equations can be used to calculate the value of the constant of dinosaur mass?

- (A) $b = \frac{h(h^3 + l)}{m\sqrt{2h + 2l}}$
- (B) $b = \frac{mh(h^3 + l)}{\sqrt{2h + 2l}}$
- (C) $b = \frac{m\sqrt{2h + 2l}}{h(h^3 + l)}$
- (D) $b = \frac{\sqrt{2h + 2l}}{mh(h^3 + l)}$

8. If $\frac{y-2}{2} = \frac{x-8}{8}$ what is the value of $\frac{y}{x} + 1$?

- (A) .25
- (B) 1.25
- (C) 4
- (D) 5

9. The velocity v of a newly-discovered particle in a testing chamber can be calculated by the formula below, where g is a constant, n is the number of similar particles in the testing chamber, and x is the coefficient of atmospheric friction at a temperature of 270 degrees Celsius.

$$v = \frac{\sqrt{g - n^2} + 17n}{3x - 12n}$$

Which of the following equations can be used to calculate the coefficient of atmospheric friction?

- (A) $x = \frac{\sqrt{g - n^2} + 17n - 12nv}{v}$
- (B) $x = \frac{\sqrt{g + n^2} - 17n + 12nv}{v}$
- (C) $x = \frac{\sqrt{g - n^2} + 17n + 12nv}{3v}$
- (D) $x = \frac{\sqrt{g + n^2} - 17n - 12nv}{3v}$

10. The future value v in dollars of a certain speculative investment in electronic currency can be predicted by the equation below, where i is the initial investment in dollars, p is the constant of market volatility, n is the number of competing electronic currencies, and D is the current value of the Dow-Jones Industrial Average.

$$v = \frac{D\sqrt{pn^2 + 100i}}{i\left(\frac{1 - \sqrt{i - n^3}}{p - 20i}\right)}$$

Which of the following equations can be used to calculate the value of the Dow-Jones Industrial Average?

(A) $D = \frac{\sqrt{pn^2 + 100i}}{v\left(\frac{1 - \sqrt{i - n^3}}{p - 20i}\right)}$

(B) $D = \frac{vi\sqrt{pn^2 + 100i}}{\left(\frac{1 - \sqrt{i - n^3}}{p - 20i}\right)}$

(C) $D = \frac{i\left(\frac{1 - \sqrt{i - n^3}}{p - 20i}\right)}{v\sqrt{pn^2 + 100i}}$

(D) $D = \frac{vi\left(\frac{1 - \sqrt{i - n^3}}{p - 20i}\right)}{\sqrt{pn^2 + 100i}}$

Absolute Value Practice Questions

DO NOT USE A CALCULATOR ON ANY OF THE FOLLOWING QUESTIONS.

1. If $x < 0$, what is the value of x in the equation below?

$$|x - 6| = 10$$

- (A) $x = 16$
- (B) $x = -4$
- (C) $x = -6$
- (D) $x = -16$

$$3 + |n| = 12$$

2. What is the set of solutions for n in the equation above?

- (A) $\{9, -15\}$
- (B) $\{-9\}$
- (C) $\{-15\}$
- (D) $\{9, -9\}$

$$|-4 - 2t| = 14$$

3. FREE RESPONSE: What is the value of t in the equation above, if $t > 0$?

4. What is the solution set for the equation below?

$$|-2x + 3| = -9$$

- (A) $\{3\}$
- (B) $\{-6, 3\}$
- (C) $\{-3, 6\}$
- (D) There are no solutions to the given equation.

$$|x - 4.5| = 3.5$$

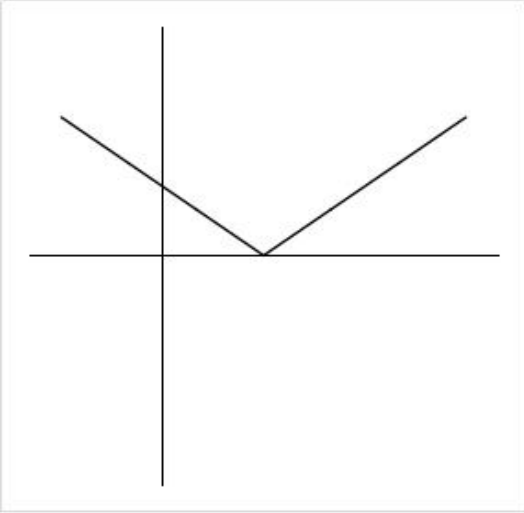
5. If a and b are solutions to the equation above, what is the value of $a + b$?

- (A) 1
- (B) 7
- (C) 8
- (D) 9

$$|4x + 12| = 4$$

6. FREE RESPONSE: If n and t are solutions to the equation above, what is the value of $|n - t|$?

7. Which of the following equations could produce the graph below?

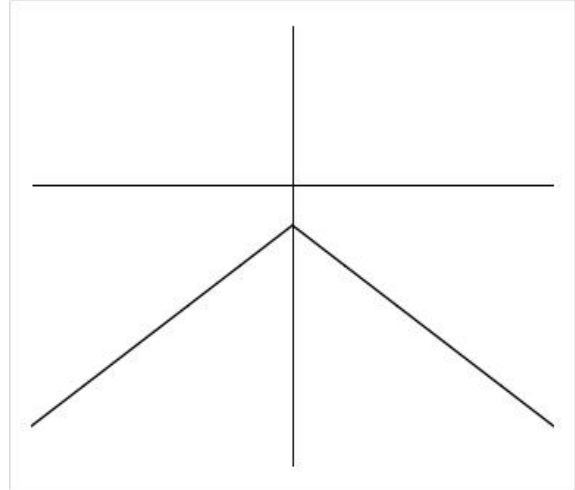


- (A) $y = x + 4$
- (B) $y = |x| - 4$
- (C) $y = |x - 4|$
- (D) $y = x - 4$

8. A number line contains two different points A & B . These points are both 7 units from the point with coordinate -2 . The solutions to which of the following equations gives the coordinates of both points?

- (A) $|x - 2| = 7$
- (B) $|x + 2| = 7$
- (C) $|x - 7| = 2$
- (D) $|x - 7| = -2$

9. Which of the following equations could produce the graph below?



- (A) $y = -|x| - 1$
- (B) $y = |x| - 1$
- (C) $y = |-x| - 1$
- (D) $y = |-x - 1|$

10. FREE RESPONSE: If G and H are points on a number line that are 12.5 units from the point with coordinate -6 , and the coordinate of point G is s and the coordinate of point H is t , then what is the value of the expression above?

$$|s - t|$$

Algebra 1 Word Problems Practice Questions

DO NOT USE A CALCULATOR ON ANY OF THE FOLLOWING QUESTIONS UNLESS INDICATED.

1. If $4q - 15$ is 19 more than 26, what is the value of $3q$?

- (A) 7.5
- (B) 15
- (C) 22.5
- (D) 45

2. If $21 + 7x$ is 12 less than 68, how many times does $4x$ divide into 60?

- (A) 7
- (B) 5
- (C) 3
- (D) 2

3. One pint of raspberries costs \$3. At this rate, how many dollars will r pints of raspberries cost?

- (A) $\frac{r}{3}$
- (B) $3r$
- (C) $\frac{3}{r}$
- (D) $12r$

$$T = 100c + 50s$$

4. (CALCULATOR) FREE RESPONSE: A factory manufactures completed guitar amplifiers from a speaker cabinet and a speaker cone. The equation above shows the total cost T in dollars of making the amplifiers from c units of speaker cabinets and s units of speaker cones. If the total cost of manufacturing was \$2000 and the factory produced 10 speaker cabinets, how many speaker cones did the factory produce?

5. (CALCULATOR) FREE RESPONSE:

Membership at a swimming center costs a one-time sign-up fee of \$50 plus m dollars for each month. If a swimmer paid \$230 for the first 12 months, including the sign-up fee, what is the value of m ?

6. Karl's house sits exactly at Mile Marker 6 on a road that runs directly North to South. He walked due south from his house to Mile Marker 5. Then he walked due north to Mile Marker 9. Then he walked south again to Mile Marker 3. From there he walked directly home. How many miles did Karl walk?

- (A) 7
- (B) 14
- (C) 19
- (D) 23

7. (CALCULATOR) If 40 Antarctic Ants were stacked directly on top of each other, the column would be approximately $4\frac{2}{5}$ inches tall. Which of the following is closest to the number of Antarctic Ants it would take to make a 10-inch column?

- (A) 9
- (B) 89
- (C) 90
- (D) 91

8. The equation below shows the number of minutes r that Christian spends jogging each week and the number of hours w that he spends walking each week. In the equation, what does the number 300 represent?

$$300 = r + 60w$$

- (A) The number of minutes spent jogging each week.
- (B) The total number of hours spent jogging and walking each week.
- (C) The total number of minutes spent jogging and walking each week.
- (D) The difference in minutes spent jogging and walking each week.

$$.15x + .25y = .2(x + y)$$

9. (CALCULATOR) Christian will mix x liters of a 15% by volume peroxide solution with y liters of a 25% by volume peroxide solution in order to create a 20% by volume peroxide solution. The equation above represents this situation. If Christian uses 10 liters of the 25% by volume peroxide solution, how many liters of the 15% by volume peroxide solution must he use?

- (A) 10
- (B) 15
- (C) 100
- (D) 150

10. Ian has \$225 to spend on video games and controllers. Video games cost \$50 each, and controllers cost \$30 each. If there is no tax on this purchase and he buys 3 video games, what is the maximum number of controllers he can buy?

- (A) One
- (B) Two
- (C) Three
- (D) Four

$$2520 = 8r + 14t$$

11. (CALCULATOR) A warehouse stores two types of tires: race car tires and tractor tires. Because of space limitations, the number of tires the warehouse is capable of storing can be calculated by the equation above, where r is race car tires and t is tractor tires. If the warehouse currently holds 110 race car tires, what is the maximum number of tractor tires that the warehouse can currently store?
- (A) 117
(B) 118
(C) 122
(D) 123
12. A manufacturer is considering an upgrade to a new type of machinery that will allow their factory to produce shaving cream canisters at a lower cost per unit, saving \$1.50 per canister. The cost of installing this new type of machinery is \$20,000. If the factory produces c shaving canisters per month, which of the following inequalities can be solved to find y , the number of months after which the total savings on unit production will exceed the installation cost?
- (A) $20,000 > \frac{1.5}{cy}$
(B) $20,000 < 1.5cy$
(C) $20,000 < \frac{1.5c}{y}$
(D) $20,000 > \frac{1.5y}{c}$
13. FREE RESPONSE: The density of an object is equal to its mass divided by its volume. What is the volume, in cubic centimeters, of a meteorite with a density of 9 grams per cubic centimeter and a mass of 54 grams?
14. A student estimates that an end-of-semester project for history class will take h hours to complete, where $h < 30$. The goal is for the estimate to be within 5 hours of the time it will actually take to complete the project. If the student meets the goal and it takes x hours to complete the project, which of the following inequalities represents the relationship between the estimated time and the actual completion time?
- (A) $x + h < 10$
(B) $x > 30 - h$
(C) $h < 30 + x$
(D) $-5 < x - h < 5$
15. At a certain food truck, s servings of omelets are made by adding g pinches of shredded cheese to a frying pan full of scrambled eggs. If $s = g + 3$, how many additional pinches of shredded cheese are needed to make each additional serving of omelette?
- (A) One
(B) Two
(C) Three
(D) Four

QUESTIONS 16, 17, AND 18 REFER TO THE FOLLOWING INFORMATION:

When designing a skyscraper, a construction firm can use the skyscraper dimensions formula $4h + p = 170$, where h is the height in feet of a single story of the skyscraper, and p is the perimeter in feet of the skyscraper's base. For any given skyscraper, the height of each story and the perimeter of the base are always the same.

16. Which of the following expresses the height of a single story in terms of perimeter of the base?

(A) $h = 4(170 + p)$

(B) $h = \frac{170 + p}{4}$

(C) $h = \frac{4}{170 - p}$

(D) $h = \frac{170 - p}{4}$

17. (CALCULATOR) The building code of a certain city requires that, for all skyscrapers, the height of a single story must be no less than 10 feet and the perimeter of the skyscraper's base must be at least 80 feet. According to the skyscraper dimensions formula, which of the following inequalities represents the set of all possible values for the height in feet of a single story that meets this code requirement?

(A) $10 < h$

(B) $10 < h < 17.5$

(C) $10 < h < 22.5$

(D) $10 < h < 62.5$

18. (CALCULATOR) A construction firm wants to use the skyscraper dimensions formula to design a skyscraper with a total height of 780 feet, a base perimeter of at least 86 feet but no more than 90 feet, and an odd number of floors. Within these constraints, which of the following must be the perimeter, in feet, of the skyscraper?

(A) 86

(B) 87

(C) 88

(D) 90

19. Aaron has a bag of Halloween candy containing n pieces of candy to share with his friends at a party. If he gives each of his friends 4 pieces of candy, he will have 7 pieces of candy left over. In order to give each friend 5 pieces of candy, he will need an additional 6 pieces. How many friends does Aaron have at the party?

- (A) 8
- (B) 13
- (C) 23
- (D) 30

20. (CALCULATOR) FREE RESPONSE: The force of gravitational attraction between two bodies can be determined by the equation

$$F = G \frac{m_1 m_2}{d^2},$$
 where F is the force in

Newtons, G is a constant, m_1 and m_2 are the masses of the two bodies in kilograms, and d is the distance between the centers of the two objects in meters. An astronomer finds three celestial bodies with exactly equal masses but different distances from each other. If the force of gravitational attraction between the two closer bodies is exactly 2.25 times greater than the force of gravitational attraction between the two farther bodies, what is the ratio of the farther distance to the closer distance?