GACE® - Quiz Questions with Answers

Mathematics

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1.

Consider the following statement: To join the U.S. Military, all members need to be at least 18 years of age.

Which of the following statements must be **true**?

Individuals who are not at least 18 years old are not in the military

Everyone in the U.S. is at least 18 years old

All individuals in the U.S. who are at least 18 years old are members of the military

Some members of the military are not 18 years old

Correct answer: Individuals who are not at least 18 years old are not in the military

You are told that all members of the military are at least 18 years of age. With an "all" quantifier, find the contrapositive. The contrapositive tells you that if an individual is not at least 18 years old, he or she is not a member of the military.

2.

Angie scored in the 87th percentile on the algebra exam. Brooke scored in the 79th percentile. The exam contained 175 questions, and Angie answered 148 questions correctly. Which of the following statements must be **true**?

Brooke answered fewer than 148 questions correctly

Brooke answered 79 questions correctly

Brooke answered 138 questions correctly

Eight students received scores between Angie's and Brooke's

Correct answer: Brooke answered fewer than 148 questions correctly

Brooke scored in a lower percentile than Angie, so she must have answered fewer questions correctly than Angie did. Thus, she answered fewer than 148 questions correctly.

You do not know how many questions Brooke answered correctly. Therefore, you can eliminate the answer choices that state that Brooke answered 79 or 138 questions correctly. Next, you do not know how many test takers there were. Therefore, you should not assume that there were 100 students taking the test, which is what the other answer choice does.

3.

65 less than 2 times a number is 53. What is the number?

59

-6

28

89

Correct answer: 59

The algebraic equation is 2x - 65 = 53.

To solve the equation, add 65 to both sides of the equation, giving you 2x = 118.

Then, divide both sides by 2 to get x = 59.

4.

Find *z* when *x* equals 3 and *y* equals -2.

$z = 6x^2 + 2y^2 - 2xy + 3$

77

-24

32

-18

12

Correct answer: 77

1. Insert 3 for x and -2 for y.

$z = 6x^2 + 2y^2 - 2xy + 3$

$z = 6(3)^2 + 2(-2)^2 - 2(3)(-2) + 3$

2. Simplify.

$z = 6(9) + 2(4) - 2(-6) + 3$

$z = 54 + 8 + 12 + 3$

$z = 77$

5.

There are 15 yellow balls and 17 red balls in a bag. What is the probability of picking a yellow ball from the bag?

15/32

1/2

13/16

7/8

17/32

Correct answer: 15/32

1. Find the total number of balls in the bag.

15 + 17 = 32 balls

2. Set up a proportion representing the number of yellow balls in the bag.

There are 15 yellow balls, so the chance of picking out a yellow ball is 15/32.

6.

View the *supporting details* to answer the following question.

Which of the following types of beverages saw the smallest percent increase in sales from 2011 to 2012?

Root Beer

Soda

Ginger Ale

Diet Coke

Correct answer: Root Beer

Calculate the percent increase using the percent change formula (difference / original). The total for Root Beer in 2011 is 25,000 and 25,500 in 2012. The percent change fraction is 500/25,000, thus giving you the smallest percent increase at 2.0%.

7.

Solve the following equation:

$x^2 + 6x + 5 = 0$

-5, -1

1, 2

-3, 2

0, 4

0, 0

Correct answer: -5, -1

1. Factor the quadratic equation.

$x^2 + 6x + 5 = 0$

$(x + 5)(x + 1) = 0$

2. Set each factor equal to 0 and solve for x.

$x + 5 = 0$

$x = -5$

$x + 1 = 0$

$x = -1$

The solution is -5, -1.

8.

Solve for *b* if *a* is equal to -2:

$b = a^3 – 5a^2 + 7a - 1$

-43

16

-27

8

2

Correct answer: -43

1. Insert the value of a.

$b = a^3 – 5a^2 + 7a - 1$

$b = (-2)^3 – 5(-2)^2 + 7(-2) - 1$

2. Simplify.

$b = -8 – 5(4) + -14 - 1$

$b = -8 - 20 - 15$

$b = -43$

9.

The figure is composed of a cylinder with a height of 50 inches and a cone with a height of 30 inches. The cylinder and the cone share a base that has a radius of 40 inches. What is the volume of the figure the cylinder and cone compose?

96000π in^3

80000π in^3

16000π in^3

24000π in^3

22000π in^3

Correct answer: 96000π in^3

1. Find the volume of the cylinder.

Volume of a cylinder = $\pi r^2 h$

$V = \pi(40in^2)(50in) = 80000\pi\ in^3$

2. Find the volume of the cone.

Volume of a cone = $(1/3)(\pi r^2 h)$

$V = (1/3)(\pi)(40in^2)(30in) = 16000\pi\ in^3$

3. Add the volumes together.

$80000\pi + 16000\pi = 96000\pi\ in^3$

10.

If 1/4p - 3 = 9, what is twice the value of p?

96

24

12

48

Correct answer: 96

First, add 3 to each side of the equation: 1/4p = 12

Now, divide each side of the equation by 1/4: p = 48

The question asks for twice the value of p: 48 x 2 = 96

11.

If a coin is flipped three times, what is the probability that it will land on heads all three times?

1/8

1/2

1/4

1/16

1/32

Correct answer: 1/8

Since the probability of a coin landing on heads one time is 1/2, multiply 1/2 three times to find the answer.

1/2 × 1/2 × 1/2 = 1/8

12.

Brandon's math average is based on five tests. Brandon's test scores were 75, 83, 94, 85, and 98. What is Brandon's math average for the five tests?

87

77

80

85

Correct answer: 87

To find the average, take the sum of the scores and divide it by the number of tests.

435 / 5 = 87

13.

All whole numbers are divisible by:

- **1**
- 0
- -1
- 100
- 10

Correct answer: 1

All whole numbers (0, 1, 2, 3, etc.) are divisible by 1. Every whole number is an example of this rule.

No number other than 0 is divisible by 0. Only negative whole numbers are divisible by -1. Only certain whole numbers that are multiples of 100 are divisible by 100.

14.

The stem-and-leaf plot shows new car mileage in the city and on the highway.

Which number is **not** represented in the plot?

40

31

23

41

34

Correct answer: 40

In a stem-and-leaf plot, the tens place is represented by the stem and the ones place is represented by the leaf. In this particular plot, the tens place is still represented by the stem, even though the city mileage runs from right to left.

40 is not shown on the plot, as there is no 0 following the stem of 4.

- *31 is represented twice under city mileage*
- *23 is represented twice under city mileage*
- *41 appears once under highway mileage*
- *34 appears once under city mileage*

15.

Don orders cable television with HBO, Starz, and Encore. Basic cable packages cost $30.00, and additional channels are $10.00 each. Don pays with a hundred-dollar bill. Don uses the following expression to calculate the amount of money he should receive back from the order:

$100.00 - ($30.00 + $10.00 + $10.00 + $10.00)

Which of the following expressions could Don have also used?

$70.00 - 3 x $10.00

3 x ($100.00 - $30.00 - $10.00)

$30.00 + (3 x $10.00) - $100.00

$10.00 - $100.00 + $30.00

Correct answer: $70.00 - 3 x $10.00

If you solve the expression given to you, you have $100.00 - $60.00 = $40.00. Therefore, the correct answer needs to produce a value of $40.00.

The expression $70.00 - 3 x $10.00 = $40.00. This yields the same value as the given expression, so it is the correct answer.

16.

Solve the following:

3/5 + 0.4

1

9/5

0.7

4 3/5

2

Correct answer: 1

1. Convert 0.4 to a fraction.

0.4 = 4/10

2. Convert 3/5 to a common denominator.

3/5 × 2/2 = 6/10

3. Solve.

6/10 + 4/10 = 10/10 = 1

17.

What is the mode in the given set of data?

12 14 7 2 21 2 17 6

- **2**
- 10
- 19
- 9
- 17

Correct answer: 2

The mode is the number that appears the most often. All the numbers appear only once except for 2, so it is the correct answer.

18.

There are 18 red candies, 23 blue candies, 20 green candies, and 25 yellow candies in a bag. What is the probability of **not** drawing a red candy?

34/43

9/43

81/86

1/3

1/2

Correct answer: 34/43

1. Find the total number of candies in the bag.

18 + 23 + 20 + 25 = 86 candies

2. Subtract the number of red candies from the total number.

86 - 18 = 68

3. Set up a proportion.

68/86

4. Simplify.

68/86 = 34/43

19.

Sara wants to fence in her backyard, which is 36 feet long and 22 feet wide. How much fencing will Sara need in yards, considering that she does not have to provide fencing for one of the 22 foot wide sides of the yard that backs up against her house?

31 1/3 yards

94 yards

38 2/3 yards

116 yards

74 yards

Correct answer: 31 1/3 yards

1. Find how many feet of fencing Sara will need.

36 + 36 + 22 = 94 feet

2. The question asks for the answer in yards, so convert feet to yards by dividing by 3.

94 ÷ 3 = 31 1/3 yards

20.

Pick 'n Save sells 550 boxes of cereal every day. How many boxes of cereal does Pick 'n Save sell in 30 days?

16,500 boxes of cereal

1,650 boxes of cereal

33,000 boxes of cereal

8,250 boxes of cereal

Correct answer: 16,500 boxes of cereal

In order to find out how many boxes of cereal were sold over the 30-day period, you need to multiply:

550 × 30

1. Set up the long multiplication.

2. Calculate 0 x 3, which is 0.

3. Calculate 5 x 3, which is 15.

Since 15 is two-digit, we carry the first digit 1 to the next column.

4. Calculate 5 x 3, which is 15. Now add the carry digit of 1, which is 16. Since 16 is two-digit, we carry the first digit 1 to the next column.

5. Bring down the carry digit of 1.

6. Therefore, 550 x 30 = 16,500.

21.

If Hunter scored an average of 76 on his first four tests, what is the minimum he must score on his fifth test in order to have an overall average of 80?

96

80

86

94

Correct answer: 96

First, you will need to find the total of the tests that have already been taken. Multiplying 4 by 76 gives you a total of 304.

Next, you will need to find the total of what you want. There are 5 tests, and you want an average of 80. Multiplying 5 by 80 gives you a total of 400.

Then, you will need to find the difference between the total of the first 4 tests and all 5 tests. Subtracting 304 from 400 gives you a total of 96.

22.

What is the area of the triangle in the graph?

7.5

12

15

9

8.5

Correct answer: 7.5

1. Find the measurements of the triangle.

To find the area of a triangle, we only need to know the base and height. Based on the measurements in the graph, a is 5 and b is 3.

2. Find the area of the triangle.

Area = (1/2)(base)(height)

A = (1/2)(3)(5)

A = (1/2)(15) = 7 1/2, or 7.5

23.

If two of the angles in a triangle were 40 degrees each, what would the third angle equate to?

100 degrees

40 degrees

90 degrees

110 degrees

Correct answer: 100 degrees

Every triangle contains 180 degrees. In order to get the degrees of the third angle, you will need to subtract:

180 - 40 - 40 = 100 degrees.

24.

A bucket contains 10 pink marbles, 6 purple marbles, 5 blue marbles, and 3 white marbles. If two marbles are picked out of the bucket, what is the probability that one will be purple and one will be white?

1/32

1/6

1/12

1/24

1/16

Correct answer: 1/32

1. Find the total number of marbles.

10 + 6 + 5 + 3 = 24

2. Find the probability of choosing a purple marble.

6/24, or 1/4

3. Find the probability of choosing a white marble.

3/24, or 1/8

4. Multiply the two together.

1/4 × 1/8 = 1/32

25.

What does y equal if (6 - y) + (1 + 4y) = 43?

12

21

11

3

Correct answer: 12

First, combine like terms: (6 + 1) + (-y + 4y) = 43 to give you: 7 + 3y = 43.

Then, subtract 7 from each side of the equation: 3y = 36.

Now, divide each side of the equation by 3: y = 12.

26.

Consider the following statement: All the pizza deliveries will not be made if Dan does not deliver the pizza.

Which of the following answer choices must be **true**?

If all of the pizza deliveries were not made, Dan did not deliver the pizza.

Dan is the only one who can deliver the pizza.

If Dan does not deliver the pizza, no one will receive their pizza delivery.

All the pizza deliveries were made, but Dan did not deliver the pizza.

Correct answer: If all of the pizza deliveries were not made, Dan did not deliver the pizza.

It is neither necessary for Dan to deliver the pizza in order for other individuals to receive their pizza, nor is he the only driver who is delivering pizza.

27.

If 10 + 8n = 42, what is the value of 9n?

36

4

9

32

Correct answer: 36

First, subtract 10 from each side of the equation: 8n = 32

Now, divide each side of the equation by 8: n = 4

The question asks you to find the value of 9n: 9 x 4 = 36

28.

Grant bikes a total of 18 miles from his house to go to the record store. Grant passes his friend Bert's house when he is 69 percent of the way to the store. After visiting the record store, Grant stops at Bert's house to visit.

How many miles has Grant biked by the time he stops at Bert's?

23.58 miles

12.42 miles

30.42 miles

19.67 miles

21.0 miles

Correct answer: 23.58 miles

1. Find the distance from Grant's house to Bert's house.

18 miles × 0.69 = 12.42 miles

2. Subtract 12.42 miles from the distance between Grant's house and the record store to find the distance between the record store and Bert's house.

18 miles - 12.42 miles = 5.58 miles

3. Add the total number of miles Grant traveled from his house to the record store to Bert's house.

18 miles + 5.58 miles = 23.58 miles

29.

What is 81.029 rounded to the nearest tenth? To the nearest hundredth?

81.0, 81.03

80, 100

81.1, 81.02

81, 100

Correct answer: 81.0, 81.03

First, eliminate answer choices 80, 100 and 81, 100. These answers are not rounded to the nearest tenth or hundredth. To round 81.029 to the nearest tenth, you need to look at the digit in the hundredths place. The digit is 2. Rounding tells you that if a digit is 4 or less, round down. Thus, you need to leave the digit in the tenth place alone: 81.0.

To round 81.029 to the nearest hundredth, you need to look at the digit in the thousandths place. The digit is 9. Rounding tells you that if a digit is 5 or greater, round up. Thus, you need to round the digit in the hundredths place from 2 up to 3: 81.03.

30.

You taught five separate math classes, in which you gave each class the same exam. The exam average for all five classes was 88, and had a total of 10,560 points. How many total exams were given?

120

24

2,112

440

Correct answer: 120

To find the number of exams given, you will need to divide the total points by the exam average. 10,560 / 88 = 120.

31.

Darcie has a jar containing 9,064 pennies. She drops the jar and half of the pennies fall out of the jar. Approximately how many pennies does she have left in the jar?

4,500

3,000

9,000

13,500

Correct answer: 4,500

Darcie has approximately 9,000 pennies. If she drops the jar and loses half of that amount, she subtracts approximately 4,500 pennies from her jar:

9,000 - (0.5 x 9,000) = 4,500.

32.

Gary eats 2 hamburgers a day. If each hamburger weighs 6 ounces, how many pounds of hamburger does Gary eat per week?

5 pounds, 4 ounces

84 pounds

4 pounds, 5 ounces

5 pounds, 2 ounces

Correct answer: 5 pounds, 4 ounces

First, calculate the total number of ounces of hamburger that Gary consumes per week. Each day, he eats 12 ounces of hamburger (2 x 6). Multiply 12 by 7 to get his weekly total of 84 ounces.

Now, convert ounces to pounds. There are 16 ounces to 1 pound. 84 divided by 16 is 5, with a remainder of 4.

33.

The diameter of a given sphere is 8 inches. What is the surface area of the sphere?

64π in^2

12π in^2

28π in^2

72π in^2

60π in^2

Correct answer: 64π in^2

1. Find the radius of the sphere.

Diameter = 2r

8 = 2r

r = 4 inches

2. Find the surface area of the sphere.

Surface area of a sphere = $4\pi r^2$

$A = 4\pi(4^2)$

$A = 4\pi(16)$

$A = 64\pi$ in^2

34.

What does x equal if (5x + 1) x 3 = 48?

3

1

6

-3

Correct answer: 3

First, multiply 5x by 3 and 1 by 3: 15x + 3 = 48

Then, subtract 3 from each side of the equation: 15x = 45

Now, divide each side of the equation by 15: x = 3

35.

The stem-and-leaf plot shows student heart rates after doing 1 minute of jumping jacks.

What is the mode?

99 beats/minute

90 beats/minute

115 beats/minute

121 beats/minute

154 beats/minute

Correct answer: 99 beats/minute

In a stem-and-leaf plot, the tens place is represented by the stem and the ones place is represented by the leaf. The mode is the number that appears most often. Because 99 appears three times, it is the mode.

- *90 appears 0 times, so it is not the mode*
- *115 appears 0 times, so it is not the mode*
- *121 appears only 1 time, so it is also incorrect*

36.

If $5x - 3x + 2x = 8x - 28$, then what is $5x + 10$?

45

30

-28

42

52

Correct answer: 45

1. Solve for x in the first equation by combining like terms.

5x - 3x + 2x = 8x - 28

4x = 8x - 28

2. Subtract 8x from both sides.

4x - 8x = 8x - 8x - 28

-4x = -28

3. Solve for x.

-4x = -28

x = 7

4. Insert x = 7 into the second equation.

5x + 10 =

5(7) + 10 =

35 + 10 = 45

37.

Evaluate the following expression for $a = 7$, $b = 4$, and $c = -1$.

$5a + 9b - 2c$

73

52

69

16

61

Correct answer: 73

1. Replace each variable with its value.

5a + 9b - 2c =

5(7) + 9(4) - 2(-1)

2. Simplify.

5(7) + 9(4) - 2(-1) = 35 + 36 + 2 = 73

38.

This is an image of a(n):

Line segment

Line

Angle

Plane

Shape

Correct answer: Line segment

A line segment is a line with two clear endpoints. The image shows a clearly-defined line connecting point A with point B, so it is a line segment.

A line goes continuously in one or both directions, which is indicated by one or more arrows. An angle is formed when two lines converge at one point. A plane is a flat surface that continues indefinitely in all directions.

39.

If 2m + 18 > 11m, which of the following must be true?

2 > m

13 > m

2 < m

9 < m

Correct answer: 2 > m

Subtract 2m from both sides of the equation: 18 > 9m

Divide both sides of the equation by 9: 2 > m

40.

Of the following fractions, which is the greatest?

3/5

-4/9

7/13

-1/3

Correct answer: 3/5

First, approximate, using the answer choices. Eliminate any number that is negative: -1/3 and -4/9.

You can compare the remaining answer choices by reducing them. 7/13 is 0.54, 4/7 is 0.57, and 3/5 is 0.6, which is the greatest.

41.

To the nearest ten, what is 167?

170

160

100

200

Correct answer: 170

Rounding tells us that if it is 0 - 4 to round down, and if it is 5 - 9 to round up. In the ones place, you have a 7, which tells you that you need to round up, giving you the correct answer of 170.

42.

Consider the following statement: If Diane passes the test, the whole class will pass.

Which of the following answer choices must be **true**?

If Diane's whole class did not pass, she didn't pass the test

If Diane does not pass, her whole class will fail

Diane is the only student who can pass the test

The other students passed the test, but Diane failed it

Correct answer: If Diane's whole class did not pass, she didn't pass the test

It is not necessary for Diane to pass in order for the other students to pass their test, nor is she the only student who is taking the test.

43.

The Venn diagram represents the favorite foods of 100 people polled on a college campus.

Which of the following is **true** about the people polled?

Some people like both pizza and ice cream

Everyone likes either veggie burgers or pizza

No one likes more than two foods

Everyone who likes pizza also likes french fries

There is no one who likes only one food

Correct answer: Some people like both pizza and ice cream

In the Venn diagram, the circles representing people who like pizza and the people who like ice cream overlap. This means that there are some people who report that they like both pizza and ice cream.

- *The diagram shows that there are some people who like only potato chips, only french fries, or only ice cream, so "everyone likes either veggie burgers or pizza" is incorrect.*
- *There is overlap in the diagram between ice cream, pizza, and french fries. This means that some people report they like all three foods, so "no one likes more than two foods" is incorrect.*
- *The diagram shows that some people only like pizza and some people only like french fries, so "everyone who likes pizza also likes french fries" is incorrect.*
- *The diagram shows that there are people who like only french fries, only veggie burgers, etc., so "there is no one who likes only one food" is incorrect.*

44.

The image shows what type of angle?

Obtuse

Acute

Right

Straight

Nonexistent

Correct answer: Obtuse

An obtuse angle is an angle more than 90 degrees but less than 180 degrees. The image shows an angle at approximately 135 degrees, so it is obtuse.

An acute angle is less than 90 degrees but more than 0 degrees. A right angle is exactly 90 degrees. A straight angle is exactly 180 degrees and is a straight line.

45.

What should be done to the expression to change it to scientific notation?

3617.09×10^{-9}

Move the decimal three places to the left and make the exponent three higher

Move the decimal three places to the left and make the exponent three lower

Move the decimal two places to the left and make the exponent four higher

Move the decimal two places to the left and make the exponent four lower

Move the decimal two places to the right and make the exponent two higher

---

Correct answer: Move the decimal three places to the left and make the exponent three higher

In order to write a number in scientific notation, move the decimal until the number is between 1 and 10. In this case, the decimal would be moved three places to the left, which would be added to the exponent.

$3617.09 \times 10^{-9} = 3.61709 \times 10^{-9+3} = 3.61709 \times 10^{-6}$

46.

Mike drives 15 miles to work. When he gets off work, he drives 5 miles to get to a restaurant for dinner, and 8 more miles to reach the grocery store. Assuming the restaurant and the grocery store are both on his way home, approximately how many miles will he still have to drive to make it home?

2 miles

6 miles

4 miles

11 miles

3 miles

Correct answer: 2 miles

1. Add the number of miles Mike traveled after he got off work.

5 miles + 8 miles = 13 miles

2. Since both stops were on his way home, subtract the distance that Mike traveled after work from the distance of Mike's work from home.

15 miles - 13 miles = 2 miles

47.

Edward is scheduled to detail 23 cars this week. If he details 3 cars on Monday, how many must he detail each day, on average, to finish by Saturday?

4

2

3

5

Correct answer: 4

First, subtract the cars he detailed on Monday. This leaves Edward with 20 cars to detail, and 5 days left. Divide 20 by 5 to get the correct answer of 4 cars to detail per day.

48.

If Craig can walk 2 miles in 26 minutes, how long will it take him to walk 5 miles?

1 hour 5 minutes

52 minutes

1 hour 26 minutes

1 hour 35 minutes

Correct answer: 1 hour 5 minutes

The question gives you the initial relationship of 2 (miles) / 26 (minutes), and you will need to set this relationship equal to the one you want to find:

2 (miles) / 26 (minutes) = 5 (miles) / x (minutes).

Now, you will need to cross multiply to solve the question:

2x = 130

x = 65 minutes

While 65 minutes is not an answer choice, you can reduce it to find the correct answer of 1 hour 5 minutes.

49.

Solve the equation for x.

$(x - 3)/2 = (x + 2)/12$

4

6

1

5

-2

Correct answer: 4

1. Cross-multiply.

$(x - 3)/2 = (x + 2)/12$

$12(x - 3) = 2(x + 2)$

2. Simplify.

$12x - 36 = 2x + 4$

3. Subtract 2x from each side.

$12x - 2x - 36 = 2x - 2x + 4$

$10x - 36 = 4$

3. Solve for x.

$10x - 36 + 36 = 4 + 36$

$10x = 40$

$x = 4$

50.

What does s equal if (6s - 2) / 2 = 8?

3

6

4

-4

Correct answer: 3

First, divide 6s by 2 and -2 by 2: 3s - 1 = 8

Then, add 1 to each side of the equation: 3s = 9

Now, divide each side of the equation by 3: s = 3

51.

Solve the following:

|-7| × | 6 | ÷ -3

-14

14

18

-18

-16

Correct answer: -14

The absolute value of any number is positive. Therefore, the absolute value of -7 is 7.

|-7| × | 6 | ÷ -3 =

7 × 6 ÷ -3 =

42 ÷ -3 = -14

52.

Multiplying a number by 1/8 is the same as dividing that number by:

- **8**
- 16
- 1/16
- 0.125

Correct answer: 8

If you select the number 16, and multiply it by 1/8, the result is 2. If you divide the number 16 by 8, the result is 2. 1/8 means 1 divided by 8.

53.

Steve scored the following scores on his five science tests:

75, 82, 81, 98, and 90. What does he need to score on his sixth test in order to have an average of 86?

90

96

84

80

92

Correct answer: 90

1. Set up an equation, with x representing the score on Steve's sixth test.

$$\frac{75 + 82 + 81 + 98 + 90 + x}{6} = 86$$

2. Multiply both sides by 6.

$$\frac{75 + 82 + 81 + 98 + 90 + x}{6} \times 6 = 86 \times 6$$

3. Simplify.

$$75 + 82 + 81 + 98 + 90 + x = 516$$

$$426 + x = 516$$

$$x = 90$$

54.

What is the greatest common factor of 24 and 42?

- **6**
- 7
- 3
- 24
- 80

Correct answer: 6

1. To find the greatest common factor of two numbers, find all the factors of both numbers.

24: 1, 2, 3, 4, 6, 8, 12, 24

42: 1, 2, 3, 6, 7, 14, 21, 42

2. Determine which factors the numbers have in common.

Both numbers have 1, 2, 3, and 6 in common.

3. Determine which of these factors is the greatest.

6 is the greatest common factor.

55.

If $a = 3$ and $b = -9$, then $3a^3 - 5b + 2 = ?$

128

66

108

20

54

Correct answer: 128

1. Insert 3 for a and -9 for b into the equation.

$3a^3 - 5b + 2 =$

$3(3)^3 - 5(-9) + 2 =$

2. Simplify.

$3(27) + 45 + 2 =$

$81 + 47 = 128$

56.

Use the box-and-whisker plot to answer the following question:

What is the median annual snow depth, in inches, at Mathsville Ski Resort?

75 inches

60 inches

80 inches

102 inches

95 inches

Correct answer: 75 inches

The median of the box-and-whisker plot is indicated by a line drawn through the center of the box. The value graphed at this point is 75 inches.

57.

What is the product of -6, 1, -3, -8, and 5?

-720

720

5

-240

-77

Correct answer: -720

1. Remove the negative signs and multiply the numbers together to find the product.

6 × 1 × 3 × 8 × 5 =

6 × 3 × 8 × 5 =

18 × 8 × 5 =

144 × 5 = 720

2. Because the number of negative terms (3) is odd, the answer is negative.

-6 × 1 × -3 × -8 × 5 = -720

58.

Carrie was painting her fingernails. None of her fingernails were colored blue. Some of her fingernails were pink. The fingernail colors are pink, red, purple, or brown, but no fingernail has more than one color on it.

Which of the following statements must be **true**?

Carrie has more pink fingernails than blue fingernails

Carrie has more fingernails colored red than any other color

Carrie has more purple fingernails than pink fingernails

Carrie's favorite fingernail is colored pink and purple

Correct answer: Carrie has more pink fingernails than blue fingernails

To find the true statement, look at each answer choice and eliminate those that are incorrect. You do not know the number of each fingernail colored a different color, but you do know that a fingernail can only be one color. There are no "If - Then" statements in the question, so do not get trapped with that answer choice.

The question does state that there are no fingernails colored blue, but that there are some colored pink. Therefore, you know that Carrie has more pink fingernails than blue fingernails.

59.

Each of the following is a multiple of 8 **except**:

54,308,324

54,234,800

76,760

98,321,873,968

190,834,096

Correct answer: 54,308,324

If the last 3 digits of any number form a number that is divisible by 8, then the entire number is divisible by 8.

- *The last 3 digits of 54,234,800 are 800, which is divisible by 8 (8 × 100 = 800).*
- *The last 3 digits of 76,760 are 760, which is divisible by 8 (8 × 95 = 760).*
- *The last 3 digits of 98,321,873,968 are 968, which is divisible by 8 (8 × 121 = 968).*

The last 3 digits of 54,308,324 are 324, which is not divisible by 8 (324 ÷ 8 = 40.5).

60.

The box plot shows the ages of Oscar-winning actors between 1975 and 2004.

What percentage of male actors who won Oscars were younger than 37?

25%

35%

45%

75%

80%

Correct answer: 25%

The box plot indicates that the lowest age of any Oscar-winning male actor was about 28 years old. The median of the lower quartile was about 37, so 25% of the male actors were younger than 37.

61.

Brent measured the board at 8-3/4 feet. Shawn measured the same board at 6-1/2 feet. What is the difference between Brent's measurement and Shawn's measurement?

2 1/4 feet

3 feet

2 1/3 feet

1 2/3 feet

Correct answer: 2 1/4 feet

To find the difference, convert all mixed numbers to improper fractions.

8 3/4 = 35/4

6 1/2 = 13/2

Next, find a common denominator and subtract the numbers.

35/4 - (13/2)(2/2)

35/4 - 26/4 = 9/4 = 2 1/4 feet

8 3/4 - 6 2/4 = 2 1/4

You could also use the Bowtie method, where you first need to convert the mixed numbers into improper fractions:

8 3/4 = 35/4, and 6 1/2 = 13/2

Then, 35/4 - 13/2 = (70 - 52) / 8 = 18/8 = 9/4 = 2 1/4.

62.

Use the graph to answer the following question:

How many years at Mathsville Ski Resort was snowfall 50 inches or less?

25%

35%

50%

55%

75%

Correct answer: 25%

The box-and-whisker plot indicates that the median of the lower quartile is 50 inches, so 25% of the years had an annual snowfall of less than 50 inches.

63.

If the value of y is between -0.60 and 0.01, which of the following could be the value of y?

-0.1

-0.75

0.11

-0.65

Correct answer: -0.1

-0.10 is between -0.60 and 0.01. -0.75 and -0.65 are smaller than -0.60 and 0.11 is greater than 0.01.

64.

The chef used 2 tablespoons of salt, 4 tablespoons of baking soda, and some pepper. There is a 1 to 3 ratio of salt to pepper. Which of the following numbers in the problem are needed to find the total number of tablespoons of pepper that the chef will use?

2, 1, and 3 only

4, 1, and 3 only

4, 2, 1, and 3

1 and 3 only

Correct answer: 2, 1, and 3 only

In order to find the actual number of tablespoons of pepper, you need the initial ratio, plus one actual number. The initial ratio of salt to pepper is 1 to 3, and the actual number of tablespoons of salt is 2.

You do not need the fact that the chef used 4 tablespoons of baking soda. This piece of information does nothing to help you solve the ratio box involving salt and pepper.

65.

Betty is making soup for a large group of people. If she pours 4 quarts of water into a pot, and then Sally pours 3 pints of broth into the pot, how many cups of liquid are in the pot?

22 cups

16 cups

12 cups

24 cups

32 cups

Correct answer: 22 cups

1. The best way to determine the answer is to convert all the measurements to cups and then add them together. Convert quarts to cups.

4 quarts = 4 × 4 = 16 cups

2. Convert pints to cups.

3 pints = 3 × 2 = 6 cups

3. Add the cups together.

16 cups + 6 cups = 22 cups

66.

The local motorcycle dealership was hosting a ride on Saturday. There were 310 motorcycle riders on Saturday's ride. If there were four times as many male riders, how many female riders were on Saturday's ride?

62

258

46

80

Correct answer: 62

Backsolving is the easiest way to solve this problem. To backsolve, choose the answer choice that is the middle option to start with, and work toward the correct answer.
80 is the middle option in the answer bank. If there were 80 female riders, then 320 male riders were on Saturday's ride. This answer proves to be too high, as you only want 310 riders, not 400. You will need to choose another answer choice that is lower than 80.

The answer choice that is lower than 80 is 62. If there were 62 female riders, then 248 male riders were on Saturday's ride. This gives you the total of 310 riders that you are looking for.

67.

Betty and Kris spent a total of $360 shopping today. If Betty spent $80 more than Kris did, how many dollars did Kris spend?

$140.00

$220.00

$80.00

$100.00

Correct answer: $140.00

Backsolving is the easiest way to solve this problem. To backsolve, choose the answer choice that is the middle option to start with, and work toward the correct answer.

$120 is the middle option in the answer bank. If Betty and Kris spent a total of $360 and Kris spent $120, that would leave Betty spending $240 dollars. Betty's $240 less Kris's $120 equals $120. This answer choice proves to be too low, as you want Betty to spend only $80 more than Kris, so you will need to choose the answer choice that is higher than $120.

The answer choice that is higher than $120 is $140. If Betty and Kris spent a total of $360 and Kris spent $140, that would leave Betty spending $220 dollars. Betty's $220 less Kris's $140 equals $80. Thus, you can determine Betty spent $80 more than Kris did.

You can also solve this problem setting up the algebraic equation:

(x + $80) + x = $360

$80 + 2x = $360

2x = $280

x = $140

68.

What is the solution to the equation?

x - |-42| = 108

150

66

-150

-66

0

Correct answer: 150

1. Any number in absolute value is positive.

|-42| = 42

2. Solve for x.

x - |-42| = 108

x - 42 = 108

x = 108 + 42

x = 150

69.

If Shelly eats 3/8 of a pie and Charlie eats half as much as Shelly eats, what fraction of the pie is left?

7/16

9/16

5/8

7/8

1/2

Correct answer: 7/16

1. Find the fraction of the pie that Charlie eats.

3/8 × 1/2 = 3/16

2. Change 3/8 to have the same denominator as 3/16.

(3 × 2)/(8 × 2) = 6/16

3. Add the amount that Shelly eats to the amount that Charlie eats.

6/16 + 3/16 = 9/16

4. Subtract the portion eaten from the total amount of pie.

1 - 9/16 =

16/16 - 9/16 = 7/16

70.

What is the sum of $3x^2y^3$ and $-5x^2y^3$?

$-2x^2y^3$

$-15x^2y^3$

$8x^2y^3$

$-5xy$

$-15xy^2$

Correct answer: $-2x^2y^3$

When adding variables with the same exponents, such as $3x^2y^3$ and $-5x^2y^3$, add the coefficients as normal. The exponents of the variables remain the same.

71.

Each of the 25 children in a group get to pick one and only one bumper car. There are 8 pink bumper cars, 9 blue bumper cars, and 8 yellow bumper cars. At this very instant, 19 of the total bumper cars have been selected.

Which of the following facts can be determined from the information given above?

The number of children in the group that have not yet chosen a bumper car

The number of children that chose a pink bumper car

The number of boys who selected a blue bumper car

The total number of children at the theme park

Correct answer: The number of children in the group that have not yet chosen a bumper car

You will want to eliminate the answer choices you know are wrong and focus on the information you are given.

You know that 19 of the bumper cars have been chosen, and that there are a total of 25 children who are picking a bumper car. Therefore, you can determine how many children have not yet chosen a bumper car.

72.

John adopted his dog exactly 5 years and 12 days ago. At this instant, how many minutes has John had his dog?

2,645,280 minutes

1,837 minutes

44,088 minutes

1,825 minutes

Correct answer: 2,645,280 minutes

Start by finding the number of days in 5 years.
5 years x (365 days / 1 year) = 1,825 days

Add the 12 days.
1,825 days + 12 days = 1,837 days

Convert the number of days to hours.
1,837 days x (24 hours / 1 day) = 44,088 hours

Convert the number of hours to minutes
44,088 hours x (60 minutes / 1 hour) = 2,645,280 minutes

John had his dog for 2,645,280 minutes when he had him for exactly 5 years and 12 days.

73.

Solve:

$24m^6n^2p^3 \div 2m^4np^3$

$12m^2n$

$22m^2p$

$12m^{10}n^3p^6$

$12mnp$

$6m^{10}n^3p^6$

Correct answer: $12m^2n$

When dividing exponents, subtract the exponents of like terms.

1. Divide 24 ÷ 2.

$24 \div 2 = 12$

2. Subtract $m^6 - m^4$.

$m^6 - m^4 = m^{6-4} = m^2$

3. Subtract $n^2 - n$.

$n^2 - n = n^{2-1} = n$

4. Subtract $p^3 - p^3$. If

$p^3 - p^3 = p^{3-3} = p^0$, so p cancels out.

5. Combine the terms.

$12m^2n$

74.

How many hectograms are in 8,500 milligrams?

0.085 hg

8.5 hg

850 hg

0.0085 hg

850,000,000 hg

Correct answer: 0.085 hg

1. Convert milligrams to grams.

8,500 mg × 1/1,000 = 8.5 g

2. Convert grams to hectograms.

8.5 g × 1/100 = 0.085 hg

75.

Simplify:

$-5(x + 3)$

$-5x - 15$

$-x + 15$

$3x - 15$

$-3x - 5$

$-5x - 2$

Correct answer: -5x - 15

Use the distributive property to simplify.

-5(x + 3) =

-5(x) + -5(3) =

-5x - 15

76.

If 2y - 8 = 8, what is half of the value of y?

4

16

8

2

Correct answer: 4

First, add 8 to each side of the equation: 2y = 16

Now, divide each side of the equation by 2: y = 8

The question asks for half of the value of y: 8 / 2 = 4

77.

What is the perimeter of quadrilateral RSTV, to the nearest hundredth?

33.12

30.01

24.98

18.56

24.51

Correct answer: 33.12

The distance between two points (x_1, y_1) and (x_2, y_2) is given by the distance formula:

$d = \sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$

To find the perimeter, find the side lengths and add them together.

1. Find the length of RS.

$d = \sqrt{[(2 - -5)^2 + (6 - 7)^2]}$

$d = \sqrt{[7^2 + -1^2]}$

$d = \sqrt{(49 + 1)}$

$d = \sqrt{50} = 7.07$

2. Find the length of ST.

$d = \sqrt{[(5 - 2)^2 + (-3 - 6)^2]}$

$d = \sqrt{[3^2 + -9^2]}$

$d = \sqrt{(9 + 81)}$

$d = \sqrt{90} = 9.49$

3. Find the length of TV.

$d = \sqrt{[(-4 - 5)^2 + (0 - -3)^2]}$

$d = \sqrt{[(-9)^2 + (3)^2]}$

$d = \sqrt{(81 + 9)}$

$d = \sqrt{90} = 9.49$

4. Find the length of RV.

$d = \sqrt{[(-5 - -4)^2 + (7 - 0)^2]}$

$d = \sqrt{[(-1)^2 + (7)^2]}$

$d = \sqrt{(1 + 49)}$

$d = \sqrt{50} = 7.07$

5. Add the lengths to find the perimeter.

$7.07 + 9.49 + 9.49 + 7.07 = 33.12$

78.

View the *supporting details* to answer the following question.

What was the percent increase of popcorn sales from the first half of 2009 to the first half of 2010?

1.75%

0.75%

1.50%

15.00%

Correct answer: 1.75%

First, you need to add the popcorn sales shown for the first half of 2009. Then, you need to add the popcorn sales shown for the first half of 2010. Now, calculate the percent increase using the percent change formula (difference / original).

The total for 2009 was $5,420.00 and the total for 2010 was $5,515.00. The percent change fraction is $95.00 / $5,420.00, which equals a 1.75% increase in popcorn sales.

79.

A passenger train left Boston and went to New York City and back. The trip to New York City took four hours, but the return trip took three and a half hours. If the train averaged 61 miles per hour back to Boston, find the average speed of the train during the outbound trip.

53.4 miles/hour

65 miles/hour

48.9 miles/hour

57.8 miles/hour

39.2 miles/hour

Correct answer: 53.4 miles/hour

1. Find the distance between Boston and New York City.

61 miles/hour × 3.5 hours = 213.5 miles

2. Find the average speed of the train during the outbound trip.

213.5 miles ÷ 4 hours = 53.4 miles/hour

80.

Julie buys a car with power windows, air conditioning, and a sun roof. The car costs $20,000.00, and each option costs $500.00 each. Julie pays with a $22,000.00 check. Julie uses the following expression to calculate the amount of money she should receive back from the purchase:

$22,000.00 - ($20,000.00 + $500.00 + $500.00 + $500.00)

Which of the following expressions could Julie have also used?

$22,000.00 - $20,000.00 - 3($500.00)

3 x ($22,000.00 - $25,000.00 - $500.00)

$20,000.00 + (3 x $500.00) - $22,000.00

$500.00 - $22,000.00 + $20,000.00

Correct answer: $22,000.00 - $20,000.00 - 3($500.00)

If you solve the expression given to you, you have $22,000.00 - $21,500.00 = $500.00. Therefore, the correct expression needs to produce a value of $500.00.

The expression $22,000.00 - $20,000.00 - 3($500.00) = $500.00. This yields the same value as the given expression, so it is the correct answer.

81.

Megan has exactly 23 weeks until she retires. How many hours does Megan have before she retires?

3,864

161

892

1,759

Correct answer: 3,864

First, you will need to convert 23 weeks to days: 23 weeks x 7 days / 1 week = 161 days.

Then, convert 161 days to hours: 161 days x 24 hours / 1 day = 3,864 hours.

82.

Evaluate the following expression for x = 1/2, y = 5/7, and z = -3.

$12x - 8y + z$

-2 5/7

6 1/7

-5

4 1/2

3 1/7

Correct answer: -2 5/7

1. Replace each variable with its value.

12x - 8y + z = 12(1/2) - 8(5/7) + -3

2. Simplify.

12(1/2) - 8(5/7) + -3 =

6 - 40/7 - 3

3. Combine whole numbers.

6 - 40/7 - 3 =

3 - 40/7

4. Convert whole number to a fraction with a denominator of 7.

(3 × 7)/7 - 40/7 =

21/7 - 40/7

4. Simplify.

21/7 - 40/7 = -19/7

5. Convert to a mixed number.

-19/7 = -2 5/7

83.

Jan has a bag of bubble gum balls. The bag of bubble gum balls has 12 yellow balls, 15 green balls, 8 red balls, and 7 purple balls. If Jan reaches into her bag of bubble gum balls and randomly picks one, what is the probability that she will pick a purple bubble gum ball?

1/6

2/3

4/21

1/7

Correct answer: 1/6

Probability is a fraction that expresses number of desired outcomes / total number of outcomes. In this question, there are 7 purple gum balls (the number of desired outcomes), and there are a total of 42 gum balls (the total number of possible outcomes).

Therefore, the probability of selecting a purple gum ball is 7/42, which reduces to 1/6.

84.

Which of the following fractions is between 3/5 and 3/4?

2/3

4/5

1/2

2/5

Correct answer: 2/3

3/5 reduces to 0.6 and 3/4 reduces to 0.75. This tells you that the number is between 0.6 and 0.75. 2/3 reduces to 0.667, which falls between 0.6 and 0.75. Therefore, 2/3 is the fraction between 3/5 and 3/4.

85.

Which of the following represents 16/112 in simplest form?

1/7

1/3

1/8

1/6

1/2

Correct answer: 1/7

1. Reduce the fraction by finding the greatest common factor of each number.

16: 1, 2, 4, 8, 16

116: 1, 2, 4, 7, 8, 14, 16, 28, 56, 112

2. Since 16 is the greatest common factor, divide both the numerator and denominator by 16.

(16 ÷ 16)/(112 ÷ 16) = 1/7

86.

Solve the following:

3/8 + 9/16 - 7/5

-37/80

23/80

5/16

-5/16

42/51

Correct answer: -37/80

1. Find the least common multiple of the denominators (8, 16, and 5).

8: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

16: 16, 32, 48, 64, 80

5: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80

2. Change each fraction so that each has the same denominator.

(3 × 10)/(8 × 10) = 30/80

(9 × 5)/(16 × 5) = 45/80

(7 × 16)/(5 × 16) = 112/80

3. Simplify.

30/80 + 45/80 - 112/80 = -37/80

87.

You taught five separate math classes, in which you gave each class the same exam. The exam average was 78, and each class had 22 students. What is the sum total of all the exams for the five classes?

8,580

110

1,716

5,148

Correct answer: 8,580

First, you will need to find the total number of exams taken: 5 classes x 22 students = 110 exams.

Now, you will need to multiply the total number of exams by the average: 110 x 78 = 8,580.

88.

If Charlotte is driving at a steady speed of 50 miles per hour, how long will it take her to drive 20 miles?

24 minutes

15 minutes

28 minutes

8 minutes

Correct answer: 24 minutes

1. There are 60 minutes in an hour, so set up the following equation:

50/60 = 20/x

2. Solve.

50x = 1200

x = 1200/50

3. Simplify.

x = 24 minutes

89.

Kacee has a total of $32,642 in her checking account. JoAnn has a total of $21,982 in her checking account. What is the best estimate of how many more dollars Kacee's checking account contains than JoAnn's checking account contains?

$11,000

$10,000

$8,000

$400

Correct answer: $11,000

To find the best estimate, you would approximate the two values.

$32,642 is approximately $33,000 and $21,982 is approximately $22,000.

$33,000 - $22,000 = $11,000

90.

Written in scientific notation, the number 980,000,000,000 is:

9.8×10^{11}

980×10^{9}

0.98×10^{12}

98.0×10^{10}

0.98×10^{-10}

Correct answer: 9.8×10^{11}

1. To convert a number to scientific notation, move the decimal until it forms a real number. In this case, that number is 9.8.

2. The exponent tells us how many decimal places are in the number. Since the decimal moved 11 places to the left, the number is positive.

$980,000,000,000 = 9.8 \times 10^{11}$

91.

Tiffany is looking at a right triangle, where angle B is identified as being 42 degrees. How many degrees would angle C be, if angle A was the 90-degree angle?

48

228

52

42

Correct answer: 48

Every triangle contains 180 degrees. You will need to subtract the degrees of angles A and B to find the degrees of angle C:

180 - 90 - 42 = 48

92.

Kent has been working on his web design for exactly 22 weeks. How many minutes has Kent worked on his web design?

221,760

3,696

90,560

161,320

Correct answer: 221,760

First, you will need to convert 22 weeks to days: 22 weeks x 7 days / 1 week = 154 days.

Next, you will need to convert 154 days to hours: 154 days x 24 hours / 1 day = 3,696 hours.

Then, you will need to convert 3,696 hours to minutes: 3,696 hours x 60 minutes / 1 hour = 221,760 minutes.

93.

Jason scored an 80 in math, a 90 in writing, a 75 in history, and a 95 in science. What was Jason's average score for his four classes?

85

78

83

88

Correct answer: 85

To find the average, you take the sum of the class scores and divide it by the number of classes.

80 + 90 + 75 + 95 = 340

340 / 4 = 85

94.

The box plot shows the ages of Oscar-winning actors between 1975 and 2004.

What is the approximate median age of female Oscar winning actors?

35

42

32

48

28

Correct answer: 35

In a box-and-whisker plot, or box plot, the median is represented by the vertical line in the box. Because A represents female actors, the median age is about 35 years old.

- *42 is incorrect because it is the median of the upper quartile, so only 25% of female actors were over the age of 42.*
- *32 is incorrect because it is the median of the lower quartile, so only 25% of female actors were younger than 32.*
- *48 is incorrect because the box plot shows that it is the highest age of any female Oscar-winning actress between 1975 and 2004.*

95.

June uses her own car to travel for work. Within the last month, June made 5 trips to Columbus, and 8 trips to Cleveland. The mileage reimbursement is $0.50 per mile. The round trip to and from Columbus is 110 miles, and the round trip to and from Cleveland is 250 miles. June uses the following expression to calculate her mileage reimbursement for the trips:

5($0.50 x 110) + 8($0.50 x 250)

Which of the following expressions could June have also used?

5 x $55.00 + 8 x $125.00

13($0.50 x 360)

5 + 8($0.50 x 110 + 250)

5($0.50 x 250) x 8

Correct answer: 5 x $55.00 + 8 x $125.00

If you solve the expression given to you, you have $275.00 + $1,000.00 = $1,275.00. Therefore, the correct answer needs to produce a value of $1,275.00. The expression 5 x $55.00 + 8 x $125.00 = $1,275.00. This yields the same value as the given expression, so it is the correct answer.

13($0.50 x 360) would yield $2,340 as an answer.

5 + 8($0.50 x 110 + 250) would yield $2,445 as an answer.

5($0.50 x 250) x 8 would yield $5,000 as an answer.

96.

Chris purchased 10 maple trees, 6 oak trees, and some pine trees from the nursery. There is a 3 to 5 ratio of maple trees to pine trees. Which of the following numbers in the problem are needed to find the total number of pine trees that Chris purchased?

10, 3, and 5 only

6, 3, and 5 only

10, 6, 3, and 5

3 and 5 only

Correct answer: 10, 3, and 5 only

In order to find the actual number of pine trees, you need the initial ratio, plus one actual number. The initial ratio of maple trees to pine trees is 3 to 5, and the actual number of maple trees is 10.

You do not need the fact that there were oak trees purchased. This piece of information does nothing to help you solve the ratio box involving maple trees and pine trees.

97.

When 45.67 is multiplied by 100, which digit of the answer is in the hundreds place?

- **5**
- 4
- 6
- 7
- 3

Correct answer: 5

1. When multiplying a number expressed as a decimal by 100, move the decimal two places to the right.

45.67 × 100 = 4,567

2. The hundreds place is the third place to the left of the decimal point. 4,567 can be rewritten as 4567.0, so the digit in the third place to the left of the decimal point is 5.