Advanced Math

1. How long will Lucy have to wait before for her $2,500 invested at 6% earns $600 in simple interest?

A. 2 years

B. 3 years

C. 4 years

D. 5 years

E. 6 years

2. Grace has 16 jellybeans in her pocket. She has 8 red ones, 4 green ones, and 4 blue ones. What is the minimum number of jellybeans she must take out of her pocket to ensure that she has one of each color?

A. 4

B. 8

C. 12

D. 13

E. 16

3. If r = 5 z then 15 z = 3 y, then r =

A. y

B. 2 y

C. 5 y

D. 10 y

E. 15 y

4. What is 35% of a number if 12 is 15% of a number?

A. 5

B. 12

C. 28

D. 33

E. 62

5. A computer is on sale for $1600, which is a 20% discount off the regular price. What is the regular price?

A. $1800

B. $1900

C. $2000

D. $2100

E. $2200

6. A car dealer sells a SUV for $39,000, which represents a 25% profit over the cost. What was the cost of the SUV to the dealer?

A. $29,250

B. $31,200

C. $32,500

D. $33,800

E. $33,999

7. After having to pay increased income taxes this year, Edmond has to sell his BMW. Edmond bought the car for $49,000, but he sold it for a 20% loss. What did Edmond sell the car for?

A. $24,200

B. $28,900

C. $35,600

D. $37,300

E. $39,200

8. If Sam can do a job in 4 days that Lisa can do in 6 days and Tom can do in 2 days, how long would the job take if Sam, Lisa, and Tom worked together to complete it?

A. 0.8 days

B. 1.09 days

C. 1.23 days

D. 1.65 days

E. 1.97 days

9. Find 0.12 ÷12

A. 100

B. 10

C. 1

D. 0.01

E. 0.001

10. Divide x5 by x2

A. x25

B. x10

C. x7

D. x3

E. x2.5

11. Which of the following numbers could be described in the following way: an integer that is a natural, rational and whole number?

A. 0

B. 1

C. 2.33

D. -3

E. none of the above

12. Find the mode of the following list of numbers: 2, 4, 6, 4, 8, 2, 9, 4, 3, 8

A. 2

B. 3

C. 4

D. 5

E. 6

13. In the fraction 3/x, x may not be substituted by which of the following sets?

A. {1, 2, 4}

B. {-2,-3,-4}

C. {1, 3, 7}

D. {0, 10, 20}

E. {1.8, 4.3}

14. Sarah needs to make a cake and some cookies. The cake requires 3/8 cup of sugar and the cookies require 3/5 cup of sugar. Sarah has 15/16 cups of sugar. Does she have enough sugar, or how much more does she need?

A. She has enough sugar.

B. She needs 1/8 of a cup of sugar.

C. She needs 3/80 of a cup of sugar.

D. She needs 4/19 of a cup of sugar.

E. She needs 1/9 of a cup of sugar.

15. At a company fish fry, ½ in attendance are employees. Employees' spouses are ⅓ of the attendance. What is the percentage of the people in attendance who are not employees or employee spouses?

A. 10.5%

B. 16.7%

C. 25%

D. 32.3%

E. 38%

16. In a college, some courses contribute more towards an overall GPA than other courses. For example, a science class is worth 4 points; mathematics is worth 3 points; History is worth 2 points; and English is worth 3 points. The values of the grade letters are as follows, A= 4, B=3, C=2, D=1, F=0. What is the GPA of a student who made a "C" in Trigonometry, a "B" in American History, an "A" in Botany, and a "B" in Microbiology?

A. 2.59

B. 2.86

C. 3.08

D. 3.33

E. 3.67

17. There are 8 ounces in a ½ pound. How many ounces are in 7 3/4 lbs?

A. 12 ounces

B. 86 ounces

C. 119 ounces

D. 124 ounces

E. 138 ounces

18. If the value of x and y in the fraction XZ/Y are both tripled, how does the value of the fraction change?

A. increases by half

B. decreases by half

C. triples

D. doubles

E. remains the same

19. What is the next number in the following pattern? 1, ½, ¼, ⅛, ___

A. 1/10

B. 1/12

C. 1/14

D. 1/15

E. 1/16

20. Of the following units which would be more likely used to measure the amount of water in a bathtub?

A. kilograms

B. liters

C. milliliters

D. centigrams

E. volts

21. If a match box is 0.17 feet long, what is its length in inches the most closely comparable to the following?

A. 5 1/16 inch highlighter

B. 3 1/8 inch jewelry box

C. 2 3/4 inch lipstick

D. 2 3/16 inch staple remover

E. 4 1/2 inch calculator

22. Which of the following fractions is the equivalent of 0.5%?

A. 1/20

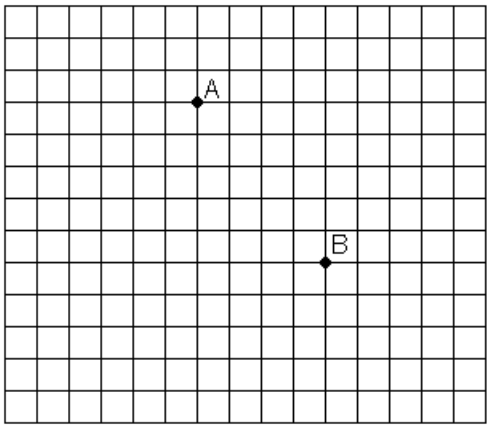
B. 1/200

C. 1/2000

D. 1/5

E. 1/500

23. In the graph below, no axes or origin is shown. If point B's coordinates are (10,3), which of the following coordinates would most likely be A's?



A. (17, -2)

B. (10, 6)

C. (6, 8)

D. (-10, 3)

E. (-2, -17)

24. Over the course of a week, Fred spent $28.49 on lunch. What was the average cost per day?

A. $4.07

B. $3.57

C. $6.51

D. $2.93

E. $5.41

25. Of the following units, which would be most likely to measure the amount of sugar needed in a recipe for 2 dozen cookies?

A. degrees Celsius

B. milliliters

C. quarts

D. kilograms

E. cups

26. Jim has 5 pieces of string. He needs to choose the piece that will be able to go around his 36-inch waist. His belt broke, and his pants are falling down. The piece needs to be at least 4 inches longer than his waist so he can tie a knot in it, but it cannot be more that 6 inches longer so that the ends will not show from under his shirt. Which of the following pieces of string will work the best?

A. 3 4/5 feet

B. 3 2/3 feet

C. 3 3/8 feet

D. 3 1/4 feet

E. 2 1/2 feet

27. After purchasing a flat screen television for $750, John realizes that he got a great deal on it and wishes to sell it for a 15% profit. What should his asking price be for the television?

A. $800.30

B. $833.60

C. $842.35

D. $862.50

E. $970.25

28. If 300 jellybeans cost you x dollars, how many jellybeans can you purchase for 50 cents at the same rate?

A. 150/x

B. 150x

C. 6x

D. x/6

E. 1500x

29. If 6 is 24% of a number, what is 40% of the same number?

A. 8

B. 10

C. 15

D. 20

E. 25

30. Lee worked 22 hours this week and made $132. If she works 15 hours next week at the same pay rate, how much will she make?

A. $57

B. $90

C. $104

D. $112

E. $122

31. The last week of a month a car dealership sold 12 cars. A new sales promotion came out the first week of the next month and the sold 19 cars that week. What was the percent increase in sales from the last week of the previous month compared to the first week of the next month?

A. 58%

B. 119%

C. 158%

D. 175%

E. 200%

32. If $8x + 5x + 2x + 4x = 114$, the $5x + 3 =$

A. 12

B. 25

C. 33

D. 47

E. 86

33. If two planes leave the same airport at 1:00 PM, how many miles apart will they be at 3:00 PM if one travels directly north at 150 mph and the other travels directly west at 200 mph?

A. 50 miles

B. 100 miles

C. 500 miles

D. 700 miles

E. 1,000 miles

34. What is the cost in dollars to steam clean a room W yards wide and L yards long it the steam cleaners charge 10 cents per square foot?

A. 0.9WL

B. 0.3WL

C. 0.1WL

D. 9WL

E. 3WL

35. Find 8.23 x 109

A. 0.00000000823

B. 0.000000823

C. 8.23

D. 8230000000

E. 823000000000

36. During a 5-day festival, the number of visitors tripled each day. If the festival opened on a Thursday with 345 visitors, what was the attendance on that Sunday?

A. 345

B. 1,035

C. 1,725

D. 3,105

E. 9,315

37. Which of the following has the least value?

A. 0.27

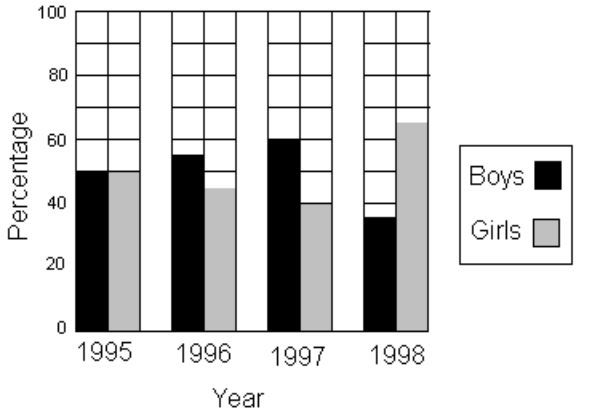
B. 1/4

C. 3/8

D. 2/11

E. 11%

38. How many boys attended the 1995 convention?



Total Number in Attendance at Nation Youth Convention

Year	Number
1995	716
1996	1108
1997	1520
1998	2244

A. 358

B. 390

C. 407

D. 540

E. 716

39. Which year did the same number of boys and girls attend the conference?

A. 1995

B. 1996

C. 1997

D. 1998

E. None

40. Which two years did the least number of boys attend the convention?

A. 1995 and 1996

B. 1995 and 1998

C. 1996 and 1997

D. 1997 and 1994

E. 1997 and 1998

Answers & Explanations

1. C: The formula for simple interest is I = Prt, where I represents the interest amount, P represents the principal, r represents the rate, and t represents the length of time. Substituting 600 for I, 2500 for P, and 0.06 for r gives: 600 = 2500(0.06)t. Solving for t gives t = 4. So, she will have to wait 4 years for her principal to earn $600 in interest.

2. D: If she only takes out 12 jellybeans, blue jellybeans may remain in her pocket. However, is she takes out 13 jellybeans, she is ensured that one of each color will have been taken out.

3. A: Solving the first equation for Z gives r/5=Z. Substituting this value of Z into the second equation gives 15(r/5)=3y, which simplifies to 3r = 3y. Dividing both sides of the equation by 3 gives r = y.

4. C: The second part of the problem may be modeled with the equation, 12 = 0.15x. Dividing both sides of the equation by 0.15 gives x = 80. 35% of 80 may be written as 0.35(80), which equals 28.

5. C: The problem may be modeled with the equation, x - 0.20x = 1600, which simplifies to 0.80x = 1600. Dividing both sides of the equation by 0.80 gives x = 2000. The original cost of the computer was $2000.

6. B: The cost of the SUV to the dealer may be represented by the equation, 39000 = x + 0.25x, which simplifies to 39000 = 1.25x. Dividing both sides of the equation by 1.25 gives x = 31,200.

7. E: The problem may be modeled by the expression, 49000 - 0.20(49000), which equals 39,200. Thus, he sold the car for $39,200.

8. B: The problem may be modeled with the equation, 1/4+1/6+1/2=1/t, which simplifies to 11/12=1/t. Solving for t gives t=12/11. Thus, they can finish the work in 1.09 days, when working together.

9. D: The quotient of 12 divided by 12 is 1. The quotient of 0.12 divided by 12 equals 0.01, since the decimal point in 0.12 is moved two places to the left.

10. D: When dividing terms, with the same base, the exponents should be subtracted. So, x5/x2 =x3.

11. B: The integer, 1, is a natural number. The natural numbers are a subset of the set of whole numbers, and the set of whole numbers are a subset of the set of rational numbers. Thus, the integer, 1, is a natural number, whole number, and rational number.

12. C: 4 occurs in the list three times, which is more than any other frequency, thus it is the mode.

13. D: This set contains the element, 0, which would result in division by zero.

14. C: The number of cups of sugar she needs is equal to the sum of 3/8 and 3/5, or 39/40. The amount of sugar she has and the amount she needs may be compared by finding a common denominator. Doing so gives the fractions, 78/80 and 75/80, showing that she needs 3/80 cup more of sugar.

15. B: The attendance of employees and their spouses may be modeled by the expression, 1/2+1/3, which equals 5/6. Thus, 1/6, or 16.7%, of the attendees were not employees or spouses.

16. C: The GPA may be represented as ((2.3)+(3.2)+(4.4)+(3.4))/13, which is approximately 3.08.

17. D: The problem may be modeled by the proportion, 8/(1/2)=x/(7 3/4). Solving for x gives x = 124. Thus, there are 124 ounces in 7 3/4 pounds.

18. E: Tripling X and Y gives 3XZ/3Y, which reduces to XZ/Y, which is the same as the given fraction.

19. E: The pattern is a geometric sequence, with a common ratio of 1/2. Multiplication of 1/8 by 1/2 gives 1/16, or the next number in the pattern.

20. B: Liters is the most reasonable measurement for capacity of water in a bathtub.

21. D: The proportion, 0.17/x=1/12, may be used to find the length, in inches. Thus, the length of the match box is 2.04 inches. The length of 2 3/16 is closest to this length.

22. B: 1/200=0.005, which equals 0.5%.

23. C: Movement of 4 units to the left and 5 units up gives the ordered pair, (6, 8). Note. 4 is subtracted from the x-value of 10 and 5 is added to the y-value of 3.

24. A: The average may be written as 28.49/7, which equals 4.07. Thus, his average cost per day was $4.07.

25. E: The unit of cups is the most reasonable measurement for measuring the capacity of sugar.

26. C: The inequality may be written as $42 > x \geq 40$. A length of 3 3/8 feet equals 40.5 inches, which satisfies the required conditions of the inequality.

27. D: The problem may be modeled with the expression, 750 + 0.15(750), which equals 862.50. Thus, his asking price would be $862.50.

28. A: The ratio, 300/x, represents the number of jellybeans purchased for x dollars. Since 50 cents is one-half of a dollar, the ratio, 150/x, will represent the number of jellybeans that may be purchased at the same rate.

29. B: The first part of the problem may be modeled with the equation, 6 = 0.24x, where x represents the number to be determined. Solving for x gives x = 25. 40% of 25 is written as 0.40(25), which equals 10.

30. B: The following proportion may be written and solved for x: 22/132=15/x; x = 90.

31. A: The percent increase may be written as (19-12)/12, which equals 7/12, or approximately 58%.

32. C: The first equation may be solved for x. Doing so gives x = 6. Substituting 6 for x, into the expression, 5x + 3, gives 5(6) + 3, or 33.

33. C: The equation, 3002+4002=c2, may be used to solve the problem. Note. After 2 hours, the one plane has ascended 300 miles, while the other plane has traveled 400 miles. Solving the equation for c gives c = 500. Thus, they will be 500 miles apart.

34. A: The area, in feet, may be represented as A = (3W)(3L), or A = 9WL. Since the cost is $0.10 per square foot, the cost will be equal to 9WL x 0.10, or 0.9WL.

35. D: Moving the decimal 9 places to the right involves adding 7 zeros. Doing so gives 8,230,000,000.

36. E: The numbers of visitors for Thursday through Sunday are 345, 1035, 3105, and 9315.

37. E: 0.11 is less than 0.27, 0.25, 0.375, and 0.18.

38. A: The number of boys attending, in 1995, may be written as 0.50(716), which equals 358.

39. A: During 1995, 50% of boys and 50% of girls were in attendance. Thus, 358 boys and 358 girls were in attendance.

40. A: The attendance of boys for the years 1995 through 1998 may be represented as 0.50(716), 0.55(1108), 0.60(1520), and 0.35(2244). The years, 1995 and 1996, show attendance of 358 and 610, while the other two years show attendance of 912 and 786. Thus, the least number of boys attended during 1995 and 1996.