

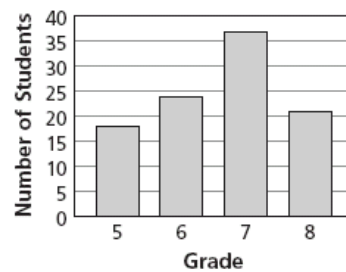
**Calculators were not permitted for this booklet. All scrap work had to be done in booklet.**

- 1) You are presented with the table at the right and asked to select the bar graph that displays the data correctly. If you carefully examine each graph, you will see that only choice B shows the correct number of students for each grade. Choice B is shown at the right as well. The others all have wrong data for at least one grade. For example, choice A can immediately be ruled out because it shows the number of students for grade 5 as being a bit over 20. Choice C can be ruled out because it shows more than 35 students for grade 6. Choice D can also be ruled out immediately because it shows more than 18 students for grade 5.

**GYMNASTICS CLASS**

Grade	Number of Students
5	18
6	24
7	37
8	21

**GYMNASTICS STUDENTS**



**ANSWER: (B)**

- 2) Choice D shown at the right is the only figure that has no rectangular face.

**ANSWER: (D)**



- 3) You are told that Mr. Snyder uses 4 liters of water. You are asked to determine how many milliliters that is. You are given that 1 liter equals 1000 milliliters. If 1 liter is 1,000 millimeters -- 1000 times as much, then 4 liters will also be 1,000 times as much -- 4 times 1,000 equals 4,000. The answer is 4,000 milliliters.

**ANSWER: (C)**

- 4) You are presented with the pictogram at the right. The key indicates that each ribbon represents 4 students, and each one-half ribbon represents 2 students. You are asked how many students participated from grade 7. You see 6 complete ribbons.

**FRANKLIN MIDDLE SCHOOL SCIENCE FAIR**

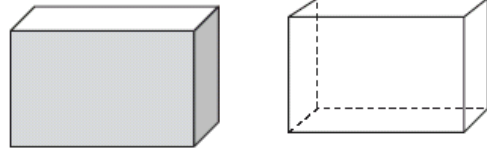
Grade	Number of Students
6	6 complete ribbons and 1 half ribbon
7	6 complete ribbons and 1 half ribbon
8	6 complete ribbons

KEY	
	= 4 students
	= 2 students

That means there are  $6 \times 4$  students or 24 students, plus that half ribbon which represents 2 more students, for a total of  $24 + 2$ , or 26 students.

**ANSWER: (C)**

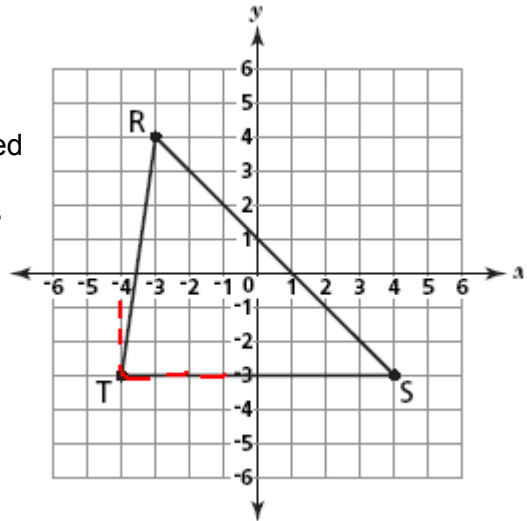
- 5) You are shown the rectangular prism at the right and asked how many faces it has.  
 A rectangular prism has 6 faces.  
 You can see them more clearly if you look at the second choice given for problem 2 you had on this test. Here it is again. Count its faces and you will see there are 6.  
**ANSWER: (D)**



- 6) You are told that Martin sells 200 pints of water a day. You are also told that 1 gallon equals 8 pints. You are asked how many gallons of water Martin sells per day.  
 You have to figure out how many 8's there are in 200. In other words, you need to divide 200 by 8. The answer is 25.  
**ANSWER: (A)**

$$\begin{array}{r} 25 \\ 8 \overline{) 200} \\ \underline{16} \phantom{0} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

- 7) You are asked for the coordinates of point T.  
 The horizontal axis is the x, and the vertical axis is the y. When naming a point, the x coordinate is given first, followed by the y. As you see marked in red at the right, the x-coordinate for T is -4. Its y-coordinate is -3. This makes its coordinates **(-4,-3)**



**ANSWER: (C)**

- 8) If the temperature is -6 and it **decreases** by 8, then the new temperature will be -6 plus -8, or -14.  
**ANSWER: (C)**

- 9) You are presented with the following set of numbers:  $-1, 5, 6\frac{1}{2}, 15, 3.75, 36, \sqrt{81}, 100$

You are asked what type of numbers are contained in this set.

Choice A says mixed numbers.  $6\frac{1}{2}$  is the only mixed number there.

Choice C says whole numbers.  $6\frac{1}{2}$ , and  $3.75$  are not whole numbers.

Choice D says counting numbers.  $-1$  as well as  $6\frac{1}{2}$ , and  $3.75$  are not counting numbers.

Choice B is the answer -- rational numbers. A rational number is a number that can be represented as a fraction where the numerator and denominator are integers and the denominator is not equal to 0. As seen below, each number in the set can be rewritten in the form of a over b.

$$(-1 = \frac{-1}{1}, 5 = \frac{5}{1}, 6\frac{1}{2} = \frac{13}{2}, 15 = \frac{15}{1}, 3.75 = \frac{375}{100}, 36 = \frac{36}{1}, \sqrt{81} = \frac{9}{1}, 100 = \frac{100}{1})$$

**ANSWER: (B)**

- 10) Pam wants to buy a suitcase.

They come in **5** different colors: Tan, Blue, Green, Black, Red

They come in **3** sizes: Small, Medium, Large

They come in **2** materials: Leather, Nylon

You are asked to determine how many different combinations are possible for a suitcase.

This is a problem using what is known as the counting principle. You simply multiply the number of ways each possibility exists and your product is your answer. In the above case you multiply **5 X 3 X 2**, and your answer is **30**.

You can see that it is your answer by listing all the combinations and then counting them.

Tan, Small, Leather	Blue, Small, Leather	Green, Small, Leather	Black, Small, Leather
Tan, Small, Nylon	Blue, Small, Nylon	Green, Small, Nylon	Black, Small, Nylon
Tan, Medium, Leather	Blue, Medium, Leather	Green, Medium, Leather	Black, Medium, Leather
Tan, Medium, Nylon	Blue, Medium, Nylon	Green, Medium, Nylon	Black, Medium, Nylon
Tan, Large, Leather	Blue, Large, Leather	Green, Large, Leather	Black, Large, Leather
Tan, Large, Nylon	Blue, Large, Nylon	Green, Large, Nylon	Black, Large, Nylon

Red, Small, Leather  
 Red, Small, Nylon  
 Red, Medium, Leather  
 Red, Medium, Nylon  
 Red, Large, Leather  
 Red, Large, Nylon

**ANSWER: (D)**

- 11) Drew worked  $h$  hours last month. This month he worked 6 less than twice those hours. Twice those hours is  $2h$ , and 6 less than that would be  $2h - 6$ .

**ANSWER: (B)**

- 12) The square root of two, **choice A**, is an irrational number because it can not be represented in the form of  $\frac{a}{b}$ , where  $a$  and  $b$  are integers and  $b$  is not equal to 0. Look back at number 9 for more of an explanation. By the way, choice C is an example of a repeating decimal (1.8888...). Every repeating decimal can be shown to be rational.

**ANSWER: (A)**

- 13) The range of salaries would be the difference between the lowest and highest salaries. The lowest salary is \$21,750.00, and the highest salary is \$47,250.00. The difference is

**ANSWER: (B)**

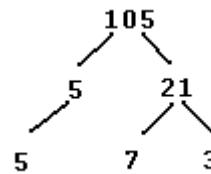
$$\begin{array}{r} 6 \\ - 47,250.00 \\ - 21,750.00 \\ \hline 25,500.00 \end{array}$$

- 14) If  $m$  represents the number of months, and she deposits \$10 each month, then the total she will have deposited in  $m$  months will equal  $10m$ . Since her account already had a balance of \$15, then at the end of  $m$  months it will have a balance of  $10m + 15$ . You are told that her balance is \$75. Therefore you can now set up the equation:

**$10m + 15 = 75$ .**

**ANSWER: (C)**

- 15) To the right you see the factor tree for 105. You see that 21 is a factor of 105. ( $21 \times 5 = 105$ ) You also know that 21 is a factor of 42. ( $2 \times 21 = 42$ ). 21 is also a factor of 63. ( $21 \times 3 = 63$ )



**21 is therefore the greatest common factor** shown for the numbers 42, 63, and 105.

**ANSWER: (D)**

- 16) Twenty-seven million is written as follows: 27, 000, 000. Written in scientific notation this would be  $2.7 \times 10^7$ .

**Your answer is choice B.**

Choice C is also equal to 27, 000, 000, but it is not in scientific notation.

To represent a number in scientific notation, its first part can not be 10 or greater.

**ANSWER: (B)**

- 17) The survey may be invalid because the group surveyed consisted only of teenagers who shopped at the same store. To get a true random sampling, teenagers at other clothing stores should also have been surveyed.

**ANSWER: (D)**

- 18) According to the table presented:  
Model W =  $3.64 \times 10^8 = 364,000,000$   
Model X =  $1.28 \times 10^9 = 1,280,000,000$   
Model Y =  $2.56 \times 10^9 = 2,560,000,000$   
Model Z =  $5.12 \times 10^8 = 512,000,000$

**The model with the most memory is clearly Model Y.**

**ANSWER: (C)**

- 19) You are given the expression  $8m + 5$  and are told it represents the total cost for a certain number of music CD's represented by  $m$ .

What would be the cost of 4 music CD's?

To get your answer, simply substitute 4 for  $m$  in the given expression and solve.

$8m + 5$                       Substitute 4 for  $m$ .

$8(4) + 5$                     Multiply

$32 + 5$                       Add

37                              **Your answer is \$37.**

**ANSWER: (D)**

- 20) Find the least common multiple of 9, 18, 21.

21, 42, 63, 84, 105, 126

18, 36, 54, 72, 90, 108, 126

9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117, 126,

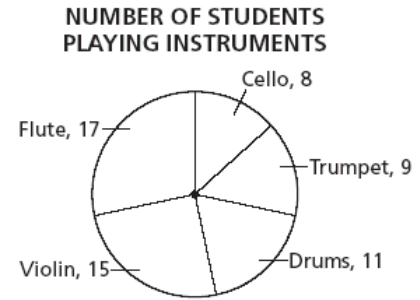
**126 is the least common multiple.**

**ANSWER: (C)**

- 21) The answer is choice C. Rachel will probably pick a silver bracelet because there are more silver bracelets than gold bracelets. The probability for picking a silver bracelet is  $\frac{5}{7}$ , for picking a gold bracelet it is only  $\frac{2}{7}$

**ANSWER: (C)**

- 22) You are presented with the circle graph shown at the right. You are asked what percent of the total number of students in the school orchestra play the violin?  
**Step number 1** is to determine the total number of students. Simply add the numbers shown on the graph. There are a total of 60 students who play instruments. 15 out of these 60 students play the violin.  
**Step number 2** is to now convert 15 out of 60 to a percent. A percent is a number out of 100. So change the fraction 15/60 to something out of 100.



$$\frac{15}{60} = \frac{x}{100}$$

To make life easier, reduce the 15/60 to 1/4 since 60 divided by 15 is 4.

$$\frac{1}{4} = \frac{x}{100}$$

Cross multiply

$$4x = 100$$

Divide both sides by 4.

$$x = 25$$

In other words, **15 out of 60 is the same as 25 out of 100. 25 out of 100 equals 25%.**

**ANSWER: (B)**

- 23) What is the prime factorization of 144 written in exponential form?

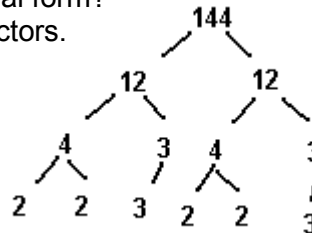
First let's draw the factor tree for 144 down to its prime factors.

The final row indicates the prime factors of 144.

What it shows is that  $2 \times 2 \times 2 \times 2 \times 3 \times 3 = 144$

Using exponents, this can be expressed as:  $2^4 3^2$ .

**ANSWER: (D)**



- 24) Experimental probability is probability based on an experiment. This means your data for calculating the probability is already available. For this problem you are presented with the bowling scores you see at the right. Your question is what is the experimental probability that the next student who bowls will have a score that is 126 or more?

**BOWLING SCORES**

Scores	Number of Students
Under 100	28
100–125	52
126–150	30
151 and up	15

Based on the table, you see that out of a total number of **125** students (28+52+30+15), **45** have scores of 126 or above. (You add the scores you see in the 126-50 row as well as the scores you see in the 151 and up row 30+15=45).

So the experimental probability that the next student will bowl a score that is 126 or more, will be 45/125.

**ANSWER: (C)**

- 25) Between what two whole numbers is the  $+\sqrt{125}$  ?  
 $8 \times 8 = 64$        $9 \times 9 = 81$        $10 \times 10 = 100$        $11 \times 11 = 121$        $12 \times 12 = 144$   
 Based on the above, the square root of 125 will be somewhere between 11 and 12.  
**ANSWER: (D)**
- 26) The ratio of 20 ounces of yellow paint to 8 ounces of red paint is 20/8.  
 You want to keep the same ratio and use 18 ounces of red paint.  
 How many ounces of yellow paint will you need?  
 Set up a proportion and solve.  

$$\frac{\text{yellow}}{\text{red}} \frac{20}{8} = \frac{x}{18}$$
 Cross multiply  
 $8x = 20(18)$  multiply  
 $8x = 360$  Divide both sides by 8.  
 $x = 45$   
**45 ounces of yellow paint will be needed** with 18 ounces of red paint to keep the same proportion.  
 $20/8 = 5/2$      $45/18 = 5/2$ .  
**ANSWER: (D)**
- 27) As mentioned in the explanation to problem 22, percent is a number out of 100 -- a fraction with a denominator of 100. 85% would therefore be 85/100.  
 Chad made 18 out of 20 shots. How does that compare to 85%?  
 Let's first reduce 18/20 by dividing the numerator and denominator by 2.  

$$\frac{18}{20} = \frac{9}{10}$$
 Now, 
$$\frac{9}{10} = \frac{x}{100}$$
 Cross multiply  
 $10x = 900$  Divide both sides by 10  
 $x = 90$   
 This means that 18 out of 20 shots is 90%. Chad did better than he expected!  
 His prediction of 85% was lower than his actual result.  
**ANSWER: (B)**
- 28) You are told that the circumference of a round tablecloth is 50B inches.  
 You are also told that the circumference of a circle equals 2Br.  
 Your mission is to find the radius.  
 What you can now say is that in the case of our problem,  
 $2Br = 50B$  Divide both sides by 2.  
 $B r = 25B$  Divide both sides by B (It is obvious at this point that  $r = 25$ ).  
 $r = 25$  The radius, r, is equal to 25 inches  
**ANSWER: (B)**
- 29) The best method to determine the mass of a penny would be to weigh the penny on a scale to the nearest gram. The mass of the penny in this case means the weight of the penny. Choice B sounds good as well but a kilogram is 1000 grams--a weight much too great to use for weighing a penny.  
**ANSWER: (A)**

- 30) You are asked for the area of the deck shown on the grid at the right. What you see at right is a rectangle. The area of a rectangle is found by multiplying the measure of its length times its width. To determine the dimensions of the grid, simply count the number of units on its length and width. From the point  $(-8, 6)$  to the point  $(6, 6)$  is **14 units**. And from  $(-8, 6)$  to  $(-8, -4)$  is **10 units**. 14 times 10 is 140. The answer is 140 square units.  
**ANSWER: (D)**

