

# **Summer Review for Students Entering Concepts of Mathematics 6, Mathematics 6 or Accelerated Mathematics 6**

1. Multiplying Whole Numbers and Fractions
2. Dividing Whole Numbers
3. Place Value and Rounding
3. Addition and Subtraction of Fractions
4. Multiple Representations of Portions (Fraction, Decimal, Percent)
5. Calculating Volumes
6. Coordinate Plane and Number Lines
7. Writing Expressions
8. Data Displays: Line Plots and Bar Graphs

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## Multiplication of Whole Numbers and Fractions

**Strategies to multiply whole numbers:** Breaking the Number Apart, Changing One Number to Make an Easier Problem, Creating an Equivalent Problem.

**To multiply fractions,** multiply the numerators and then multiply the denominators. To multiply mixed numbers, change each mixed number to a fraction greater than one before multiplying. In both cases, simplify by looking for factors that make "one."

**Example 1: Multiply**  $\frac{3}{8} \cdot \frac{4}{5}$

Solution:

$$\frac{3}{8} \cdot \frac{4}{5} \Rightarrow \frac{3 \cdot 4}{8 \cdot 5} \Rightarrow \frac{3 \cdot \cancel{4}}{2 \cdot \cancel{4} \cdot 5} \Rightarrow \frac{3}{10}$$

**Example 2: Multiply**  $3\frac{1}{3} \cdot 2\frac{1}{2}$

Solution:

$$3\frac{1}{3} \cdot 2\frac{1}{2} \Rightarrow \frac{10}{3} \cdot \frac{5}{2} \Rightarrow \frac{10 \cdot 5}{3 \cdot 2} \Rightarrow \frac{5 \cdot \cancel{2} \cdot 5}{3 \cdot \cancel{2}} \Rightarrow \frac{25}{3} \text{ or } 8\frac{1}{3}$$

## Division of Whole Numbers

### Example:

Janet has 1,780 marbles. She wants to put them into bags, each of which holds 32 marbles. How many full bags of marbles will she have?

Samantha solved this problem by multiplying groups of 32 to reach 1,780.

#### Samantha's solution

$$\begin{array}{l} 30 \times 32 = 960 \text{ There are 960 marbles in 30 bags of 32.} \\ 20 \times 32 = 640 \text{ There are 640 marbles in 20 bags of 32.} \\ \underline{5 \times 32 = 160} \text{ There are 160 marbles in 5 bags of 32.} \\ 55 \qquad 1,760 \text{ There are 1,760 marbles in 55 bags of 32.} \end{array}$$

1,760 is as close as I can get to 1,780 with groups of 32.

Answer: 55 R20

Janet can fill 55 bags, and she will have 20 extra marbles.

Talisha solved this problem by subtracting groups of 32 from 1,780.

#### Talisha's solution

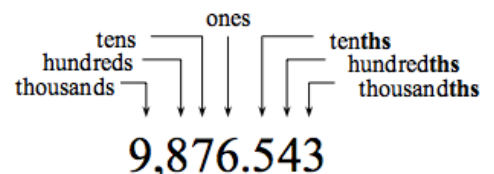
$$\begin{array}{r} 32 \overline{)1,780} \\ \underline{-640} \\ 1,140 \\ \underline{-640} \\ 500 \\ \underline{-320} \\ 180 \\ \underline{-160} \\ 20 \end{array}$$

20 bags  
20 bags  
10 bags  
5 bags

→ 55 bags

→ 20 extra marbles

## Using Place Value to Round and Compare Decimals



Example 1: Round 17.23579 to the nearest hundredth.

Solution: We start by identifying the digit in the hundredths place—the 3. The digit to the right of it is 5 or more so the hundredths place is increased by one. 17.24

Example 2: Round 8.039 to the nearest tenth.

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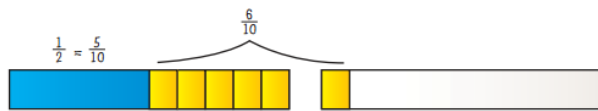
**Solution:** Identify the digit in the tenths place— the 0. The digit to the right of it is less than 5 so the tenths place remains the same. 8.0 (the zero must be included)

## Addition and Subtraction of Fraction Strategies

$$\frac{1}{2} + \frac{3}{5} =$$

Samantha used shaded strips to solve this problem.

**Samantha's solution**



I know  $\frac{1}{2} = \frac{5}{10}$ , I thought of  $\frac{3}{5}$  as  $\frac{6}{10}$ .  $\frac{5}{10} + \frac{6}{10} = \frac{11}{10} = 1\frac{1}{10}$

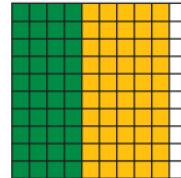
$$\frac{2}{5} + \frac{1}{2} =$$

Renaldo used percent equivalents to solve this problem.

**Renaldo's solution**

$\frac{2}{5}$  is the same as  $\frac{4}{10}$  or 40%.

$\frac{1}{2}$  is 50 out of 100, or 50%.



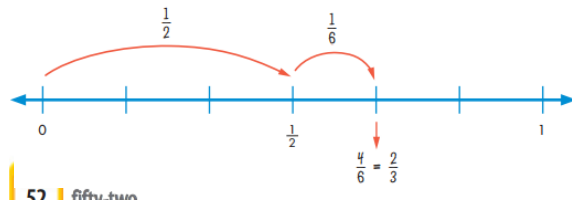
$$40\% + 50\% = 90\%$$

$$\frac{2}{5} + \frac{1}{2} = \frac{9}{10}$$

$$\frac{1}{2} + \frac{1}{6} =$$

Tamira used a number line to solve this problem.

**Tamira's solution**



$$\frac{3}{4} + \frac{1}{6} =$$

Deon used a clock model to solve this problem.

**Deon's solution**

Starting at 12:00 and moving  $\frac{3}{4}$  of the way around, you land at 9:00.

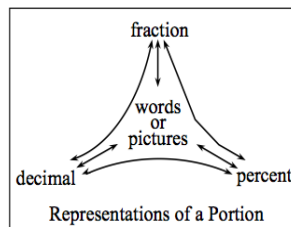
Moving  $\frac{1}{6}$  is 2 hours more, or 11:00.

That is the same as  $\frac{11}{12}$  of the way around the clock.

$$\text{So, } \frac{3}{4} + \frac{1}{6} = \frac{11}{12}$$



## Multiple Representations of Portions



Portions of a whole may be represented in various ways as represented by this web. Percent means “per hundred” and the place value of a decimal will determine its name. Change a fraction in an equivalent fraction with 100 parts to name it as a percent.

**Example 1: Write the given portion as a fraction and as a percent. 0.3**

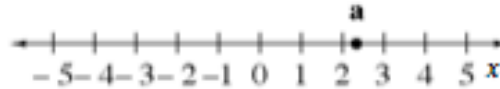
**Solution:** The digit 3 is in the tenths place so,  $0.3 = \text{three-tenths} = \frac{3}{10}$ . On a diagram or a hundreds grid, 3 parts out of 10 is equivalent to 30 parts out of 100 so  $\frac{3}{10} = \frac{30}{100} = 30\%$ .

**Example 2: Write the given portion as a fraction and as a decimal. 35%** **Solution:**  $35\% = \frac{35}{100} = 0.35$

## Locating Points on a Number Line

Points on a number line represent the locations of numbers. Numbers to the right of 0 are positive; to the left of 0, they are negative.

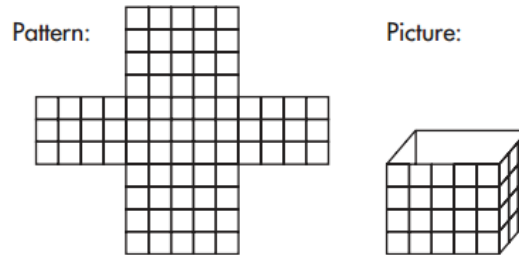
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Point **a** at right approximates the location of  $2\frac{1}{3}$ .

## Calculating Volumes

Volume is the amount of space a 3-D object occupies. You can think of the volume of a box as the number of cubes that will completely fill it.



**Example:** How many cubes will fit in this box?

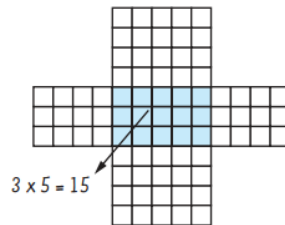
Olivia's Solution:

There will be 15 cubes on the bottom layer of the box.

When you fold up the sides of the pattern, there will be four layers.

$$4 \times 15 = 60$$

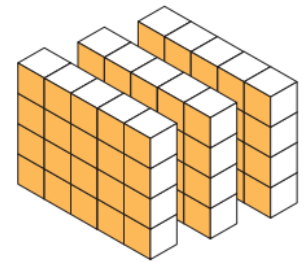
The box will hold **60 cubes**.



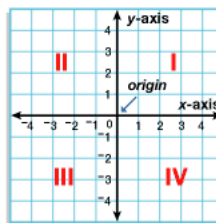
Joshua's Solution:

The front of the box is 4 by 5, so there are 20 cubes in the front of the box.

The box goes back 3 slices, so 20, 40, **60 cubes** will fit in the box.



## Plotting Points on a Coordinate Plane



You can locate any point on the coordinate plane by an ordered pair of numbers (x,y), called the coordinates. The first number in the ordered pair is the x coordinate. It describes the number of units to the left or right of the origin. The second number in the ordered pair is the y coordinate. It describes the number of units above or below the origin. To plot a point, start at the origin and count along the x axis until you reach the x coordinate, count right for positive numbers, left for negative. Then count up or down the number of the y coordinate (up for positive, down for negative.)

## Line Plots

A line plot is a graph that shows frequency of data along a number line. It is best to use a line plot when comparing fewer than 25 numbers. It is a quick, simple way to organize data.

### Example

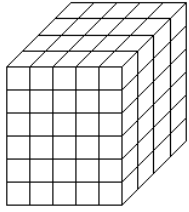
The following numbers are the result from a test taken by a class of 24 students:

16, 14, 17, 11, 14, 19, 11, 17, 12, 21, 22, 18, 11, 16, 15, 14, 18, 12, 13, 16, 17, 15, 13, 17

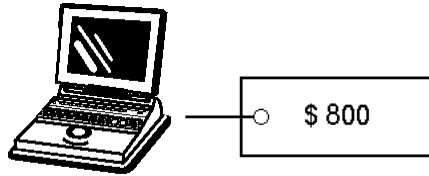
To make a line plot out of our data we determine a scale that includes all of the data in appropriate intervals. Then we plot



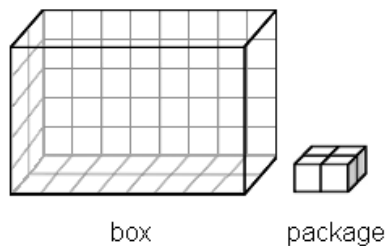
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8. A school needs to buy 40 new computers as shown below. What is the total amount of money the school will need to buy the computers?

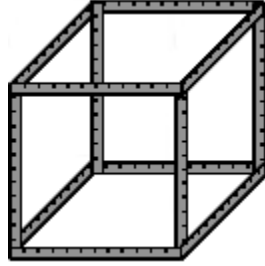


9. Lonzell has a box that is 2 units by 4 units by 6 units. He designed another box that has 3 times the volume. Which of the following could be the dimensions of the larger box?
- A. 6 units by 4 units by 6 units                      B. 6 units by 12 units by 18 units
- C. 3 units by 3 units by 3 units                      D. 2 units by 4 units by 2 units
10. What is the greatest number of  $2 \times 2 \times 1$  packages that will fit in the  $8 \times 2 \times 5$  box?



11. A group of students built a model of a cube. They used 12-inch rulers to build the edges. What is the volume of the cube?

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12. A box contains 252 cubes. You open the top of the box and count 12 cubes across the front and 7 cubes along a side. How many layers of cubes are in the box?
13. What does the 1 represent in this addition problem?

$$\begin{array}{r} 1 \\ 445 \\ + 393 \\ \hline 838 \end{array}$$

14. Which of the following shows equivalent expressions?
- A.  $1,197 - 598$  and  $1,195 - 600$       B.  $1,307 - 112$  and  $1,309 - 110$
- C.  $1,211 - 390$  and  $1,221 - 400$       D.  $1,592 - 340$  and  $1,600 - 332$

15. Sonny is solving this subtraction problem. What digit should he write in the box?

$$\begin{array}{r} 31 \\ \cancel{5}42 \\ - 138 \\ \hline \square \end{array}$$

16. What is the value of 7 in 74,512?

17. Helga ordered 100 bushels of fruit for her grocery stores. The table shows how many bushels she ordered of each type of fruit.

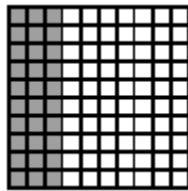
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Fruit	Number of Bushels
Peaches	20
Plums	30
Grapes	45
Strawberries	5

What percent of the order is grapes?

18. At a game, 25% of the fans support the visiting team. There are 424 people in the stadium. How many are cheering for the visitors?

19. Which percent represents the shaded part of the figure?



20. Water covers about  $\frac{7}{10}$  of the Earth's surface. Which picture shows this part shaded?

A. 
 B. 
 C. 
 D.

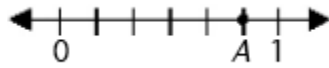
21. What number can be written in the box to make a fraction that is greater than  $\frac{1}{2}$ ?

$$\frac{\square}{500}$$

22. What fraction should be written at point A?



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23. Mr. Santiago's 5th-grade class has 24 students. The table describes the class's participation in school clubs.

Book Club	25%
Student Council	$\frac{1}{12}$
Glee Club	$33\frac{1}{3}\%$
Art Club	$\frac{1}{4}$

In which club do the greatest number of Mr. Santiago's students participate?

24. Where will the hand of the clock land if it moves  $\frac{2}{3}$  of the way around in a clockwise direction?



25. Find the sum of  $\frac{1}{4} + \frac{7}{12}$ . You may use the clock to help.



26. Find the sum of  $\frac{1}{2} + \frac{5}{12}$ . You may use the clock to help.

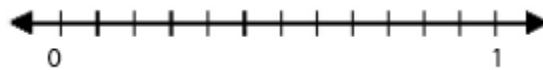
27. Dennis has  $\frac{1}{10}$  of a box of crayons. Yuki gives him an additional  $\frac{1}{5}$  of a box. What fractional part of the box of crayons does Dennis have now?

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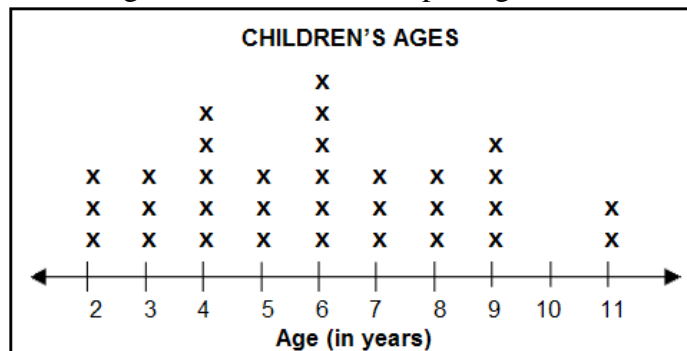
$\frac{1}{2}$				
$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{10}$
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

28. While baking, Otto used  $\frac{1}{2}$  and  $\frac{1}{4}$  cups of flour. How much flour did Otto use altogether?

29. Find the sum of  $\frac{2}{3}$  and  $\frac{1}{4}$ . You may use the number line to help.



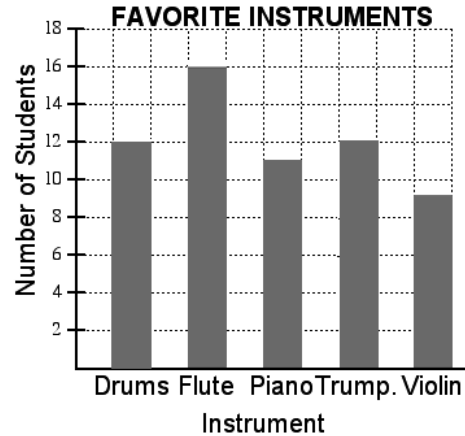
30. Use the line plot about the ages of the children at a petting zoo.



What is the range of the data?

31. A choir teacher surveyed the choir members about their favorite instruments. The bar graph shows the results of the survey.

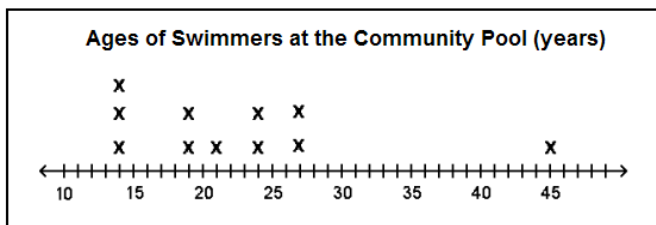
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Which instrument is as popular as drums?

Which instrument is the least favorite instrument?

32. The line plot shows the ages of the people swimming at the community pool one evening. Identify the outlier in the data set.



33. A cicada is a large, winged insect. One type of cicada emerges from the ground every 17 years in the Midwest. Below is a list of the numbers of cicadas that one scientist found on 6 different tree branches. What is the range for the set of data?

**DATA SET**  
14, 18, 22, 6, 18, 16

34. Use the medians to decide which student had the best test scores.

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Jordan's Test Scores		
89	92	80
87	83	84
93	79	89

Flora's Test Scores		
85	94	88
85	78	95
92	86	96

Manuel's Test Scores		
78	76	75
89	86	91
97	92	94

Eva's Test Scores		
85	86	84
84	91	84
87	84	83

35. Round each number to the given place.

a. 23.679  
(Hundredth)

b. 55.55  
(ones)

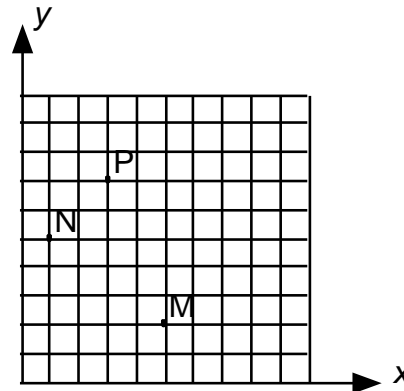
c. 2,840.12  
(Tenth)

36. What are the coordinates for points N, P and M?

N: \_\_\_\_\_

P: \_\_\_\_\_

M: \_\_\_\_\_



### ANSWERS

- 1.) 754 words
- 2.) 3 x 6
- 3.) 46 pencils
- 4.) 9 cookies
- 5.) 19 teams

- 6.) 40 ft<sup>3</sup>
- 7.) 120 units<sup>3</sup>
- 8.) \$32,000
- 9.) A
- 10.) 20
- 11.) 1 ft cubed or 1,728 in<sup>3</sup>

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- 12.) 3
- 13.) 100
- 14.) C
- 15.) 4
- 16.) 70,000
- 17.) 45%
- 18.) 106
- 19.) 30%
- 20.) D
- 21.) 251 or higher
- 22.)  $\frac{5}{6}$
- 23.) Glee Club
- 24.) 8
- 25.)  $\frac{5}{6}$
- 26.)  $\frac{11}{12}$
- 27.)  $\frac{3}{10}$
- 28.)  $\frac{3}{4}$
- 29.)  $\frac{11}{12}$
- 30.) 9
- 31.) Trumpet, Violin
- 32.) 45
- 33.) 16
- 34.) Manuel
- 35.) A. 23.68      B. 56      C. 2,840.1
- 36.) N (1,5), P (3,7), M (5,2)

