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Objective: Rounding Whole Numbers

We can use the number line to see how whole numbers are rounded.

Suppose we want to round **46** to the nearest ten.

We observe that **46** is closer to **50** than to **40**.

We say that **46** rounds to **50**, and write $46 \approx 50$.

↑
approximately equal

Objective: Subtract Integers

Recall that one definition of subtraction is finding the **missing term** in an addition.

$-8,000 - (-5,000) = ?$ means $-5,000 + ? = -8,000$

The number line version of this subtraction problem is pictured below.

Starting at **-5,000**, move towards left and reach at **-8,000**.

From the picture it is clear that the answer is **-3,000**.

We must move **3,000** places to the left of **-5,000** to get **-8,000**.

Objective: Average of a Group of Integers

New Version At the beginning of a 14-day trip, the odometer on a car read **10,278 miles**. It read **13,638 miles** at the end of the trip. What was the average number of miles traveled each day?

Solution :

$$\begin{aligned} \text{Average} &= (\text{Total miles traveled}) \div (\text{Number of days}) \\ &= (13,638 - 10,278) \div 14 \\ &= 3,360 \div 14 \\ &= 240 \text{ miles per day} \end{aligned}$$

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Sample Screens

The sample screens are from an educational software program with the following objectives:

- 00421Disc: Changing Mixed Numbers to Improper Fractions**

Consider the improper fraction $\frac{13}{5}$. The denominator suggests that a unit is divided into five equal parts. Each part is one-fifth ($\frac{1}{5}$) of a unit.

Also, $13 = 5 + 5 + 3$ suggests that $\frac{13}{5}$ represents all the five parts of two units and three parts of the third unit.

Diagram: $\frac{13}{5} = \left\{ \begin{array}{l} \text{Two bars of } \frac{5}{5} \text{ each} \\ \text{One bar of } \frac{3}{5} \end{array} \right\} = 2 + \frac{3}{5} = 2\frac{3}{5}$

Therefore, $\frac{13}{5} = 2$ units and $\frac{3}{5}$ of a unit
 $= 2 + \frac{3}{5} = 2\frac{3}{5}$
- 00423Disc: Dividing Fractions**

How many $\frac{1}{8}$ pizza slices are in 6 pizzas?

Diagram: 6 pizzas, each divided into 8 slices.

It is obvious, counting 8 slices, that there are $6 \cdot 8 = 48$ slices.

Therefore, $6 \div \frac{1}{8}$ (How many $\frac{1}{8}$ are in 6?)
 $= 6 \cdot 8$
 $= 48$ slices (6 pizzas \times 8 slices)

Observe that we multiply by 8 because we could see that there were 8 slices in 1 pizza:

1 pizza $\div \frac{1}{8}$ pieces = 8 pieces. Reciprocal of $\frac{1}{8}$.

$6 \div \frac{1}{8} = 6 \cdot \left(1 \div \frac{1}{8}\right)$
 $= 6 \cdot 8$
 $= 48$ (6 times as many slices as there are in 1 pizza.)
- 00531Disc: Perimeters and Areas of Polygon (length in fractions)**

The area formula for a **parallelogram** is related to the formula for a rectangle.

Imagine moving the shaded part to the indicated location.

A rectangle is formed.

Its length is the base (**b**) of the parallelogram and its width is the height (**h**).

The area of the parallelogram equals the area of the rectangle.

Area = base \times height
 Area of a parallelogram = $b \cdot h$

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Objective: Perform Addition and Subtraction with Decimal Numbers (+/-)

Add: 5.21, 13.719, 0.06, 103.15

Solution:

Step 1 Convert these numbers to like decimals

$$\begin{array}{r} 103.150 \\ 13.719 \\ 0.060 \\ + 5.210 \\ \hline 122.139 \end{array}$$

Step 2 Add. Place the decimal point.

Step 3 The sum is **122.139**

Objective: Solve Equations involving decimals: Variable on one side

Procedure	Example
To solve an equation with x on one side only.	$30 - 15.2 = 16.5 + x$
Step 1 If x is on the right side, rewrite the equation, switching the two sides.	$16.5 + x = 30 - 15.2$
Step 2 Simplify each side separately if possible, using the distributive property and combining like terms.	$16.5 + x = 14.8$
Step 3 Eliminate any constant on the side with x by adding its opposite to both sides.	$16.5 + (-16.5) + x = 14.8 + (-16.5)$ $x = -1.7$
Step 4 Eliminate any numerical coefficient of x by dividing both sides by that number (or multiplying both sides by its reciprocal).	Check: $16.5 + x = 30 - 15.2$ $16.5 + (-1.7) = 30 - 15.2$
Step 5 Check the resulting solution. The solution $x = -1.7$ is correct.	$14.8 = 14.8$

Objective: Solve Problems using Percent Formula

Procedure	Example
To solve percent problems using the formula:	36% of what number is 198 ?
Step 1 In each problem, identify which numbers represent R , A , and B , and which is the unknown.	$R \cdot B = A$ $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$ 36% of what number is 198 ?
Step 2 Translate the statement into an equation of the form $R \cdot B = A$ or $R = \frac{A}{B}$, and solve the resulting equation for the unknown.	$\frac{36}{100} \cdot B = 198$ Translate. $B = \frac{198}{0.36}$ $B = 550$
Step 3 Check that the answer is reasonable.	Check: 36% of 550 should be less than $\frac{1}{2}$ of 550 or 275 . 198 is less than $\frac{1}{2}$ of 550 . The answer seems correct.

36% of 550 is 198.

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Answers A.1 - A.18

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Objective: Construct a Bar Graph for a given set of Data

Procedure

To construct a vertical Bar Graph.

Step 1 Draw a vertical axis and a horizontal axis.

Step 2 Mark an appropriate scale on the vertical axis to represent the data value of each category.

Step 3 Mark the categories of data along the horizontal axis.

Step 4 Draw a vertical rectangle for each category, so that the height of the rectangle (bar) reaches the value of the data in that category.

Step 5 Give a suitable title to the graph and see that all the items are labelled clearly.

Example

Construct a bar graph that represents the following data.

Year	Sales (in million dollars)
1999	50
2000	62
2001	45
2002	58
2003	65

Sales figures of a business over a period of five years

Sales figures of a business

Objective: Converting Units in the Metric System

To convert measurements from one unit to another, identify the metric prefixes, and their relative positions with respect to one another.

The figure below shows the relation of the metric units for length.

1,000 x	100 x	10 x	1 x	1/10	1/100	1/1000
1 METER	1 METER	1 METER	BASIC UNIT	A METER	A METER	A METER
KILOMETER (km)	HECTOMETER (hm)	DEKAMETER (dam)	METER (m)	DECIMETER (dm)	CENTIMETER (cm)	MILLIMETER (mm)

With the help of this figure, conversions of units become relatively easy and fast.