

# Math 7/8

## Summer Packet 2025-2026

This packet provides practice with the prerequisite skills needed for the Math 7/8 course. Inside, you will find video tutorial links, guided examples, practice problems, and answer keys to help you review and prepare for success in the course.

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# Operations with Rational (non-calculator)

## Tutorial Links:

[Khan Academy 6<sup>th</sup> grade Unit 2: Arithmetic with Rational Numbers](#)

[Khan Academy 6<sup>th</sup> grade Unit 4: Exponents & Order of Operations](#)

[Khan Academy 6<sup>th</sup> grade Unit 5: Negative Numbers](#)

## Guided Examples:

### 1. Parentheses

- > Evaluate all groupings inside parentheses () or brackets [] first.
- > Work from the inside out if groupings are nested.

### 2. Exponents

- > Calculate all powers and square roots.
- > Examples include evaluating  $3^2$  into 9 or  $\sqrt{16}$  into 4.

### 3. Multiplication & Division

- > Solve these operations as they appear from left to right.
- > Do not automatically do multiplication before division; they hold equal rank.

### 4. Addition & Subtraction

- > Solve these final operations from left to right.
- > Treat both operations with equal priority.

$$\begin{aligned} & 50 - 4 \times (2 + 3)^2 \div 2 \\ & 50 - 4 \times (5)^2 \div 2 \\ & 50 - 4 \times 25 \div 2 \\ & 50 - 100 \div 2 \\ & 50 - 50 \\ & 0 \end{aligned}$$

### 1. Substitute

- > Replace every variable with its assigned number.
- > Use parentheses around the substituted numbers to keep track of negative signs.

### 2. Parentheses & Exponents

- > Simplify everything inside any grouping symbols () or [] first.
- > Evaluate all powers or exponents next.

### 3. Multiply & Divide

- > Calculate multiplication and division from left to right.
- > Do not automatically perform multiplication before division.

### 4. Add & Subtract

- > Calculate addition and subtraction from left to right to get the final value.

Evaluate  $3x^2 - 4y$  when  $x = 2$  and  $y = -5$ :

$$\begin{aligned} & 3(2)^2 - 4(-5) \\ & 3(4) - 4(-5) \\ & 12 - 4(-5) \\ & 12 + 20 \\ & 32 \end{aligned}$$

**Practice Problems:**

**Evaluate each expression.**

1)  $(-8) - -\frac{20}{5 - (-5)}$

2)  $\frac{4 - 8}{(-2)(-2)}$

3)  $(-6) - \frac{8}{-8} - 3$

**Evaluate each using the values given.**

4)  $(xz)(z + z)$ ; use  $x = -5$ , and  $z = -3$

5)  $jh + h^2$ ; use  $h = -1$ , and  $j = -4$

6)  $(-1) - y - (x - x)$ ; use  $x = -9$ , and  $y = -4$

**Evaluate each expression.**

7)  $4 \times 3\frac{1}{3} - 2\frac{1}{4}$

8)  $\frac{3}{2} - 1\frac{1}{5} \div \frac{3}{2}$

9)  $2 \div \left(2\frac{1}{2} + \frac{5}{6}\right)$

10)  $2.3 + 2.6^2 + 2.5 + 1$

11)  $5 \div 5 \times 4.3 \div (1.7 - 1.2)$

12)  $5.8 + 1.1 + 5.8 - (1.7 + 1.6)$

**Answer Key:**

1) -6

2) -1

3) -8

4) -90

5) 5

6) 3

7)  $\frac{133}{12}$

8)  $\frac{7}{10}$

9)  $\frac{3}{5}$

10) 12.56

11) 8.6

12) 9.4

# Multi-Step Equations + Inequalities (variables on one side) Notes

## Tutorial Links:

[Khan Academy 6<sup>th</sup> grade Unit 6: Variables & Expressions](#)

[Khan Academy 6<sup>th</sup> grade Unit 7: Equations & Inequalities](#)

## Guided Examples:

### Solving Multi-step

#### STEPS TO SOLVE

1. Distribute if necessary
2. Combine like terms if necessary
3. Undo Addition/Subtraction
4. Undo Multiplication/Division
5. Check your solution using substitution

$$\begin{aligned}
 & -2(1.7x + 1.2) - 3.8 = 4 \\
 & -3.4x - 2.4 - 3.8 = 4 \\
 & -3.4x - 6.2 = 4 \\
 & \quad +6.2 \quad +6.2 \\
 \hline
 & -3.4x = 10.2 \\
 & \quad \underline{-3.4} \quad \underline{-3.4} \\
 & \quad \quad \quad x = -3
 \end{aligned}$$

$$\begin{aligned}
 \checkmark: & -2(1.7(-3) + 1.2) - 3.8 = 4 \\
 & -2(-5.1 + 1.2) - 3.8 = 4 \\
 & -2(-3.9) - 3.8 = 4 \\
 & 7.8 - 3.8 = 4 \\
 & 4 = 4 \checkmark
 \end{aligned}$$

### Solving Multi-step Inequalities

#### 1. Simplify

- Distribute to clear parentheses.
- Combine like terms on the variable side.

#### 2. Isolate

- Add or subtract constants to move them away from the variable.
- Multiply or divide to isolate the variable by itself.

#### 3. Flip (If Needed)

- Reverse the sign direction *only* if you multiplied or divided by a negative number.

$$\begin{aligned}
 & -7(1 + 4p) + 5p \geq -99 \\
 & -7 - 28p + 5p \geq -99 \\
 & -7 - 23p \geq -99 \\
 & \quad +7 \quad \quad +7 \\
 \hline
 & -23p \geq -92 \\
 & \quad \underline{-23} \quad \underline{-23} \\
 & \quad \quad \quad p \leq 4
 \end{aligned}$$

### Graphing the Solution:

#### 1. Draw the Boundary

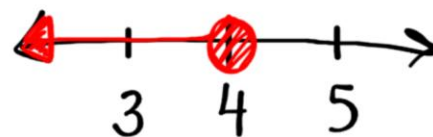
- Find the solution number on your number line.
- Draw a circle directly on top of that number.

#### 2. Choose the Circle Type

- Open circle (o) for strictly less than (<) or greater than (>).
- Closed circle (•) for equal to (≤ or ≥).

#### 3. Shade the Line

- Shade left if the variable is "less than" the number ( $x <$  or  $x \leq$ ).
- Shade right if the variable is "greater than" the number ( $x >$  or  $x \geq$ ).



**Practice Problems:**

**Solve each equation.**

1)  $7(6 + 8v) = 378$

2)  $-4(2 + 3v) = 88$

3)  $6(4x - 8) = -168$

4)  $\frac{507}{8} = \frac{9}{5}x + 6\left(\frac{9}{4}x + 1\right)$

5)  $\frac{5342}{75} = 4\left(-\frac{13}{5}n + 2\right) - \frac{10}{3}$

6)  $-6\left(\frac{19}{6}x - 2\right) = \frac{295}{4}$

7)  $4.5(-7.2 - 6.5x) = -243$

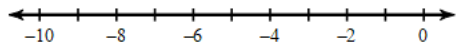
8)  $-3.5m + 6.2(1 - 8m) = 250.46$

9)  $5(5 + 4.8a) + 0.1a = -148.52$

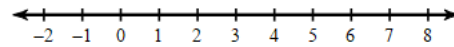
10)  $-125.97 = 5.7(-0.4 - 3.5v)$

**Solve each inequality and graph its solution.**

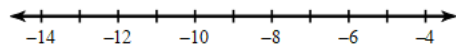
11)  $99 > 7(3 - 6n) + 3n$



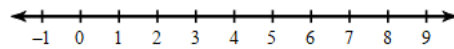
12)  $-174 < -6(4n + 5)$



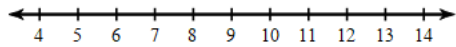
13)  $-2(1 - 8n) \leq -114$



14)  $\frac{14}{3}\left(\frac{17}{6}x + \frac{15}{8}\right) > \frac{1057}{12}$



15)  $97.1 < -2.3(-6.2 - 6n) - 2.9n$



**Answer Key:**

1)  $\{6\}$

2)  $\{-8\}$

3)  $\{-5\}$

4)  $\left\{\frac{15}{4}\right\}$

5)  $\left\{-\frac{32}{5}\right\}$

6)  $\left\{-\frac{13}{4}\right\}$

7)  $\{7.2\}$

8)  $\{-4.6\}$

9)  $\{-7.2\}$

10)  $\{6.2\}$

11)  $n > -2$ :

12)  $n < 6$ :

13)  $n \leq -7$ :

14)  $x > 6$ :

15)  $n > 7.6$ :

## Proportional Reasoning Application

### Tutorial Links:

[Khan Academy 6<sup>th</sup> grade Unit 1: Ratios](#)

[Khan Academy 6<sup>th</sup> grade Unit 3: Rates & Percentages](#)

### Guided Examples:

#1.

6 oz. of mixed nuts containing 61% peanuts were mixed with 10 oz. of another kind of mixed nuts that contain 45% peanuts. Peanuts are what percent of the new mixture?

Know: 61% of 6 oz peanuts 45% of 10 oz. peanuts Mixtures added together	Need to know: Peanuts are what percent of the new mixture?
Organize/ Work: .61 x 6 = 3.66 oz peanuts .45 x 10 = 4.5 oz peanuts 3.66 + 4.5 = 8.16 8.16 / 16 = 0.51 x 100 = 51%	Solution: 51% of the new mixture is peanuts.

#2

Find each percent change. State if it is an increase or a decrease.

From 71 to 34

### Percent Change

$$\text{Percent Change} = \frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100\%$$

If the result is positive, it is an increase.

If the result is negative, it is a decrease.

$$\frac{34 - 71}{71} \times 100 = -52.1\%$$

## Solving Proportions:

1. **Write the equation:** Place the two fractions with an equal sign between them.
2. **Cross-multiply:** Multiply the top of each fraction by the bottom of the other.
3. **Set products equal:** Write the two new numbers as an equation separated by the equal sign.
4. **Isolate the variable:** Divide both sides by the number next to the letter.
5. **Simplify:** Reduce the final fraction or calculate the final number.

$$\frac{b}{8} = \frac{3}{2}$$

$$\begin{aligned} b(2) &= (3)(8) \\ \frac{2b}{2} &= \frac{24}{2} \end{aligned}$$

$$b = 12$$

$$\frac{x+6}{4} = \frac{10}{7}$$

$$\begin{aligned} 7(x+6) &= 4(10) \\ 7x+42 &= 40 \\ -42 \quad -42 & \\ \hline \frac{7x}{7} &= \frac{-2}{7} \end{aligned}$$

$$x = \frac{-2}{7}$$

## Practice Problems:

- 1) 5 lbs. of mixed nuts containing 42% peanuts were mixed with 7 lbs. of another kind of mixed nuts that contain 54% peanuts. What percent of the new mixture is peanuts?
- 2) 15 oz. of mixed nuts containing 30% peanuts were mixed with 10 oz. of another kind of mixed nuts that contain 20% peanuts. Peanuts are what percent of the new mixture?
- 3) How many oz. of mixed nuts that contain 60% peanuts must Shanice add to 12 oz. of mixed nuts that contain 40% peanuts to make a mixture with 48% peanuts?
- 4) 6 kg of mixed nuts containing 55% peanuts were mixed with 9 kg of another kind of mixed nuts that contain 35% peanuts. What percent of the new mixture is peanuts?

**Find each percent change. State if it is an increase or a decrease.**

5) From 60 hours to 81 hours

6) From 25 minutes to 14 minutes

**Solve each problem.**

7) \$94 is 77% of what?

8) What is 79% of \$124?

9) 155 minutes is 17% of what?

10) 2% of 161 hours is what?

**Solve each proportion.**

11)  $\frac{3}{5} = \frac{5}{x}$

12)  $\frac{x}{4} = \frac{6}{9}$

13)  $\frac{8}{9} = \frac{x-3}{8}$

14)  $\frac{6}{8} = \frac{v-9}{2}$

**Answer Key:**

1) 49%

2) 26%

3) 8 oz.

4) 43%

5) 35% increase

6) 44% decrease

7) \$122.08

8) \$97.96

9) 911.8 minutes

10) 3.2 hours

11) {8.33}

12) {2.67}

13) {10.11}

14) {10.5}

# Geometry

## Tutorial Links:

[Khan Academy 6<sup>th</sup> grade Unit 8: Plane Figures](#)

[Khan Academy 6<sup>th</sup> grade Unit 9: Coordinate Plane](#)

[Khan Academy 6<sup>th</sup> grade Unit 10: 3D Figures](#)

## Guided Examples:

**Volume** is the total amount of space inside a 3D object. It measures how much the shape can hold. Think of it as how much water it takes to fill a bucket, or how many blocks you can pack inside a box.

### Rectangular Prism

$$V = Bh$$

$$V = (l \times w)h$$

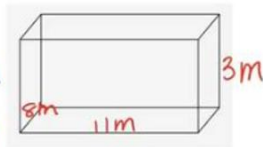
$$V = (11 \times 8) \times 3$$

$$V = 264 \text{ m}^3$$

$$l = 11\text{m}$$

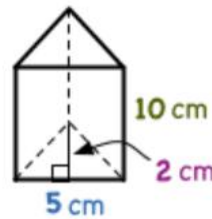
$$w = 8\text{m}$$

$$h = 3\text{m}$$



$V = Bh$   
 $V = \text{Volume}$   
 $B = \text{Area of base}$   
 $h = \text{height of figure}$

### Triangular Prism



$b = 5 \text{ cm}$   
 $h_1 = \text{triangle height} = 2 \text{ cm}$   
 $h_2 = \text{prism height} = 10 \text{ cm}$

$$V = Bh_2$$

$$B = \frac{1}{2}bh_1$$

$$V = (\frac{1}{2}bh_1)h_2$$

$$V = (\frac{1}{2}(5 \cdot 2))10$$

$$V = (\frac{1}{2}(10))10$$

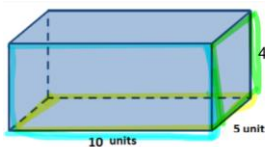
$$V = (\frac{10}{2})10$$

$$V = (5)(10)$$

$$V = 50 \text{ cm}^3$$

**Surface area** is the total measurement of all the outside space that covers a 3D object. Think of it as the exact amount of wrapping paper you need to cover a gift perfectly without any overlapping or gaps. It is like measuring the total size of the shape's "skin".

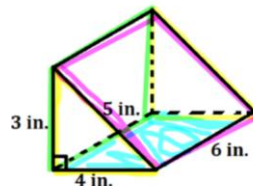
### Rectangular Prism



$5$	$\times 2$	$A = bh$	
$10$		$= (5)(10)$	
		$= 50$	$\times 2 = 100$
$4$	$\times 2$	$A = bh$	
$10$		$= (4)(10)$	
		$= 40$	$\times 2 = 80$
$4$	$\times 2$	$A = bh$	
$5$		$= (5)(4)$	
		$= 20$	$\times 2 = 40$

Total Surface Area = 100 + 80 + 40 = 220 in<sup>2</sup>

### Triangular Prism

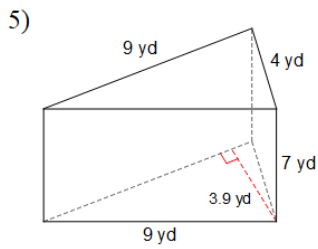
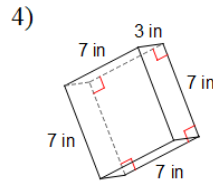
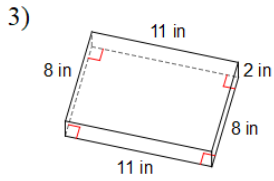
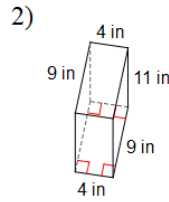
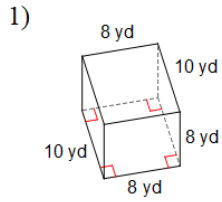


$3$	$\times 2$	$A = 1/2bh$	
$4$		$= 1/2(4)(3)$	
		$= 6$	$\times 2 = 12$
$3$	$\times 2$	$A = bh$	
$6$		$= (6)(3)$	$= 18$
$4$	$\times 2$	$A = bh$	
$6$		$= (6)(4)$	$= 24$
$5$	$\times 2$	$A = bh$	
$6$		$= (6)(5)$	$= 30$

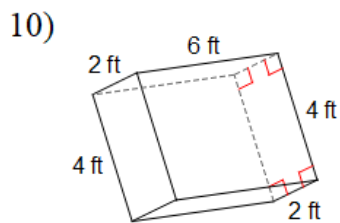
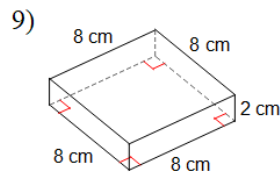
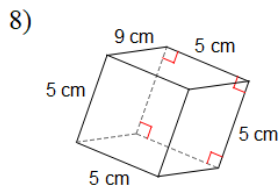
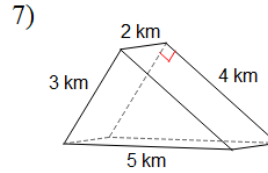
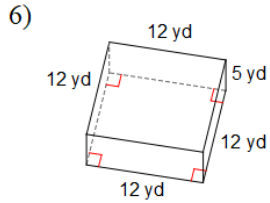
Total Surface Area = 12 + 18 + 24 + 30 = 84 in<sup>2</sup>

**Practice Problems:**

**Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.**



**Find the surface area of each figure. Round your answers to the nearest hundredth, if necessary.**



### Answer Key:

- |                           |                        |                        |                        |
|---------------------------|------------------------|------------------------|------------------------|
| 1) 640 yd <sup>3</sup>    | 2) 396 in <sup>3</sup> | 3) 176 in <sup>3</sup> | 4) 147 in <sup>3</sup> |
| 5) 122.85 yd <sup>3</sup> | 6) 528 yd <sup>2</sup> | 7) 36 km <sup>2</sup>  | 8) 230 cm <sup>2</sup> |
| 9) 192 cm <sup>2</sup>    | 10) 88 ft <sup>2</sup> |                        |                        |

## Data

### Tutorial Links:

[Khan Academy 6<sup>th</sup> grade Unit 11: Data & Statistics](#)

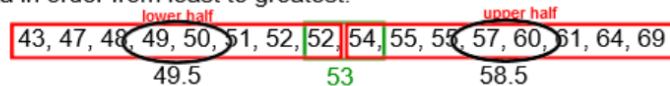
### Guided Examples:

Draw a box-and-whisker plot for each data set.

Age At Inauguration

President	Age	President	Age	President	Age	President	Age
Gerald Ford	61	John F Kennedy	43	Herbert Hoover	54	Ronald Reagan	69
Harry S Truman	60	Calvin Coolidge	51	Millard Fillmore	50	Jimmy Carter	52
Benjamin Harrison	55	Franklin Pierce	48	Abraham Lincoln	52	Grover Cleveland	47
John Quincy Adams	57	Zachary Taylor	64	Lyndon B Johnson	55	James K Polk	49

Step 1: List data in order from least to greatest.



Step 2: Identify the minimum and maximum values.

Lower Extreme = 43; Upper Extreme = 69

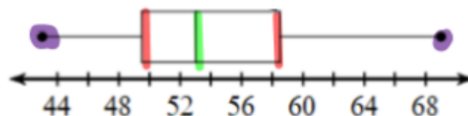
Step 3: Find the median. If there is an even number of data points find the average.

Median (Q2) = 53

Step 4: After finding the median, we can split the data into a lower and upper half. Find the median of both sets.

Median of Lower half (Q1) = 49.5; Median of Upper half (Q3) = 58.5

Step 5: Create a number line. Plot the data points from steps 2 - 4 above the number line. Create a box from Q1 - Q3, and a vertical line in the box to identify Q2. Connect the Lower and Upper Extreme to the box using a horizontal line.



**Find the mode, median, mean, and interquartile range for each data set.**

**Goals in a Hockey Game**

2 6 7 5 11 7 2 6  
 3 5 5 3 3 5 3 5  
 5

**Mode** (The number that repeats the most): **5**

**Median** (Order data from least to greatest and find the middle number; or average of the two middle numbers):

2, 2, 3, 3, 3, 3, 5, 5, **5**, 5, 5, 5, 6, 6, 7, 7, 11

**Mean** (Average of the data. Find the sum of the data and divide by the number of data points):  $83/17 = 4.88$

**Interquartile Range *IQR*** (Find the median of the lower (Q1) and upper half (Q3) of data, then find the difference between Q3 and Q1):  $6 - 3 = 3$

**Practice Problems:**

**Draw a box-and-whisker plot for each data set.**

1) **Educational Attainment by US State**

State	% Bachelor's Degree
Virginia	34
Michigan	24.6
New Jersey	34.5
Hawaii	29.6
Illinois	30.6
Oregon	29.2

State	% Bachelor's Degree
Tennessee	23
North Carolina	26.5
North Dakota	25.8
Connecticut	35.6
Washington	31

State	% Bachelor's Degree
Iowa	25.1
Missouri	25.2
Alaska	26.6
South Dakota	25.1
Pennsylvania	26.4

2) **Monthly Revenue**

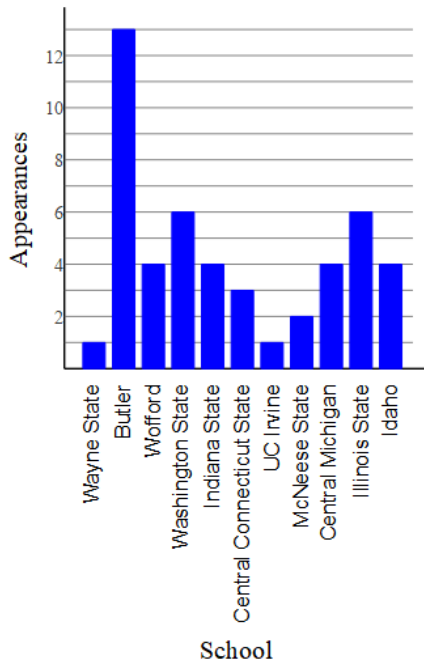
35,850 14,620 14,670 14,370  
 13,510 22,130 12,600 13,970  
 18,650 31,960 15,280 29,140  
 26,590 27,250 16,850 30,840

**Find the mode, median, mean, and interquartile range for each data set.**

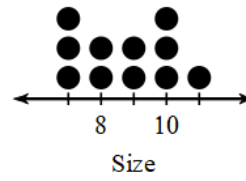
3) Goals in a Hockey Game

10 1 11 6 7 6 7 3  
5

4) Basketball Tournament



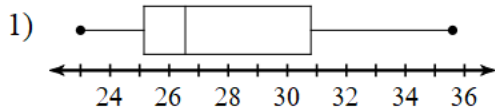
5) Shoe Size



6) # Words in Book Titles

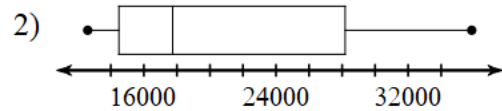
1 3 2 3 2 2 2 6  
2 1

Answer Key:



3) Mode = 6 and 7, Median = 6,  
Mean = 6.22 and IQR = 4.5

5) Mode = 7 and 10, Median = 9,  
Mean = 8.73 and IQR = 3



4) Mode = 4, Median = 4,  
Mean = 4.36 and IQR = 4

6) Mode = 2, Median = 2, Mean = 2.4  
and IQR = 1

## Mixed Application

The **KNOWS** Strategy

- **Know:** This will help you find the important information.
- **Need to Know:** This will help you to reread the question and write down what you are trying to solve for.
- **Organize/Work:** Drawing a model or picture. Show your calculations here.
- **Solution:** This is where students will ask themselves if the answer is reasonable and whether it answered the question.

### Guided Example:

Samuel charges \$15 per day for tutoring. If he tutors for 2 weeks, how much money will he earn?

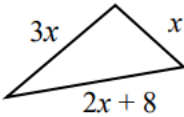

<b>I KNOW:</b> Samuel will charge \$15 per day to tutor 1 week = 7 days	<b>I Need to KNOW:</b> \$___ if he tutors for 2 weeks
<b>PLAN AND WORK:</b> $\begin{array}{r l} \$ \text{ charged} & 15 \times 14 = 210 \\ \text{number of} & \\ \text{days} & 1 \times 14 = 14 \end{array}$ 1 week = 7 days 2 weeks = 14 days	<b>SOLUTION:</b> Samuel will charge \$210 to tutor for 2 weeks.

MANEUVERING THE MIDDLE

### Practice Problems:

1. A company is ordering 350 t-shirts to sell at a fundraiser. The company wants to order the same number of large size t-shirts as medium size t-shirts, but only half as many small t-shirts. How many of each size should they order?

2. Your grades on your first three math tests were 81, 76, and 78. You have one more test to take. What grade do you need on that last test in order to get an 80 average?

<p>3. A biologist determined that there were 42 oak trees in a 5-acre forest. How many oak trees would be expected on 40 acres of identical habitat?</p>	<p>4. The perimeter of the triangle show is 26 inches. Determine the length of each side of the triangle.</p> 
<p>5. The perimeter of a soccer field at a local park is 260 feet. The length of the field is 36 feet more than the width. Find the dimensions of the soccer field.</p>	<p>6. The pedestal on which a statue is raised is a rectangular concrete solid measuring 9 feet long, 9 feet wide and 6 inches high. How much is the cost of the concrete in the pedestal, if concrete costs \$70 per cubic yard?</p>
<p>7. We are told that a cube desk weight has a surface area of 150 in<sup>2</sup>. What is the side length of this cube?</p>	<p>8. A moving truck charges a \$75 fee plus \$25 per day. If a person has a budget of \$400, for how many days can he rent the moving truck?</p>
<p>9. There are 6 cups of detergent in a bottle. If 1/3 cup is need for 1 load of laundry, how many loads can be cleaned with one bottle of detergent?</p>	<p>10. Suppose that a rectangular aquarium that is 12 inches long, 8 inches wide and 8 inches high provides enough room to safely house 6 guppies. Assuming that the number of guppies that can be safely housed depends upon the size of the aquarium, how many guppies can be safely housed in an aquarium that is 24 inches long, 16 inches wide and 16 inches high?</p>
<p>11. This wild animal house is made out of plywood. If the nesting box needs to have a volume of 129,978 cm<sup>3</sup> and a height of 83 cm and front width of 54 cm, find the depth of the box.</p>	<p>12. Tonya drove 343 miles the first day of her trip. How many days will it take her to drive the remaining 1,200 miles if she continues at the same rate?</p>
<p>13. Gomer delivers muffins for the Muffin-O-Matic muffin company. Each muffin is packed in its own little box. An individual muffin box has the shape of a cube, measuring 3 inches on each side. Gomer packs the individual muffin boxes into a larger box. The larger box is also in the shape of a cube, measuring 2 feet on each side. How many of the individual muffin boxes can fit into the larger box?</p>	<p>14. A birthday gift is placed inside the box shown. What is the minimum amount of wrapping paper needed to wrap this gift? (Assume the box is in the shape of a rectangular prism)</p> 
<p>15. A class of 50 students is divided into two groups. One group has 8 more students than the other. How many students are in each group?</p>	<p>16. A piece of stone on Planet Y weighs seven pounds, but on Earth it weighs only 4 pounds. What would a 130-pound Earthling weigh on Planet Y?</p>

17. The next-door neighbors are spending 10 hours a week maintaining their $\frac{1}{2}$ acre property. You are thinking about landscaping your own property in exactly the same way, but it is a $\frac{1}{3}$ acre lot. How many hours per week will you have to spend maintaining your property?	18. Jim is planning to take some classes at the community college. Tuition is \$110 per credit, plus \$60 in fees. Jim has saved \$1050 to take classes. How many credits can Jim afford to take with the money he saved?
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**Answer Key:**

1. The company should order 70 small shirts, 140 medium shirts, and 140 large shirts.	2. You will need to score 85 on the last test.
3. 336 oak trees	4. The lengths of the sides of the triangle are 3 inches, 9 inches, and 14 inches.
5. The dimensions of the soccer field are 47 feet by 83 feet.	6. \$105
7. 5 inches	8. The person can rent the moving truck for 13 days.
9. 18 loads	10. 48 guppies
11. 29 cm	12. 3.5 days
13. 512 boxes	14. $596 \text{ cm}^2$
15. Group A = 21 students, Group B = 29 students	16. 227.5 pounds
17. $6 \frac{2}{3}$ hours	18. 9 credits

**Link + Information to 7<sup>th</sup> grade Math Standards**

When you have finished, you may use the following website to preview the 7<sup>th</sup> grade units in math 7/8. The units in Math 7/8 include 7<sup>th</sup> grade math units 3,4 and 5. The topics from the link below include proportional relationships, geometric figures, geometric applications, inferences, and probability.

[GA Virtual](#)

Have a great summer!