

## Welcome to sixth grade mathematics!

In order to help you be successful sixth grade mathematicians, we put together this packet to review fifth grade skills and keep you problem solving. Essentially, this packet provides a review of the major fifth grade topics as well as a preview of sixth grade topics. We don't want the hard work that you did in fifth grade to be lost over the summer, so we would like you to work on this packet and/or complete some of the activities suggested below.

We recommend completing 1-2 pages of the packet per week of summer vacation. We completed one problem per page as an example. Do NOT spend more than 20 minutes on one page. After 20 minutes if you are not finished, have a parent sign off on your work by initialing the page.

Suggestions for additional practice:

- Visit the Khan Academy Website - <http://www.khanacademy.org>
- Visit the IXL Website - <http://www.ixl.com/math/>. (Work on the 5th grade skills)
- Visit Mash Up Math
- Work on logic puzzles, puzzles, play chess, or checkers
- For basic fact practice – [xtramath.org](http://xtramath.org)

The problems in the packet will identify those concepts that you have mastered as well as those you will need to practice and review. If you need help, be resourceful – use online resources, ask an adult or email one of us! We love to hear from our students in the summer.

We will collect this packet when you return to school in the fall.

Enjoy the summer. We can't wait to see you in the fall.

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# THINGS YOU SHOULD KNOW:

## Conversions:

100 centimeters = 1 meter

12 inches = 1 foot

3 feet = 1 yard

8 ounces = 1 cup

2 cups = 1 pint

2 pints = 1 quart

4 quarts = 1 gallon

## Formulas:

Area of squares and

rectangles :  $A = l \cdot w$

Volume of rectangular  
prisms :  $V = l \cdot w \cdot h$

## Order of Operations:

**P** : Parenthesis

**E** : Exponents

**MD** : Multiplication OR

Division (from left to  
right)

**AS** : Addition OR

Subtraction (from left to  
right)

## Fractions:

To find a common  
denominator, find the  
least common multiple of  
the denominators in the  
problem.

## Decimals:

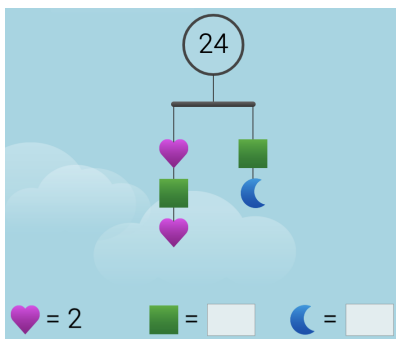
Line up like place values when adding and subtracting.  
Estimate where the decimal point goes in the answer  
when multiplying and dividing.

# WRITING EXPRESSIONS

Write an expression to represent each verbal phrase.

<p>Subtract 9 and 2, then multiply by 4.</p> $(9-2) \times 4$	<p>Divide 8 by 2 and then add 1.</p>	<p>Triple 4 and then add 6.</p>
<p>Add 2 and 8 and then multiply by 2.</p>	<p>Double 6 and then divide by 3.</p>	<p>Add 4, 6 and 13.</p>
<p>Subtract 9 and 2 and add 5.</p>	<p>4 plus the product of 2 and 7.</p>	<p>The sum of 6 times 5 and 9 minus 2.</p>

What is the value of the square? The crescent?



# WRITING EXPRESSIONS

Write an expression to represent each real world situation. Don't solve!

You pay \$1.25 per pound for 3 pounds of apples. $3 \times 1.25$	Emma weighs 38 pounds. Gavin weighs 10 pounds less.	Four friends split a \$20 dinner bill.
There are 15 kids on a bus. 6 more get on.	You have \$13 on a gift card and spend \$9.50.	It takes 100 days to build a house. 3 weeks have passed.

Vivian loves to paint in the evenings after school. She is working on three paintings. She needs 4 brushes, 3 canvases, and 12 small tubes of paint. Brushes cost \$0.75 each, canvases cost \$5.99 each, and tubes of paint costs \$1.89 each.

1. Write an expression to determine Vivian's cost, then solve the problem.
2. Help Vivian determine the average cost per painting. Write an expression and then solve the problem.

# PLACE VALUE

<p>What is the difference in the value of the 2 in each number below? 832 and 299</p> <p>832 → two represents 2 ones 299 → 2 represents 2 hundreds</p>	<p>What is the difference in the value of the 5 in each number below? 5,934 and 587</p>	<p>Explain the relationship between the 9 in the ones place and 9 in the thousands place in the number 9,999.</p>
<p>Explain the relationship between the 5 in the ones place and the 5 in the tens place in the number 55.</p>	<p>Explain the relationship between the 7 in the hundreds place and the 7 in the ones place in the number 707.</p>	<p>What is the value of the underlined digit? 46.9<u>6</u>5</p>
<p>What is the value of the underlined digit? 1,425.<u>8</u>6</p>	<p>What is the value of the underlined digit? 3<u>2</u>,962.8</p>	<p>What is the difference in the value of the 6 in each number below? 465 and 2,697</p>

What is the value of the last row?

$$\text{Shark} + \text{Shark} + \text{Shark} = 30$$

$$\text{Whale} \times \text{Shark} + \text{Shark} = 45$$

$$\text{Fish} + \text{Fish} \times \text{Whale} = 81$$

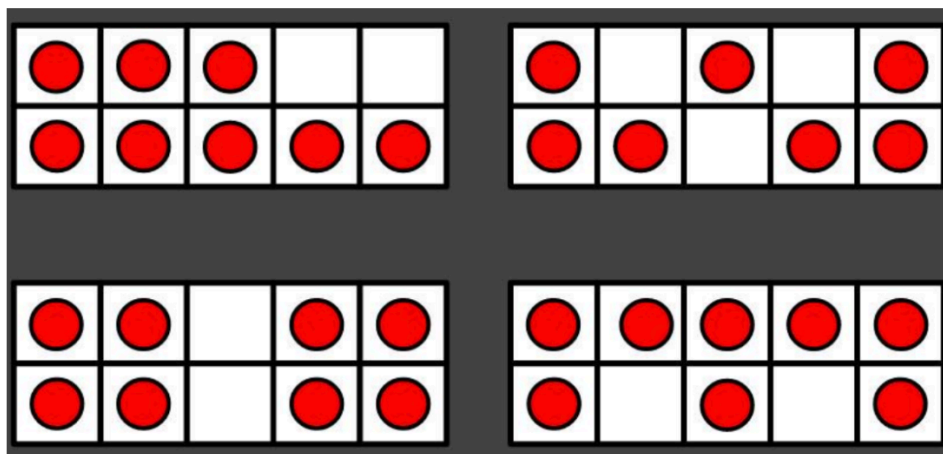
$$\text{Fish} + \text{Shark} \times \text{Whale} = ?$$

# EXPANDED FORM

Write the number below in expanded form using fractions. 5,482	Write the number below in expanded form using fractions. 38.25 $(3 \times 10) + (8 \times 1) + (2 \times \frac{1}{2}) + (5 \times \frac{1}{100})$	Write the number below in expanded form using fractions. 4.082
Write in numeric form. "Fifteen and two hundredths"	Write in numeric form. $(8 \cdot 10) + (4 \cdot 1) + (5 \cdot \frac{1}{100})$	Write in numeric form. $(5 \cdot 100) + (2 \cdot \frac{1}{10})$
Write the number below in expanded form. 800.124	Write in numeric form. "Four thousand three hundred one"	Write in numeric form. "Nine and two tenths"

Which One Doesn't Belong?

Choose one graph in this picture that you don't think belongs with the rest. Explain why. Can you pick another graph and give a different reason?



# COMPARE & ORDER DECIMALS



<p>Use &lt;, &gt;, or = to compare the two numbers.</p> <p>4.5 <u>&gt;</u> 4.420</p>	<p>Use &lt;, &gt;, or = to compare the two numbers.</p> <p>0.67 ____ 0.8</p>	<p>Use &lt;, &gt;, or = to compare the two numbers.</p> <p>0.125 ____ 0.2</p>
<p>Use &lt;, &gt;, or = to compare the two numbers.</p> <p>0.82 ____ 0.820</p>	<p>Use &lt;, &gt;, or = to compare the two numbers.</p> <p>62.4 ____ 6.24</p>	<p>Use &lt;, &gt;, or = to compare the two numbers.</p> <p>5.23 ____ 5.3</p>
<p>Put the following the numbers in order from least to greatest.</p> <p>0.3, 0.13, 0.32, 0.303</p> <p>0.13, 0.3, 0.303, 0.32</p>	<p>Put the following the numbers in order from least to greatest.</p> <p>8.2, 0.82, 0.8, 0.08</p>	<p>Use &lt;, &gt;, or = to compare the two numbers.</p> <p>9.62 ____ 9.504</p>

Below is a pattern of sunflowers in steps 1-3 below.

- Draw what you think step 4 might look like.
- Draw or describe what you think step 10 might look like.
- Label how many sunflowers are in each stage.



Step 1



Step 2



Step 3

# ▶▶▶ ROUNDING DECIMALS ◀◀◀

Round 15.435 to the nearest tenth.  $15.435$ $\uparrow$ $15.4$	Round 567.065 to the nearest hundredth.	Round 874.32 to the nearest ten.
Round 4.623 to the nearest whole number.	Round 0.7845 to the nearest hundredth.	Round 71.963 to the nearest tenth.
Round 6.8245 to the nearest tenth.	Round 182.675 to the nearest hundred.	Round 42.96 to the nearest ten.

Fill in the table to round numbers to the nearest ten, one, tenth, and hundredth.

Round to the Nearest:	Ten	One	Tenth	Hundredth
506.308				
715.071				
80.916				



# MULTI-DIGIT MULTIPLICATION

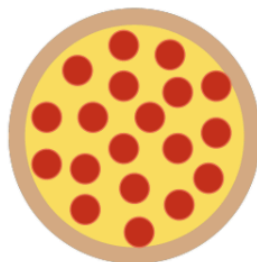


Find each product.



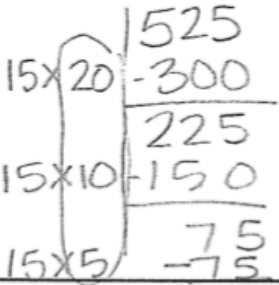
$452 \cdot 82$	$5,212 \cdot 40$	$326 \cdot 30$
$182 \cdot 63$	$948 \cdot 45$	$415 \cdot 12$ $415 \times 10 = 4150$ $415 \times 2 = 830$ $4150 + 830 = 4980$
$1,255 \cdot 81$	$4,124 \cdot 22$	$1,800 \cdot 45$

What is the maximum number of pieces you can divide a circular pizza into with 4 cuts? (All cuts must be distinct straight lines from one point on the edge of the pizza to another point on the edge of the pizza, and you may not move the pizza slices.)



# MULTI-DIGIT DIVISION

Find each quotient.

$186 \div 62$	$525 \div 15 = 35$ 	$896 \div 14$
$288 \div 32$	$688 \div 86$	$156 \div 12$
$1,232 \div 14$	$540 \div 20$	$720 \div 48$

Whitney's 9 cousins are coming to visit, and she wants to make them each a little gift bag. She wants to put an equal number of little candies in each bag, eat 3 candies herself, and have none left over. Which bag of candy should she buy? How many pieces of candy will each cousin get?

Candy	Candies per Bag
Lemon Sours	147
Strawberry Kisses	216
Pineapple Sweets	193

# ▶▶▶▶ ADDING FRACTIONS ◀◀◀◀

Find each sum.

$\frac{1}{2} + 6\frac{2}{3}$ $\downarrow \quad \downarrow$ $\frac{3}{6} + 6\frac{4}{6}$ $\frac{3}{6}$ $+ 6\frac{4}{6}$ <hr/> $6\frac{7}{6} = 7\frac{1}{6}$	$\frac{5}{8} + 2$	$\frac{9}{10} + 3\frac{1}{2}$	$4\frac{1}{5} + 6\frac{1}{2}$
$3\frac{1}{4} + 4\frac{1}{2}$	$9\frac{1}{3} + 4\frac{5}{6}$	$\frac{11}{12} + \frac{3}{4}$	$2\frac{1}{3} + 4\frac{1}{5}$

## Balanced Equation

Use the operation symbols (+, -, x, and ÷) to make the equation true. Operations may be used more than once.

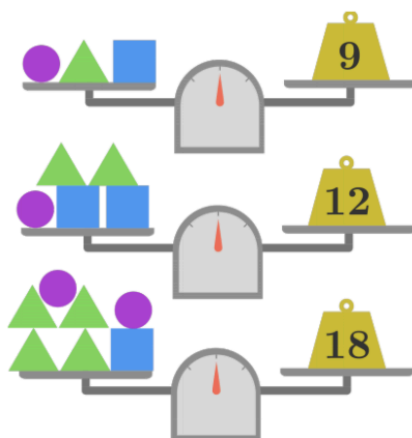
$$2 \boxed{\phantom{0}} (3 \boxed{\phantom{0}} 7 \boxed{\phantom{0}} 9) = (1 \boxed{\phantom{0}} 5) \boxed{\phantom{0}} (8 \boxed{\phantom{0}} 4)$$

# SUBTRACTING FRACTIONS

Find each difference.

$8\frac{1}{2} - 4\frac{1}{5}$	$6\frac{3}{4} - 2\frac{1}{8}$	$5\frac{3}{5} - 1\frac{1}{3}$ $5\frac{9}{15} - 1\frac{5}{15} =$ $4\frac{4}{15}$	$10\frac{4}{5} - 3\frac{1}{2}$
$9\frac{7}{8} - \frac{2}{3}$	$15\frac{9}{10} - 4\frac{5}{8}$	$8\frac{2}{3} - 5\frac{1}{5}$	<del><math>4\frac{5}{6} - 1\frac{1}{8}</math></del>

All the scales shown are perfectly balanced. What is the weight of one triangle?



# MULTIPLYING FRACTIONS

Find each product.

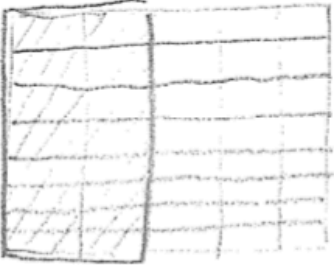
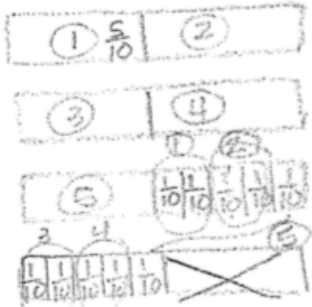
$\frac{2}{5} \cdot \frac{7}{10}$	$\frac{2}{3} \cdot 8$	$\frac{5}{6} \cdot \frac{1}{2}$				
$3\frac{1}{2} \cdot 4$	$6\frac{1}{8} \cdot 2\frac{1}{2}$	$4\frac{2}{3} \cdot 6\frac{1}{4}$ $\frac{14}{3} \cdot \frac{25}{4} = \frac{350}{12}$ $\frac{350}{12} = 29\frac{2}{12} = 29\frac{1}{6}$				
$8\frac{1}{3} \cdot 2\frac{1}{4}$ $2 \quad \frac{1}{4}$ <table border="1"> <tr> <td>16</td> <td>2</td> </tr> <tr> <td><math>\frac{2}{3}</math></td> <td><math>\frac{1}{12}</math></td> </tr> </table> $16 + 2 + \frac{2}{3} + \frac{1}{12}$ $16 + 2 + \frac{2}{3} + \frac{1}{12} = 18\frac{9}{12} = 18\frac{3}{4}$	16	2	$\frac{2}{3}$	$\frac{1}{12}$	$3\frac{3}{5} \cdot 6\frac{1}{5}$	$9\frac{1}{2} \cdot 1\frac{7}{10}$
16	2					
$\frac{2}{3}$	$\frac{1}{12}$					

Using the digits 1 to 9, at most one time each, place a digit in each box to make a whole number product.

$$\frac{\square}{\square} \times \frac{\square}{\square} = \square$$

# DIVIDING FRACTIONS

Find each quotient.

$\frac{2}{5} \div 8 = \frac{2}{40}$ 	$\frac{5}{6} \div 4$	$\frac{7}{8} \div 2$	$\frac{9}{10} \div 4$
$3\frac{1}{2} \div 5 = \frac{7}{10}$ 	$6\frac{1}{5} \div 2$	$9\frac{1}{3} \div 3$	$5\frac{2}{5} \div 2$

On a piece of paper, make two columns. In one column, list the things that are the same in this picture, and in the other column, list the things that are different.

## What is the same?

Thousands	Hundreds	Tens	Ones
	54	8	2

Thousands	Hundreds	Tens	Ones
5		48	2

## What is different?

# AREA OF QUADRILATERALS

Find the area of each shape.

<p style="text-align: center;">Inches:</p> <div style="border: 1px solid black; width: 150px; height: 80px; margin: 0 auto; position: relative;"> <span style="position: absolute; top: 10px; left: 10px; font-size: 2em;">9.4 = 36 in<sup>2</sup></span> <span style="position: absolute; top: 50px; right: 10px; font-size: 1.5em;">4</span> <span style="position: absolute; bottom: 10px; left: 50px; font-size: 1.5em;">9</span> </div>	<p style="text-align: center;">Feet:</p> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; position: relative;"> <span style="position: absolute; top: 50px; right: 10px; font-size: 1.5em;">6.5</span> </div>
<p style="text-align: center;">Centimeters:</p> <div style="border: 1px solid black; width: 100px; height: 80px; margin: 0 auto; position: relative;"> <span style="position: absolute; top: 50px; right: 10px; font-size: 1.5em;">2.15</span> <span style="position: absolute; bottom: 10px; left: 50px; font-size: 1.5em;">8</span> </div>	<p style="text-align: center;">Inches:</p> <div style="border: 1px solid black; width: 200px; height: 100px; margin: 0 auto; position: relative;"> <span style="position: absolute; top: 50px; right: 10px; font-size: 1.5em;">4 <math>\frac{3}{4}</math></span> <span style="position: absolute; bottom: 10px; left: 50px; font-size: 1.5em;">12 <math>\frac{1}{2}</math></span> </div>

## Ratio Tables

Maria is planning to make friendship bracelets to sell at the farmers' market. Each bracelet costs \$1.25 to make. Use the ratio table to show your strategy for finding the cost to make 19 bracelets.

Number of Bracelets	1								
Cost (\$)	1.25								

The cost to make 19 bracelets is \_\_\_\_\_.

Use the ratio table to show your strategy for finding how many bracelets Maria can make for \$126.25.

Number of Bracelets	1								
Cost (\$)	1.25								

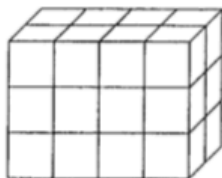
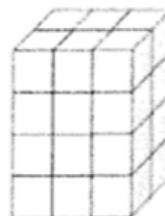
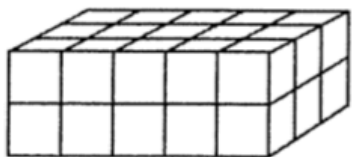
Maria can make \_\_\_\_\_ bracelets for \$126.25.



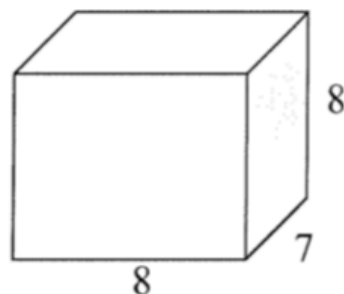
# VOLUME



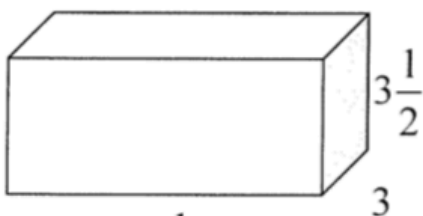
Find the volume of each shape.



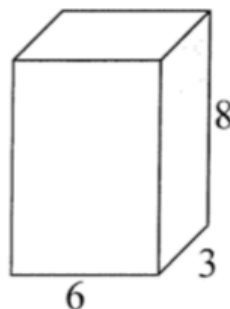
Feet



Inches



Feet



$$\frac{9}{2} \times \frac{7}{2} \times \frac{3}{1} = \frac{189}{4} = 47\frac{1}{4} \text{ in}^3$$

Fractions of Wholes

True or False?



**a**  $\frac{1}{4} \times 9 = 2\frac{1}{4}$     **T F**

**b**  $\frac{3}{5}$  of 25 = 15    **T F**

**c**  $\frac{2}{5}$  of 15 =  $5\frac{2}{5}$     **T F**

**d**  $18 \times \frac{1}{5} = \frac{5}{18}$     **T F**

**e**  $\frac{2}{6} \times 24 = 14$     **T F**

**f**  $17 \times \frac{1}{3} = \frac{17}{3}$     **T F**



# MEASUREMENT CONVERSIONS



<p>How many quarts are in 9 gallons?</p> <p><i>Handwritten: 4 quarts : 1 gallon</i>  <i>Handwritten: 36 quarts : 9 gallon</i></p>	<p>How many gallons are in 44 quarts?</p>	<p>How many cups are in 6 pints?</p>
<p>How many feet are in 3.5 yards?</p>	<p>How many centimeters are in 5 ½ meters?</p>	<p>How many quarts are in 2.5 gallons?</p>
<p>How many pints are in 4 quarts?</p>	<p>How many inches are in 2 ¾ yards?</p>	<p>How many centimeters are in 3 ½ meters?</p>

## Multiplying Fractions |

Using the digits 1 to 9 at most once each time, fill the boxes to make the greatest possible product.

$$\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}} \cdot \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}} = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$$

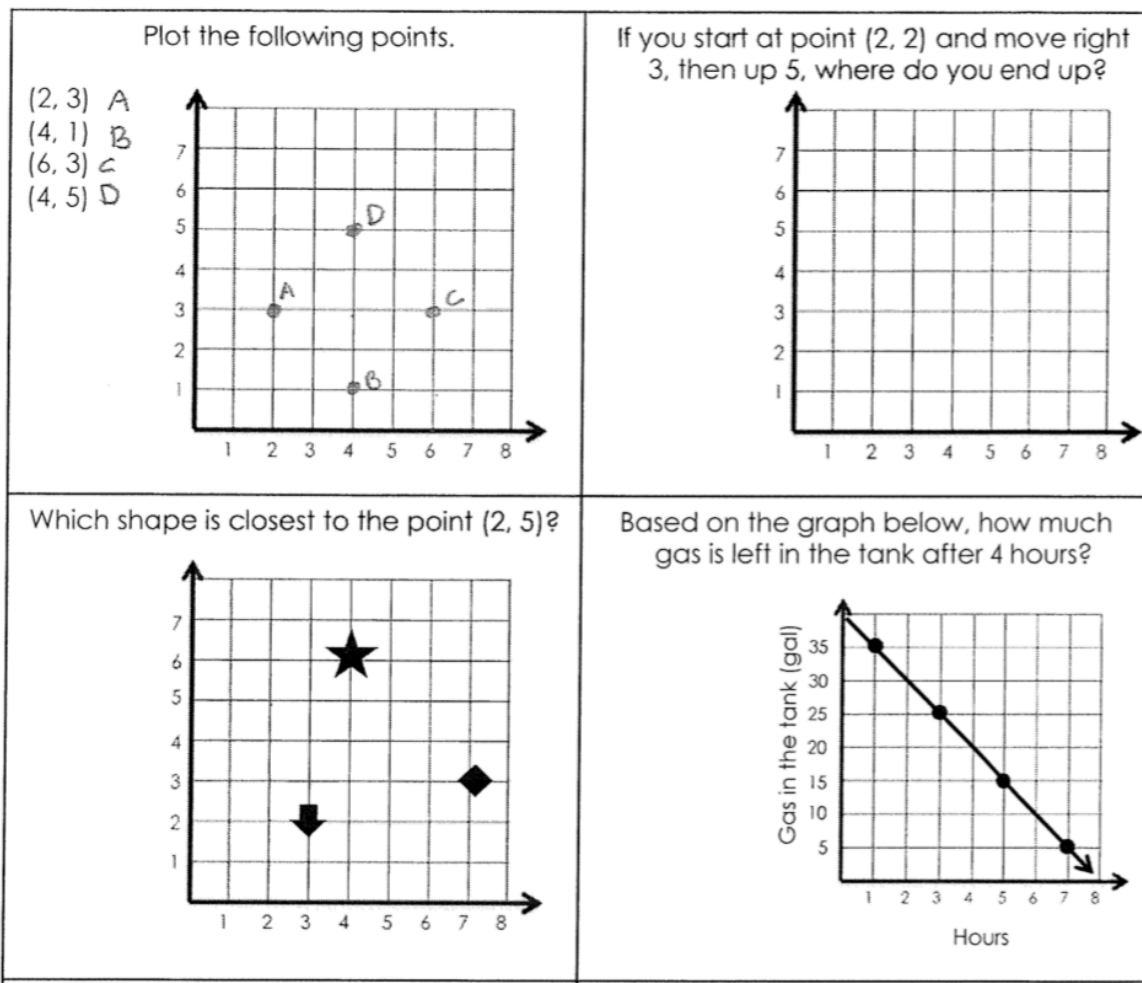
# ▶▶▶ CLASSIFYING SHAPES ◀◀◀

Is there a difference between a parallelogram and a trapezoid? Either explain in words or draw to prove your answer.	Is a rectangle also a square? Explain.	What shape has two pair of parallel lines? (There could be more than one correct answer).
Draw two regular polygons.	Identify the characteristics of a triangle.	What shape has two pair of parallel lines and four right angles? (There could be more than one correct answer).

Which fraction is largest? Explain how you made your decision.

$$\frac{1110}{1111}, \frac{2221}{2223}, \frac{3331}{3334}$$

# COORDINATE PLANES



What is the value of the last row?

$$\text{Moon Face} + \text{Moon Face} + \text{Moon Face} = 21$$

$$\text{Moon Face} \times \text{Moon Face} + \text{Smiling Moon} = 55$$

$$\text{Smiling Moon} \times \text{Cloud with Lightning} + \text{Cloud with Lightning} = 56$$

$$\text{Cloud with Lightning} + \text{Moon Face} \times \text{Smiling Moon} = ?$$