

Most recent update: May 11, 2020

RightStart™ Mathematics

Corrections and Updates for Level H/Grade 7 Lessons and Worksheets, second edition

LESSON/WORKSHEET/SOLUTIONS	CHANGE DATE	CORRECTION OR UPDATE
Worksheet 19 Solutions 19	12/27/2019	The image for Problem 4 has been changed. See attached PDFs .
Worksheet 21	12/27/2019	Two plaids are outlined in the new worksheet. Instructions are changed slightly. See attached PDF .
Worksheet 22-2	12/27/2019	For Problem 14, the instructions are changed to "Draw a regualr tessellation..." rather than "Draw a pure tessellation..."
Solutions 36-1	12/27/2019	In the notes for the remaining six products, the final problem of 45×12 can have the following options: 15×36 , 30×18 , 20×27 , and 54×10 . The solution of 60×9 is an error.
Worksheet 39-3 Solutions 39-1	12/27/2019	For Problem 25, the instructions are changed to "Find p , t , and r " and the value of r is removed from the graphics. See attached PDF . In the Solutions for Problem 25, when the calculated value for r is used in the third equation, it should be $5.4/4.1$, not $5.4/4.0$.
Worksheet 41 Solutions 41	12/27/2019	Two final questions are asked. See attached PDFs .
Worksheet 42-1	12/27/2019	The position and size of the starting rectangle has changed. See attached PDF .
Solutions 42-2	12/27/2019	The measurements for Problems 2–7 are changed. See attached PDF .
Worksheet 45	12/27/2019	The position and size of the starting squares has changed. See attached PDF .
Worksheet 48-1	12/27/2019	Problem 5 has been updated with the size of the starting rectangle. See attached PDF .
Solutions 48-2	12/27/2019	The first measurement for Problem 6 is $10.2/6.3 = 1.6$, not $10.1/6.3 = 1.7$
Solutions 75-4	02/04/2020	The answer for Question 40 should be A , not B.
Solutions 76-4	03/09/2020	The comment for Question 40 should say 600 cm^2 , not 6 cm^2 .
Solutions 85-1	03/09/2020	The answer for Problem 14 needs conversion from centimeters to decimeters. It should be $63.63 \text{ cm} \approx$ 6.4 dm .
Worksheet 91-2 Solutions 91-2	03/11/2020	Question 3 should read " If no faces are regular , how many different ways will the package fit into the box?"
Solutions 101-2	04/20/2020	For Question 21, the solutions reference Q#18 when it should be Q#19 .
Worksheet 107 Solutions 107	04/20/2020	The first ordered pair for equation 4 should read $-4 +$ 12 , not $-4 + 11$, giving an answer of $(8, 1)$, not $(7, 1)$. The first ordered pair for equation 14 should read $-2 +$ -6 , not $-2 + -5$, giving an answer of $(-8, 1)$, not $(-7, 1)$. Graphed image is correct.
Lesson 113	04/20/2020	In the first Extra, the beginning sentence should read "...would be $0.25 \times n$, or $0.25 \times$ 5 , which is $\$1.25$ ", not "...would be $0.25 \times n$, or 0.25×10 , which is $\$1.25$."
Worksheet 113 Solutions 113	04/20/2020	Question 3 should read "...household using between five and eight units...", not "...between five and nine units..."

Worksheet 114-2	Solutions 114-2	04/20/2020	Problem I (in the second column) x-value equation should be $12^2 - 141$, not $12^2 - 121$. Answer of 3 is correct.
	Solutions 114-3	04/27/2020	The solutions for Problem 38 should be: $g^2 = 92 + 749$ $g = \sqrt{841}$ $g = 29$
Worksheet 117		04/27/2020	The wording for Questions 7 and 8 have changed to recognize that at 0°C and 32°F water can be both frozen or liquid and that at 100°C and 212°F water can be both liquid or gas. See attached PDF .
	Solutions 122	05/06/2020	The answer for Question 8b should be 10% , not 20%.
Worksheet 123-2		05/11/2020	The data for Questions 14 through 17 has been changed. See attached PDF .
Worksheet 124-8		05/11/2020	The data for Questions 92 through 96 has been changed. See attached PDF .
Worksheet 125-8	Solutions 125-8	05/11/2020	The data and questions for Questions 87 through 90 has been changed. See attached PDF .

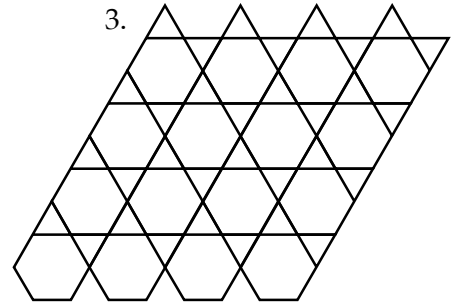
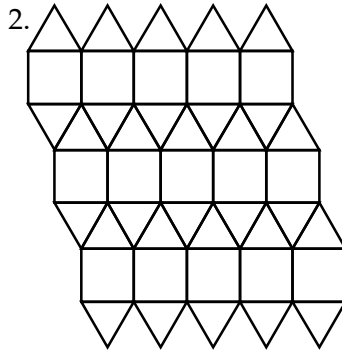
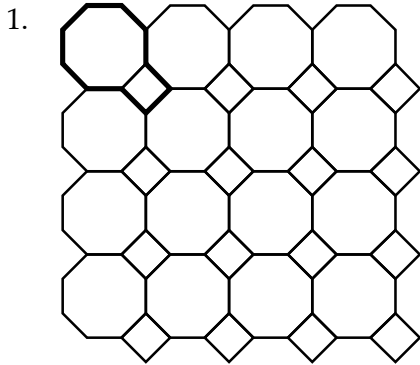
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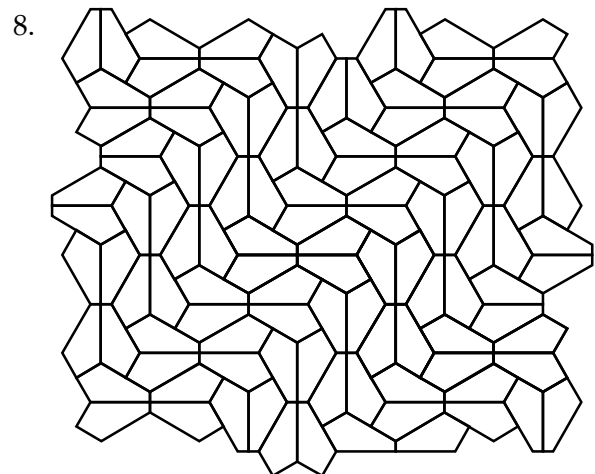
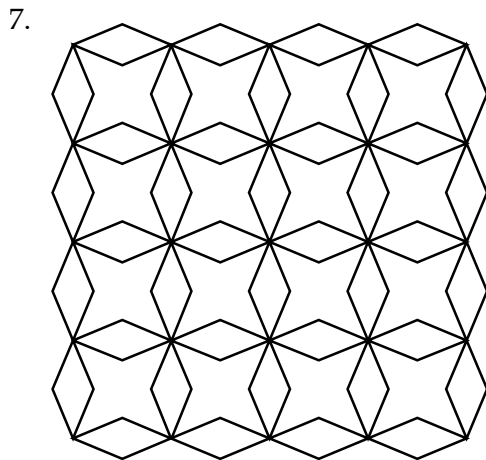
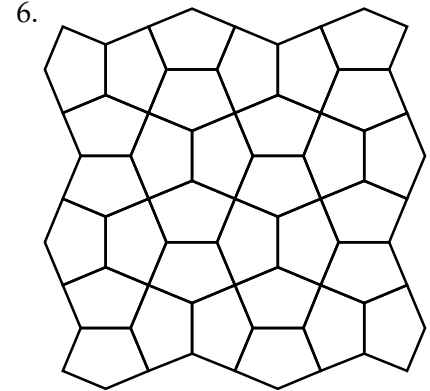
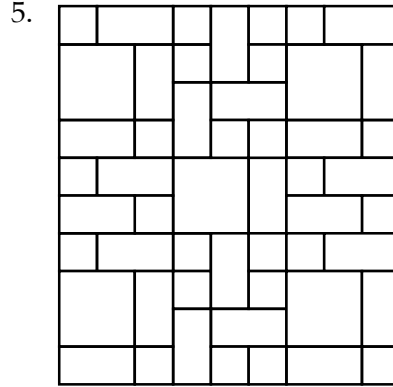
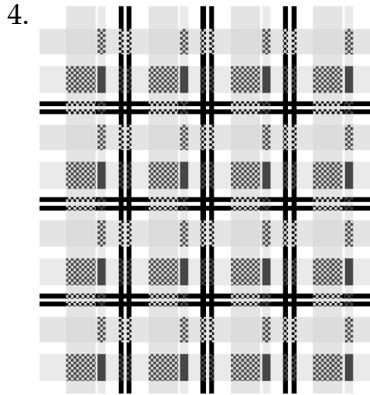
Find the basic unit for the three tessellations below. The first one is done for you.

Fill in the table to describe how to construct the tessellations by translating the basic unit. Use millimeters.

Problem	To make first row	To make next rows
1		
2		
3		



Find the basic unit.



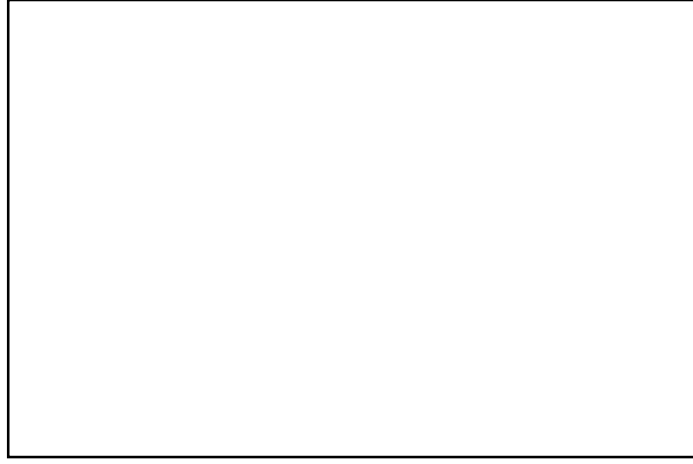
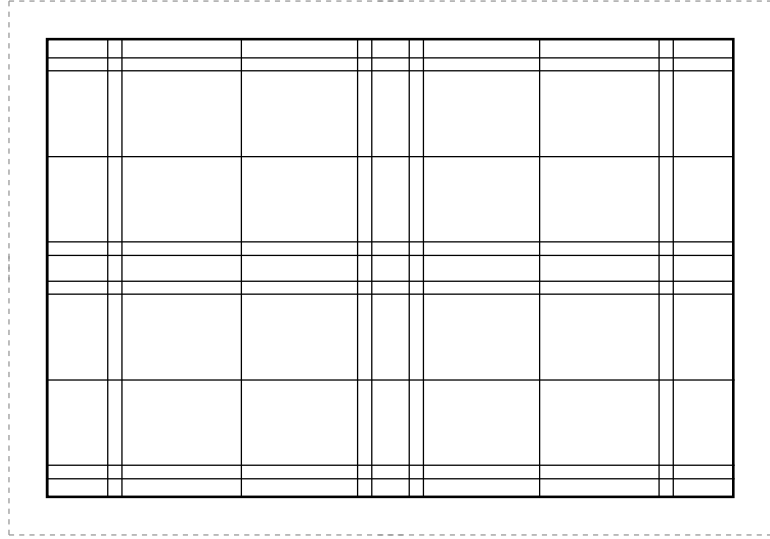
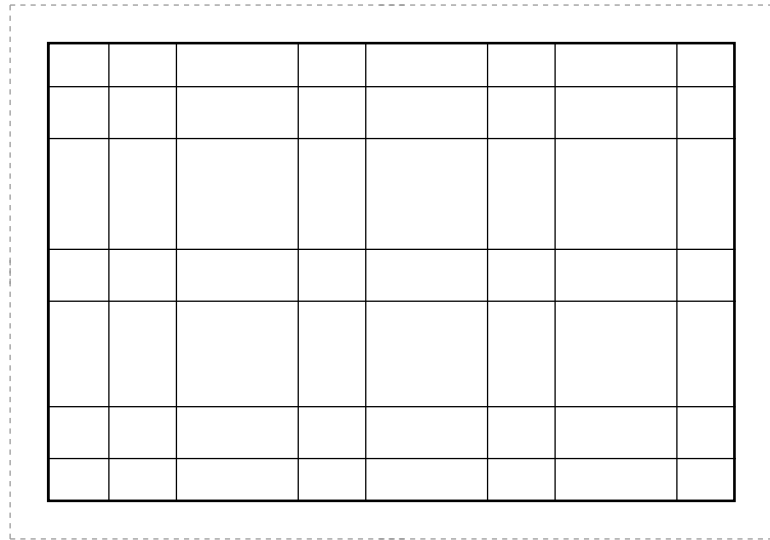
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Fold and cut your tracing paper into three rectangles, each approximately the size of the dotted rectangles below.

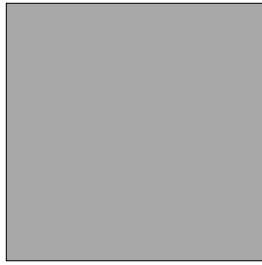
For each rectangle, follow the instructions to design a plaid and color it.

1. Two plaids are outlined for you. Draw an outline for the third rectangle. Create a systematic design.
2. Center the tracing paper over a rectangle and tape the top in place.
3. On the tracing paper, systematically color each of the horizontal weft sections of the plaid all the way across.
4. Lift the tracing paper and color the vertical warp sections, all the way down.
5. Return the tracing paper to cover the rectangle and see each plaid design.

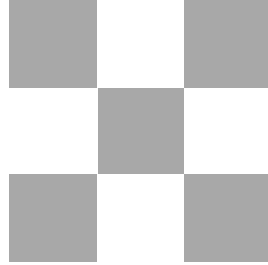


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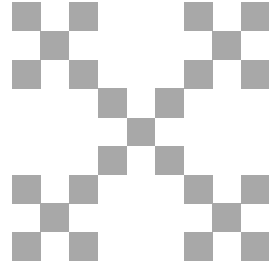
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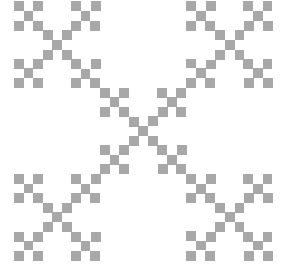
Iteration 0



Iteration 1



Iteration 2



Iteration 3

23. Using the Box Fractals above, complete the table below.

Iteration	Number of Squares (use multiplication)	Number of Squares (use exponent & numeric form)
0		$5^0 = 1$
1		
2		
3		
4		

24. Solve these proportions. You may simplify the fraction before cross multiplying.

$$\frac{p}{24} = \frac{5}{12}$$

$$p = \underline{\hspace{2cm}}$$

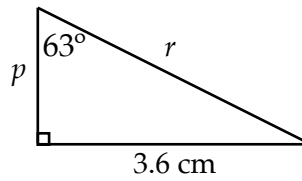
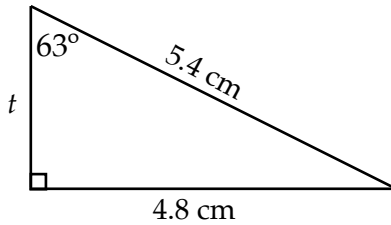
$$\frac{7}{21} = \frac{r}{3}$$

$$r = \underline{\hspace{2cm}}$$

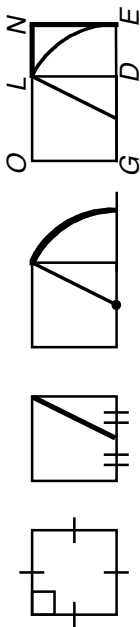
$$\frac{1}{2} = \frac{e}{67}$$

$$e = \underline{\hspace{2cm}}$$

25. Find p , t , and r . Round to the nearest tenth.



1. Construct a golden rectangle on the line below. Follow the instructions provided in the figures. Label the rectangles.



2-3. Measure and find the ratios of the longer side to the shorter side for both rectangles. Round to the nearest tenth.

$$\frac{\overline{GE}}{\overline{OG}} =$$

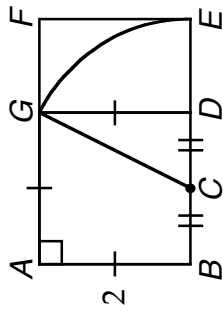
$$\frac{\overline{NE}}{\overline{DE}} =$$

4. Measure and find the ratios for the line segment \overline{GE} .

$$\frac{\text{whole}}{\text{longer}} = \frac{\overline{GE}}{\overline{DG}} =$$

$$\frac{\text{longer}}{\text{shorter}} = \frac{\quad}{\quad} =$$

5. Use the lengths of \overline{CD} and \overline{DG} with the Pythagorean theorem to find \overline{CG} . Keep your answer in square root form.



6. Fill in the chart.

Lengths	In square root form	In decimal form to 6 decimal places
\overline{CE}		
\overline{DE}		
\overline{BE}		
$\overline{BE} : \overline{BD}$		
$\overline{BD} : \overline{DE}$		
$\overline{DE} : \overline{BD}$		

CONTINUE READING THE LESSON.

Compute your answers to six decimal places.

7. What is $\phi + 1$? _____ What is ϕ^2 ? _____

8. What is $\frac{1}{\phi}$? _____ What is $\phi - 1$? _____

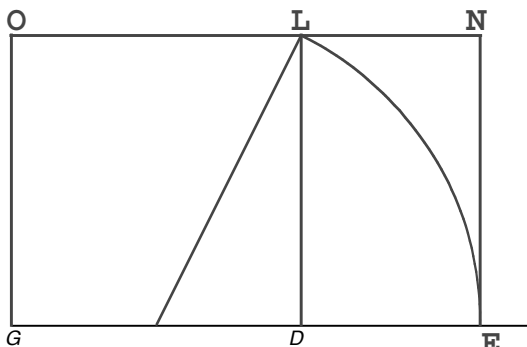
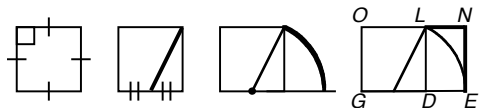
9. Does $\phi + 1 = \phi^2$? _____

10. Does $\frac{1}{\phi} = \phi - 1$? _____

Name: _____

Date: _____

1. Construct a golden rectangle on the line below. Follow the instructions provided in the figures. Label the rectangles.



2-3. Measure and find the ratios of the longer side to the shorter side for both rectangles. Round to the nearest tenth.

$$\frac{\overline{GE}}{\overline{OG}} = \frac{8.1}{5} = 1.6$$

$$\frac{\overline{NE}}{\overline{DE}} = \frac{5}{3.1} = 1.6$$

4. Measure and find the ratios for the line segment \overline{GE} .

$$\frac{\text{whole}}{\text{longer}} = \frac{\overline{GE}}{\overline{DG}} = \frac{8.1}{5} = 1.6$$

$$\frac{\text{longer}}{\text{shorter}} = \frac{\overline{DG}}{\overline{DE}} = \frac{5}{3.1} = 1.6$$

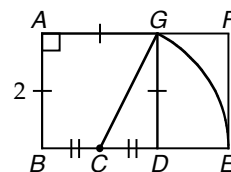
5. Use the lengths of \overline{CD} and \overline{DG} with the Pythagorean theorem to find \overline{CG} . Keep your answer in square root form.

$$c^2 = a^2 + b^2$$

$$c^2 = 1^2 + 2^2$$

$$c^2 = 5$$

$$c = \sqrt{5} = \overline{CG}$$



6. Fill in the chart.

Lengths	In square root form	In decimal form to 6 decimal places
\overline{CE}	$\sqrt{5}$	
\overline{DE}	$\sqrt{5} - 1$	
\overline{BE}	$\sqrt{5} + 1$	
$\overline{BE} : \overline{BD}$	$\frac{\sqrt{5}+1}{2}$	1.618034
$\overline{BD} : \overline{DE}$	$\frac{2}{\sqrt{5}-1}$	1.618034
$\overline{DE} : \overline{BD}$	$\frac{\sqrt{5}-1}{2}$	0.618034

CONTINUE READING THE LESSON.

Compute your answers to six decimal places.

7. What is $\phi + 1$? 2.618034 What is ϕ^2 ? 2.618034

8. What is $\frac{1}{\phi}$? 0.618034 What is $\phi - 1$? 0.618034

9. Does $\phi + 1 = \phi^2$? yes

10. Does $\frac{1}{\phi} = \phi - 1$? yes

NOTES: For Problem 1, make sure the student draws a precise square first. If a square is not in place, calculations for 2 through 4 will not be accurate.

If the student is unfamiliar or unsure how to use the mmArc compass, there is a video online at RightStartMath.com/geometry under this lesson number.

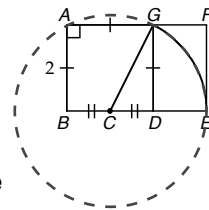
When finding the ratios for Problems 2 through 4, watch that the comparisons are longer sides to shorter sides.

Problem 5 can also be calculated as $\overline{CG} = \sqrt{1^2 + 2^2} = \sqrt{5}$, because $c = \sqrt{a^2 + b^2}$, combining steps from the solution shown above. If the student does this, they are doing steps in their heads and is to be commended.

In Problem 6, both \overline{CG} and \overline{CE} are the radius for the arc on the right side of the drawing, therefore, $\overline{CG} = \overline{CE}$. Some students may benefit from continuing the arc to make the circle. This reminds the student that C is the center of the circle, therefore, any lines from the center to the circumference will be the radius, which will all measure the same. See the figure on the right.

To convert the square root form of the answers to decimal form for Problem 6, guide the student to the note in the Extras section of the lesson. When calculating $\overline{BD} : \overline{DE}$, make sure the student realizes 2 is being divided by $(\sqrt{5} - 1)$, not 2 divided by $\sqrt{5}$, which is 0.894, then minus 1 for a total of -0.106. These are two different equations with two very different answers.

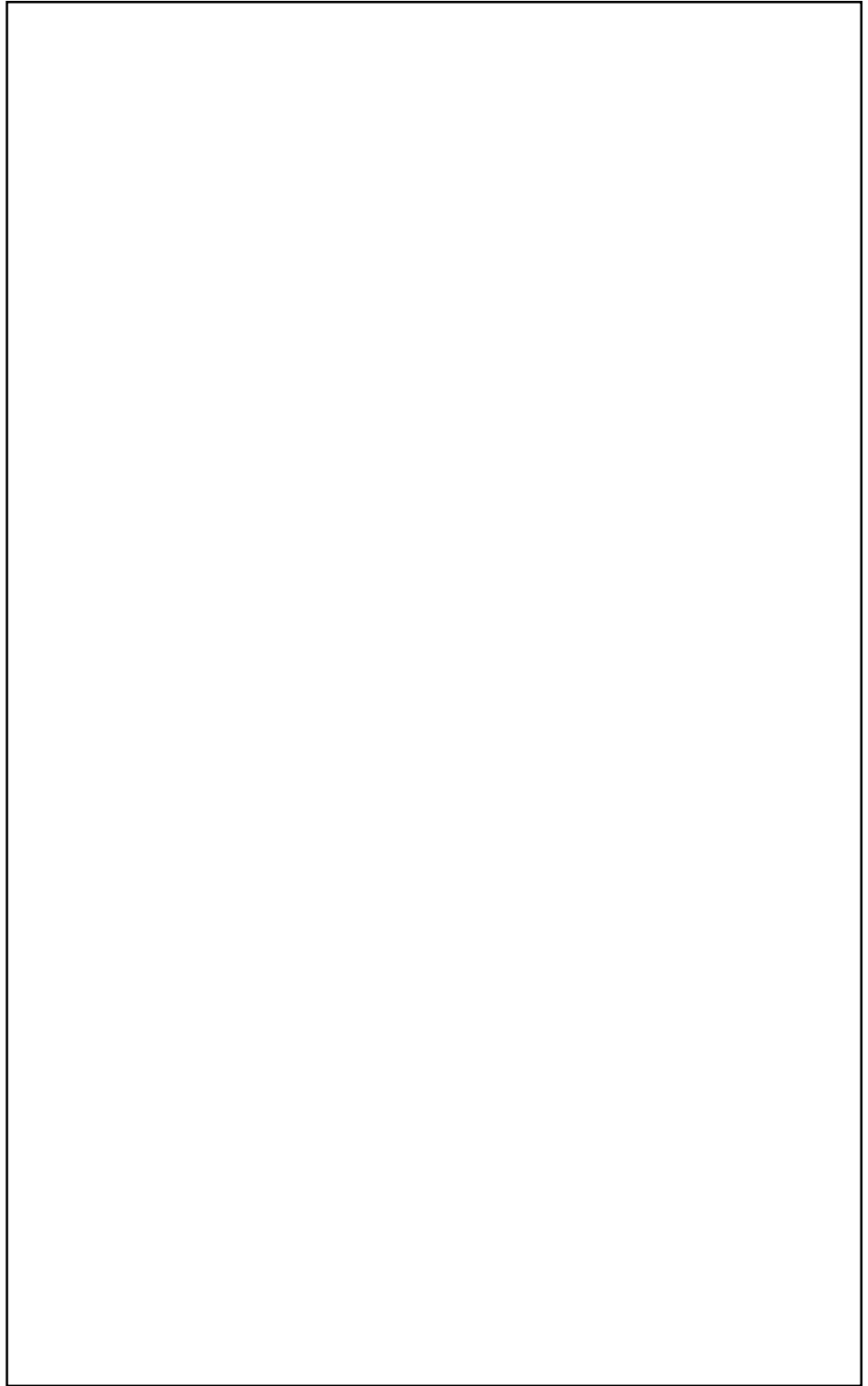
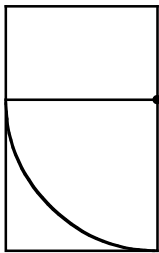
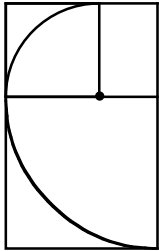
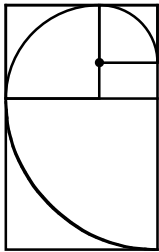
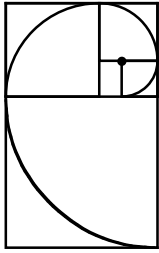
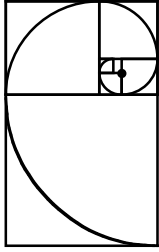
DICTIONARY TERMS: golden rectangle, golden ratio, phi, ϕ



Name: _____

Date: _____

1. Construct golden rectangles within the golden rectangle by constructing squares. Be as precise as you can as you will need these measurements on the next worksheet. Then draw the spiral.



2-7. Measure the sides of the six largest squares you drew on Worksheet 42-1 to the nearest tenth of a centimeter. Find the ratio of the sides of the largest square to the second largest square. Then find the ratio of the sides of the second largest square to the third largest square. Continue for five ratios.

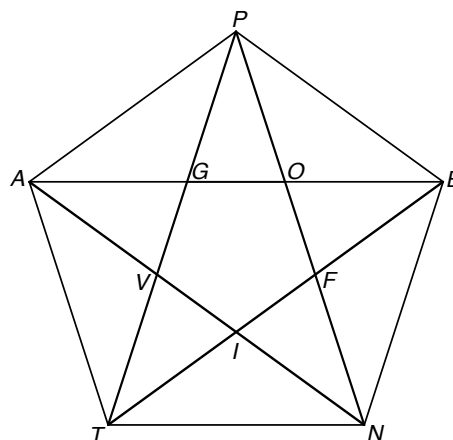
$$\frac{12.3}{7.6} = 1.6$$

$$\frac{7.6}{4.7} = 1.6$$

$$\frac{4.7}{2.9} = 1.6$$

$$\frac{2.9}{1.8} = 1.6$$

$$\frac{1.8}{1.1} = 1.6$$



CONTINUE READING THE LESSON.

8-11. Fill in the chart using the regular pentagon above on the right. Find your ratios to 3 decimal places. Use the measurements given on the right.

$\overline{PG} = 6.1803$
 $\overline{GO} = 3.8196$
 $\overline{AP} = 10.0000$
 $\overline{AE} = 16.1803$

Triangle	Longest side/ Shortest side	Ratio	Golden Triangle? (yes or no)
$\triangle PGO$	$\frac{\overline{PG}}{\overline{GO}} = \frac{6.1803}{3.8196}$	1.618	yes
$\triangle PAE$	$\frac{\overline{AE}}{\overline{AP}} = \frac{16.1803}{10.0000}$	1.618	yes
$\triangle PAG$	$\frac{\overline{PA}}{\overline{PG}} = \frac{10.0000}{6.1803}$	1.618	yes
$\triangle PGE$	$\frac{\overline{PE}}{\overline{PG}} = \frac{10.0000}{6.1803}$	1.618	yes

[TRIANGLE SIDES MAY VARY, HOWEVER RATIOS WILL BE THE SAME.]

12. What is $\angle APE$? 108°

13. What is $\angle GPO$? 36°

14. What is $\angle APG$? 36°

15. Circle the triangles that are similar to $\triangle EOF$.

$\triangle PAG$ $\triangle PAT$ $\triangle PTN$ $\triangle PGE$ $\triangle PGO$

16. Circle the triangles that are similar to $\triangle TIN$.

$\triangle PAG$ $\triangle PAT$ $\triangle PTN$ $\triangle PGE$ $\triangle PTF$

17. How many golden triangles are in the figure above? 35

18. Would you call $APET$ a golden trapezoid? Explain. yes

The 3 shorter sides are equal.

The longer:shorter ratio = ϕ .

NOTES: When working on the chart for Problems 8 to 11, some students find it beneficial to identify the triangles, then consider which side is the longest and which is the shortest. Although the chart identifies the line segment as well as the measurements, it is not necessary for the student to write both. They will need to use the measurements given and notice which line segments are congruent in the figure to find the measurement of the line segments not given.

For Question 12, when finding the measurement of $\angle APE$, remind the student that to find the interior angles of a pentagon, divide it into three triangles (Lesson 6). The total angles of the pentagon is 180×3 , which is 540° . Therefore, each of the five angles is $540 \div 5$ or 108° .

Question 13 is simply dividing the angle of the pentagon by the three triangles; $108 \div 3$. Some students may wonder how they would know that the three angles are equal. Because this is a regular pentagon, the interior pentagon, $GOFIV$, drawn with symmetrical lines, is also a regular pentagon. The angles on a regular pentagon are 108° . The vertical angle, $\angle PGA$, will also be 108° . Because $\triangle PGA$ is an isosceles triangle, the two other angles will be equal; $180 - 108 = 72$ and $72 \div 2 = 36^\circ$. This means $\angle P$ is $108 - 36 - 36$, which is 36° !

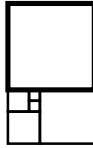
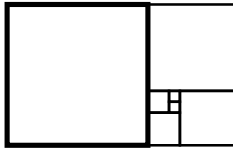
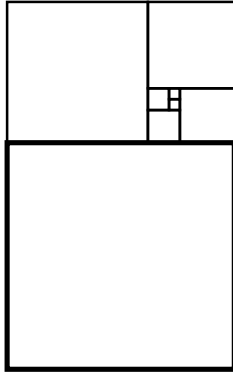
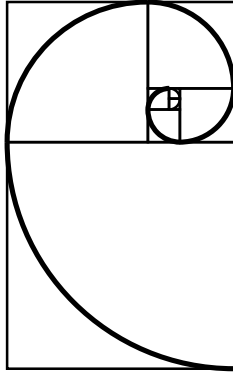
For Question 18, Bailey Hodson, age 13, answered, "Probably. Maybe. Kinda. Yes, because it looks like it has the right amount of proportion." Although that's not a mathematical answer, Bailey was able to recognize the ratios! Her brother, Seth Hodson said, "Yes, because it is made of golden triangles."

DICTIONARY TERMS: golden triangle

Name: _____

Date: _____

Construct the Fibonacci spiral as shown in the steps below. Write the Fibonacci number in each square.



Name: _____

Date: _____

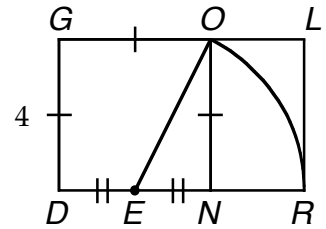
Write the correct term for the following definitions.

1. A set of quantities in some type of order is called? _____
2. The Greek symbol for the golden ratio, 1.618034? _____
3. What is the missing part of the formula for the golden ratio?

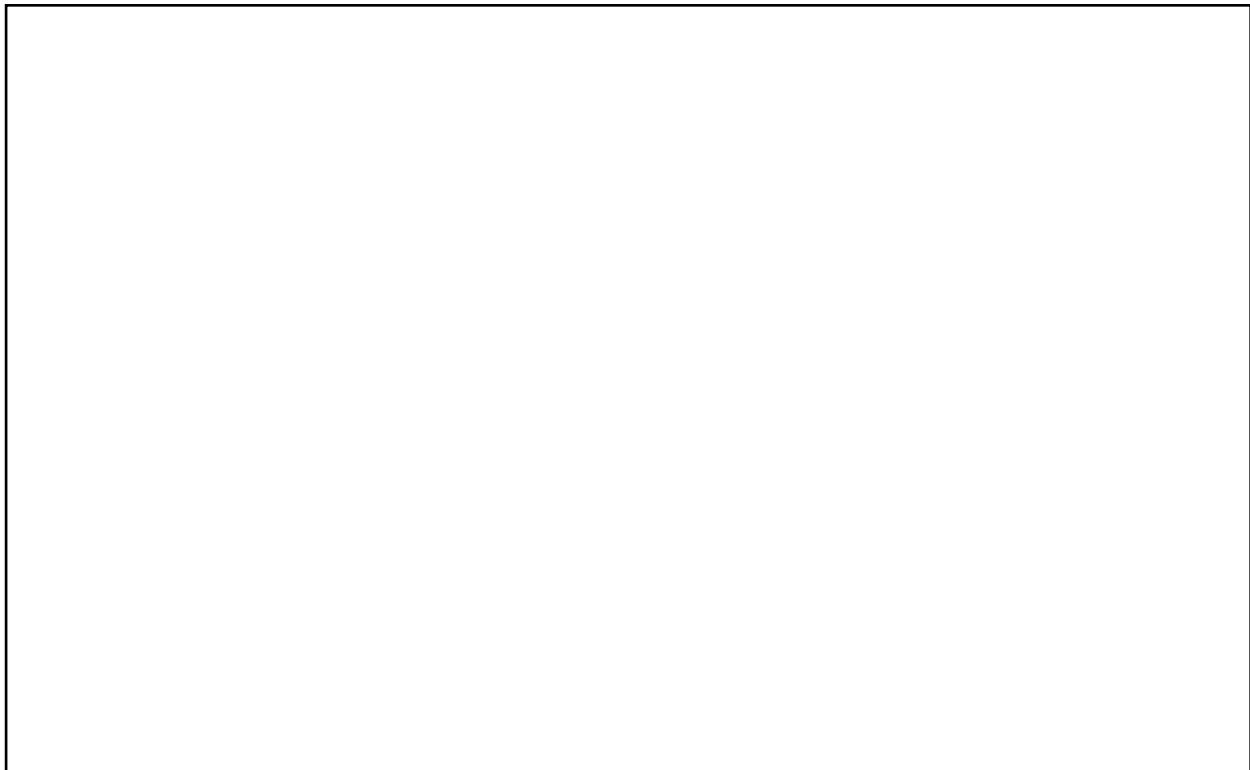
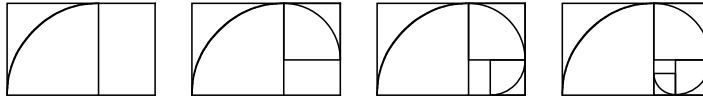
$$\frac{\text{whole}}{\text{longer part}} = \frac{\text{longer part}}{\text{shorter part}}$$

- a. equal part
- b. upper part
- c. longer part

4. Use the lengths of \overline{EN} and \overline{NO} with the Pythagorean Theorem to find \overline{EO} . Keep your answer in square root form. So now, what is the length of \overline{ER} ?



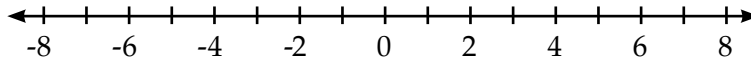
5. Construct golden rectangles within the golden rectangle by constructing squares and then draw the spiral.



Name: _____

Date: _____

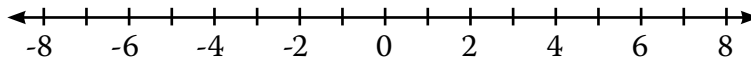
1. Write out in words what this inequality means, $4 \leq g \leq 8$ and graph it on the number line.



Can g be equal to 8? _____

Can g be equal to 3? _____

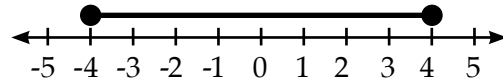
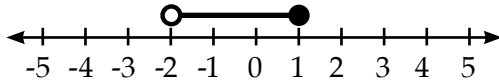
2. Write out in words what this inequality means, $-3 > r \geq -6$ and graph it on the number line.



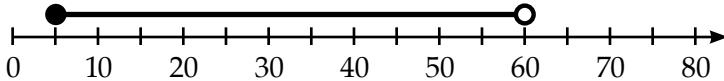
Can r be equal to -3? _____

Can r be equal to -6? _____

3–4. Write inequalities that express what the graphs show.



5. The ages, a , for those who pay \$10 for Alex's tickets is expressed by inequality, $5 \leq a < 60$. Those under 5 or those 60 or older get free tickets. Write and graph the expression(s) for the ages that get in free.

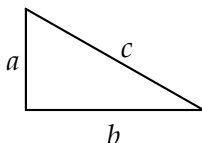


6. Write an expression for the number of days in a month. _____

7. On the Celsius scale, at sea level water at 0° can be both frozen or liquid and at 100° can be both liquid or gas. Write an expression for the temperature range that water can be a liquid.

8. On the Fahrenheit scale, water at 32° can be both frozen or liquid and at 212° can be both liquid or gas. Write an expression for the temperature range that water can be a liquid.

9–11. For the right triangle shown, write the correct symbols to make the following expressions true.



$a^2 + b^2$ _____ c^2

$a + b$ _____ c

b _____ $c + a$

Name: _____

Date: _____

10. Write the relationship symbols to make the following expressions true: $<$, \leq , $=$, \geq , or $>$.

1 cm _____ 1 m 100 mm _____ 1 dm 1 dm _____ 1 cm 28 days _____ 1 month

11–13. Find both solutions for the following equations.

$$|t + 4| = 9$$

$$|x + 2| = 2(9 - 2)^2$$

$$|n - 5| = 7 - 3^2$$

14–17. Fill in the table below. Round your calculations to two decimal points where necessary.

	Data	Mode	Median	Arithmetic Mean	Geometric Mean
a.	6, 3, 7, 3, 8				
b.	2, 5, 2, 3, 17, 11				
c.	24, 87, 83				
d.	97, 83, 72, 97				

Given a deck of 50 cards with the numbers 1 to 50, answer the following questions.

18. What is the probability you will choose a number that is a multiple of 5? _____

19. What is the probability you will select a 12? _____

20. What is the probability you will choose numbers that are odd? _____

21. What is the probability you will choose a number that is a multiple of 25? _____

22. What is the probability you will choose a double digit number? _____

23. What is the probability you will choose a zero? _____

Name: _____

Date: _____

Write the correct term for the following definitions.

88. What is the name for the solids having more than one regular polygon type and identical vertices?

89. What is the name for a polyhedron that resembles a star? _____

Write the correct symbols.

90. Greater than or equal to: _____

91. Less than or equal to: _____

92–96. Fill in the table below. Round your calculations to two decimal points where necessary.

	Data	Mode	Median	Arithmetic Mean	Geometric Mean
a.	2, 5, 32				
b.	3, 31, 32, 19				
c.	2, 9, 17, 58, 17				
d.	6, 8, 8, 10, 8				
e.	23, 6, 9, 11, 9				

Base your answers to the following questions assuming you have a deck of 10 cards with the numbers 1 to 10.

97. What is the probability you will choose a number that is a multiple of 10? _____

98. What is the probability you will select an 8? _____

99. What is the probability you will choose a number that is even? _____

100. What is the probability you will choose a number that is a multiple of 5? _____

Write the correct term for the following definitions.

83. What is the value of a number without regard to it being positive or negative? **absolute value**
84. What is the mathematical word for most used number in a data set? **mode**

Write the definitions for the following terms.

85. Mean: **the mathematical word for average**
86. Median: **the middle number when numbers are put in order**

87-90. Fill in the table below. Round your calculations to two decimal points where necessary.

Data	Mode	Median	Estimated		Calculated	
			Arithmetic Mean	Geometric Mean	Arithmetic Mean	Geometric Mean
a. 99, 66, 77, 88	---	82.5	[ANSWERS WILL VARY]	[ANSWERS WILL VARY]	82.5	81.57
b. 99, 66, 77, 88, 66	66	77	[ANSWERS WILL VARY]	[ANSWERS WILL VARY]	79.2	78.19
c. 99, 66, 77, 88, 99	99	88	[ANSWERS WILL VARY]	[ANSWERS WILL VARY]	85.8	84.79
d. 267, 275, 275	275	275	[ANSWERS WILL VARY]	[ANSWERS WILL VARY]	272.33	272.31

Base your answers to the following questions assuming you have a deck of 20 cards with the numbers 1 to 20.

91. What is the probability you will choose a number that is a multiple of 10? **10%**
92. What is the probability you will select a 19? **5%**
93. What is the probability you will choose numbers that are odd? **50%**
94. What is the probability you will choose a number that is a multiple of 5? **20%**

NOTES: For Problems 91 to 94, many student will start with a fraction, then convert to percentages. A common mistake is to forget that the count is out of 20, not out of 100 which is needed for percentages. The fractions are as follows:

91. $\frac{2}{20}$ or $\frac{10}{100}$ or 10%
92. $\frac{1}{20}$ or $\frac{5}{100}$ or 5%
93. $\frac{10}{20}$ or $\frac{50}{100}$ or 50%
94. $\frac{4}{20}$ or $\frac{20}{100}$ or 20%

DICTIONARY TERMS: none

Name: _____

Date: _____

Write the correct term for the following definitions.

83. What is the value of a number without regard to it being positive or negative? _____

84. What is the mathematical word for the most used number in a data set? _____

Write the definitions for the following terms.

85. Mean: _____

86. Median: _____

87–90. Fill in the table below. Round your calculations to two decimal points where necessary.

				Estimated		Calculated	
	Data	Mode	Median	Arithmetic Mean	Geometric Mean	Arithmetic Mean	Geometric Mean
a.	99, 66, 77, 88						
b.	99, 66, 77, 88, 66						
c.	99, 66, 77, 88, 99						
d.	267, 275, 275						

Base your answers to the following questions assuming you have a deck of 20 cards with the numbers 1 to 20.

91. What is the probability you will choose a number that is a multiple of 10? _____

92. What is the probability you will select a 19? _____

93. What is the probability you will choose numbers that are odd? _____

94. What is the probability you will choose a number that is a multiple of 5? _____