Unit 8.4, Lesson 14: Strategic Solving, Part 2

Answer Key

Warm-Up

1. $x = 5,\ y = -2$
2. $x = 1,\ y = 4$
3. $x = 8,\ y = -11$

Activity 1: Least and Most Difficult

Least Difficult Cards	Most Difficult Cards
Responses vary.	*Responses vary.*

Responses vary. A, C, and G seem easy since one of the variable solutions is already given. B, E, and H seem the most difficult since there are multiple terms, and the variables are on the same side of the equation in some of the equations.

Activity 2: Solve 'em

A. $x = -14,\ y = 4$

B. $x = 9,\ y = 29$

C. $x = -4,\ y = 6$

D. $x = 4,\ y = -2$

E. $x = 2,\ y = 1$

F. $x = -5,\ y = 10$

G. $x = 50,\ y = 3$

H. $x = -5,\ y = 10$

Activity 3: Thinking About Solutions

Yes

Responses vary.

- The sum of two numbers cannot be equal to both 5 and 7.
- Students may choose to make a graph to show that the lines will never cross.

Lesson Synthesis

1. There are multiple terms and the variables are on the same side of the equation in some of the equations.
2. We can use substitution to help us solve for one variable.

Cool-Down

$x = 7,\ y = 3$

Unit 8.5, Lesson 2: Guess My Rule

Answer Key

Activity 1: Guess My Rule

Rule #1
Possible inputs: **Any number**

Rule: **Add 7 to the input.**

Examples:
Input: **5** → Output: **12**
Input: **10** → Output: **17**

Rule #2
Possible inputs: **Any number**

Rule: **Always output 10.**

Examples:
Input: **84** → Output: **10**
Input: **-3.5** → Output: **10**

Rule #3
Possible inputs: **Single letters (e.g., "A")**

Rule: **Output a name beginning with that letter.**

Examples:
Input: **T** → Output: **T**errance or **T**aylor
Input: **M** → Output: **M**anuel or **M**alik

Rule #4
Possible inputs: **Whole numbers 1 to 9**

Rule: **Output any two-digit number whose tens digit is the input.**

Examples:
Input: **7** → Output: **7**2 (a whole number between 70 and 79)
Input: **1** → Output: **1**9 (a whole number between 10 and 19)

Rules #5 and #6: Students create their own rules.

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Unit 8.5, Lesson 2: Guess My Rule

Answer Key

Activity 2: What Is a Function?

First-draft definition: *Responses vary.* ● A rule is a function where every number or word on the input side goes to exactly one number or word on the output side. ● A function is a rule where, if you know the input, you know what the output is going to be.
Revised definition after Meeting 1: *Responses vary.*
Revised definition after Meeting 2: *Responses vary.*
Class definition: *Responses vary.* ● One definition: A function is a rule that assigns exactly one output to each possible input.

Lesson Synthesis

Responses vary.

- I changed the input in the fourth row from 2 to 4 and the input in the fifth row from 1 to 5 so that each number on the input side is different.

Cool-Down

Table B

Responses vary.

- Table B is a function because for any date (input), there is only one possible astrological sign (output).
- Table A is a not function because each astrological sign (input) has many different outputs.

Unit 8.5, Lesson 7: Feel the Burn

Answer Key

Warm-Up: Making Sense of Representations

1. Approximately 300 calories
2. 252 calories
3. 181 calories

Activity 1: Awards

1. Megan
2. Tirunesh
3. Tirunesh

Lesson Synthesis

Responses vary.

Cool-Down

The area of a square with side length 2.5 inches is 6.25 square inches. The area of a circle with radius 1.5 inches is 2.25π, which is approximately 7.07 square inches. Therefore, the circle is larger.

Unit 7.7 Lesson 12: Surface Area Strategies

Answer Key

Warm-Up

1. 14 faces

   Explanations vary. There are 2 bases and 12 sides. I counted the number of sides by counting the number of edges of the plus sign.

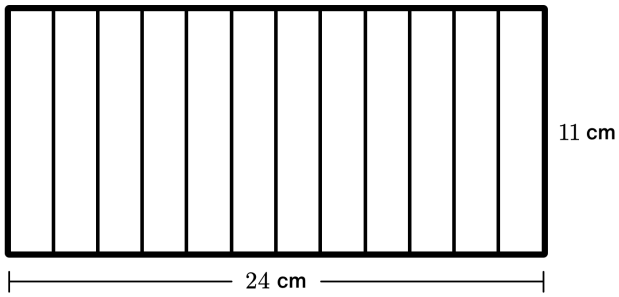
2. 20 square centimeters

Activity 1: Different Strategies

1. *Responses vary.* I agree with all three strategies. The strategies are all different, but each one will allow you to calculate the surface area of the prism.

2. 11 cm by 24 cm

   Explanations vary. The large rectangle is made up of 12 smaller rectangles. Each of the smaller rectangles has a length of 2 cm, so the large rectangle must have a length of $2 \cdot 12 = 24$ cm.



3. 304 square cm

   Calculations vary.

Activity 2: Calculating Surface Area

1. Number of faces: 5

   Surface area: 216 sq. cm

   Calculations vary.

2. Number of faces: 7

   Surface area: 148 sq. cm

   Calculations vary.

3. Number of faces: 7

   Surface area: 278 sq. cm

   Calculations vary.

4. *Responses vary.*

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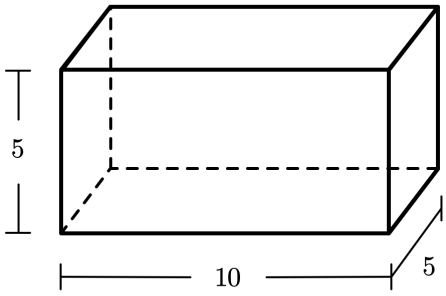
Unit 7.7 Lesson 12: Surface Area Strategies

Answer Key

Are You Ready for More?

Responses vary.



Lesson Synthesis

Responses vary. I would first find the area of the base by cutting the L shape into two rectangles. Then, I would calculate the perimeter of the L shape and multiply it by the height of the prism. That would give me the surface area of all the sides. Finally, I would add the surface area of the sides plus two times the area of the base.

Cool-Down

300 square centimeters

Unit 8.5, Lesson 10: Supplement

Answer Key

Activity 2: Volume Lab

Directions: Use the tools on Screen 6 to help you explore and answer the following questions:

1. *Responses vary.*

2. The volume of the large cone is 2 times that of the small cone.

3. The volume of the large cylinder is 9 times that of the small cylinder.

4. *Responses vary.* One such pair of objects is a sphere and cone where the cone's height and diameter are equal to the sphere's diameter. The sphere has twice the volume of the cone.

5. *Responses vary.*

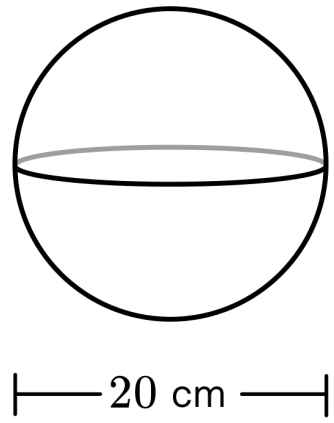
Answer Key

Activity 2: Finding Sphere Dimensions

1. A formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$. Complete the table with the missing dimensions of each sphere. Enter your answers in terms of π.

Diameter (units)	Radius (units)	Sphere Volume (cubic units)
4	2	$\frac{32}{3}\pi$
8	4	$\frac{256}{3}\pi$
6	3	36π
12	6	288π
9	4.5	121.5π

2. A sphere has a diameter of 20 centimeters. Draw the sphere. Then determine its volume.



$V = \frac{4000}{3}\pi$ cubic centimeters

Unit 8.8, Lesson 1: Tilted Squares

Answer Key

Warm-Up

Square A is larger.

Explanations vary. Square A has an area of 9 square units, which I found by multiplying the base length by the height length ($3 \cdot 3$). To find the area of Square B, I divided the figure into four congruent triangles and calculated the area of each triangle $(4[\ \frac{1}{2}\ (2 \cdot 2)])$, which was equal to 8 square units.

Activity 1: Finding the Area of Tilted Squares

1.

Square	Area (square units)
A	20
B	10
C	18
D	25

2. *Responses vary.*

   - First, I drew a larger square around the tilted square. I found the area of the large square, then subtracted the area of each triangle.
   - The area of the titled square can be subdivided into four congruent triangles and a square. I found the sum of the triangles and square areas.
   - I counted the number of unit squares within the tilted square. I counted those partial square units and estimated how many full square units they would equal.

3. *Responses vary.*

4. 5 units. The area of Square D is 25 square units. The side length of the square must be 5 units since $5 \cdot 5$ is equal to 25.

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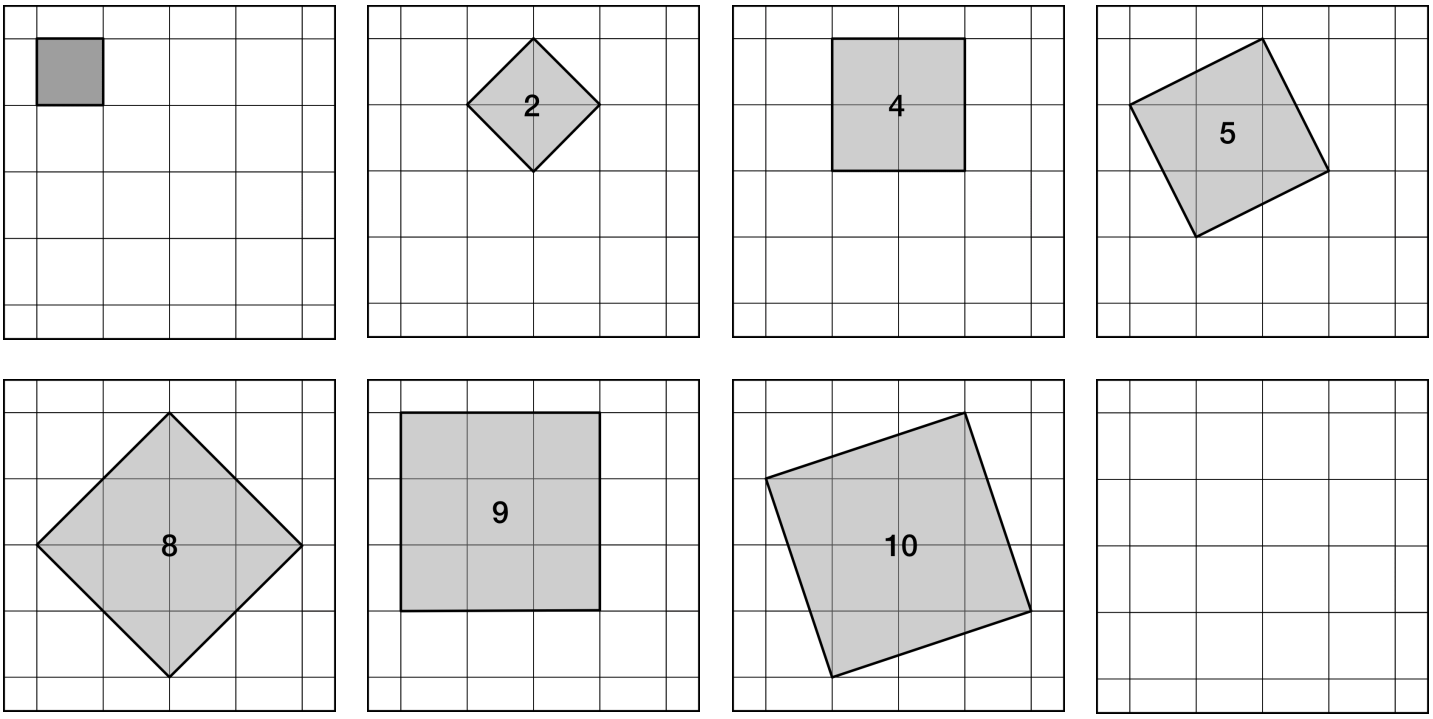
Unit 8.8, Lesson 1: Tilted Squares

Answer Key

Activity 2: Building Squares With Different Areas



1. It is possible to build squares with areas 1, 2, 4, 5, 8, 9, and 10 square units.
2. It is possible to draw a square on a grid if the area is equal to the sum of two perfect squares.

Lesson Synthesis

Responses vary.

- Enclose the tilted square in a square that is not tilted, find the areas of the triangles, and subtract them from the area of the big square.
- Find the number that when you multiply it by itself, or square it, it equals the area.

Cool-Down

1. 100 square units
2. 10 units

Unit 8.8, Lesson 7: Pictures to Prove It

Answer Key

Activity 1: Proving the Pythagorean Theorem

1.

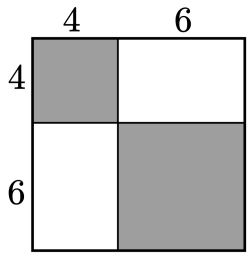


Figure C

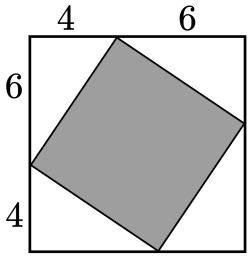


Figure D

1.1 *Responses vary.*

1.2 *Responses vary.*

1.3 *Responses vary.*

2. *Responses vary.* The two unshaded rectangles have the same area as the four unshaded triangles in the other figure, so the shaded areas must also be equal.

2.1 **Both figures:** $(a+b)^2$

2.2 **Both figures:** $2ab$

2.3 **Figure E:** a^2+b^2
Figure F: c^2

2.4 Responses vary. The total of the unshaded areas in Figure E are equal to the shaded areas in Figure F. In Figure E, this can be represented as a^2+b^2, and in Figure F, this can be written as c^2.

Activity 2: Let's Put It to Work

1. $x=\sqrt{29}$

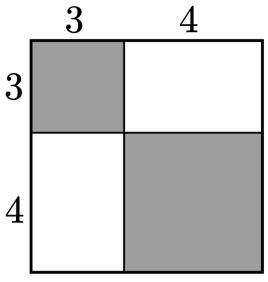
2. $y=\sqrt{8}$

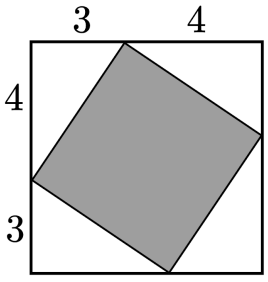
Lesson Synthesis

C. . . . all right triangles.

Explanations vary. Since the four triangles in Figure L each have a vertex in the corner of the large square, they will each contain one $90°$ angle.

Cool-Down





Explanations vary. The areas of the two large squares are the same since they are both 7-by-7 units. The area of the two unshaded rectangles in the left square are the same as the area of the four unshaded triangles in the right square (each pair of triangles makes a rectangle). So the area of the two smaller shaded squares on the left must be the same as the area of the tilted shaded square on the right. This means $3^2+4^2=5^2$.

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Unit 8.8, Lesson 12: Fractions to Decimals

Answer Key

Warm-Up

Rectangle	Fraction Shaded	As a Decimal
A	$\frac{1}{2}$	.5
B	$\frac{1}{4}$	.25
C	$\frac{1}{8}$	.125

Activity 1: Terminating or Repeating

1.

Fraction	As a Decimal	Terminating	Repeating
$\frac{1}{8}$	.125	✓	
$\frac{3}{5}$	.6	✓	
$\frac{341}{100}$	3.41	✓	
$\frac{1}{3}$	0.333 . . .		✓
$\frac{243}{99}$	2.454545 . . .		✓
$\frac{121}{15}$	8.0666 . . .		✓
$\frac{11}{50}$	0.22	✓	

2. **From least to greatest:** 8.06, 8.063, $8.0\overline{63}$, $8.0\overline{6}$

3.

Unit Fraction	Decimal Representation	Terminating	Repeating
$\frac{1}{2}$	0.5	✓	
$\frac{1}{3}$	$0.\overline{3}$		✓
$\frac{1}{4}$	0.25	✓	
$\frac{1}{5}$	0.2	✓	
$\frac{1}{6}$	$0.1\overline{6}$		✓

$\frac{1}{7}$	$0.\overline{142857}$		✓
$\frac{1}{8}$	0.125	✓	
$\frac{1}{9}$	$0.\overline{1}$		✓
$\frac{1}{10}$	0.1	✓	
$\frac{1}{11}$	$0.\overline{09}$		✓
$\frac{1}{12}$	$0.08\overline{3}$		✓

4. *Responses vary.*

   $\frac{1}{12}$, $\frac{1}{20}$, $\frac{1}{40}$, $\frac{1}{100}$, $\frac{1}{125}$, $\frac{1}{800}$

5. *Responses vary.*

   $\frac{1}{13}$, $\frac{1}{17}$, $\frac{1}{30}$, $\frac{1}{41}$, $\frac{1}{101}$

Are You Ready for More?

1.

Fraction	Decimal Representation
$\frac{1}{7}$	$0.\overline{142857}$
$\frac{2}{7}$	$0.\overline{285714}$
$\frac{3}{7}$	$0.\overline{428571}$
$\frac{4}{7}$	$0.\overline{571428}$
$\frac{5}{7}$	$0.\overline{714285}$
$\frac{6}{7}$	$0.\overline{857142}$

2. Each repetend contains the same six digits (142857) in the same order.

3. Each repetend starts at a different digit in the cycle.

4. $0.\overline{428571} + 0.\overline{571428} = 0.\overline{999999} = 0.\overline{9}$

   $\frac{3}{7} + \frac{4}{7} = \frac{7}{7}$

   This suggests that $0.\overline{9} = 1$.

Lesson Synthesis

Responses vary.

Write the denominator in factored form.

If the factors consist only of twos and fives, then the decimal representation will terminate. Otherwise, it will repeat.

If you can write an equivalent fraction with a power of 10 as the denominator, the decimal representation will terminate. If not, it will repeat.

Cool-Down

$\frac{1}{30}$ will repeat because $\frac{1}{30} = \frac{1}{2 \cdot 3 \cdot 5}$, and the denominator includes at least one factor other than 2 or 5.