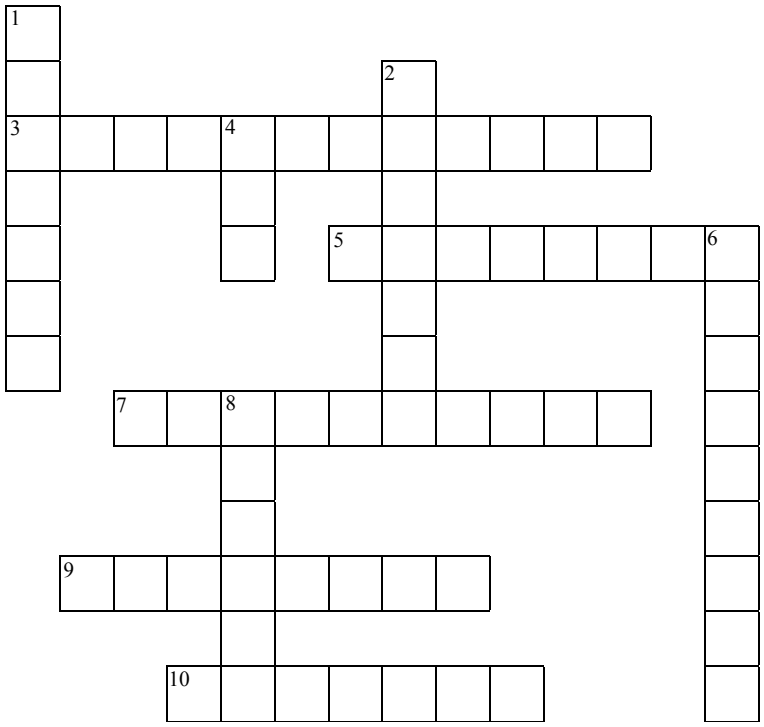
GRADE 7 MATHEMATICS

Blackline Masters

BLM 7.N.1.1: Math Language Crossword Puzzle



Down

1. Numbers that are added together
2. In division, the number by which another number is divided
4. The total when two or more numbers are added together
6. If a number can be divided into an equal whole number of groups with no remainder
8. If a number x is a multiple of another number y, then y is a _____ of x

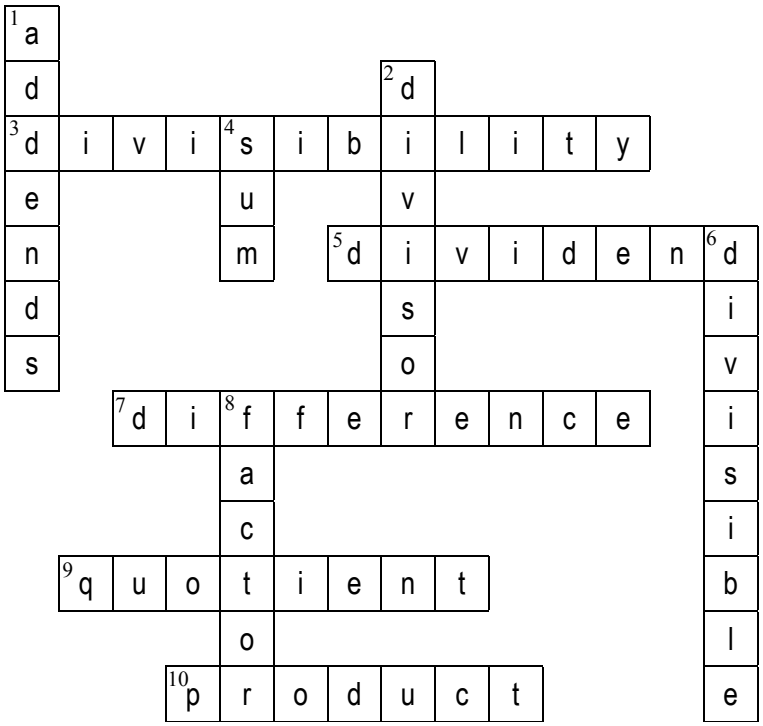
Across

3. The rules used to determine whether or not a number is a multiple of a particular factor
5. In division, the quantity that is to be divided
7. When you subtract numbers, you find the _____
9. The term that describes the result when numbers are divided
10. The total when two or more numbers are multiplied by each other

Word Bank (Optional)

addends
difference
divisible
divisibility
dividend
divisor
factor
product
quotient
sum

BLM 7.N.1.1: Math Language Crossword Puzzle (Answer Key)



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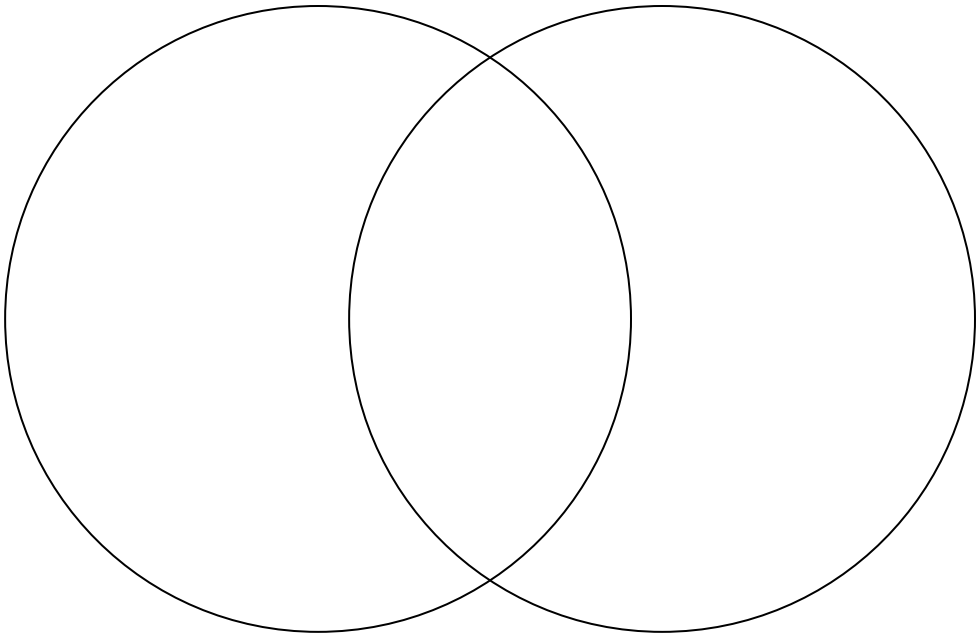
BLM 7.N.1.2: Divisibility Questions

1. Use mental mathematics strategies to find the sum of the digits in the following numbers. Record your thinking.
   a) 7943
   b) 62 847

2. Use mental mathematics strategies to calculate the following. Record your thinking. When you have answered each question, prepare to explain how you know your answer is correct. You may wish to find other strategies that also work.
   a) 126 + 83
   b) 648 + 1055
   c) the difference between 208 and 12
   d) the product of 30 and 40
   e) the product of 62 and 5
   f) the quotient of 2100 divided by 7

3. Use a Venn diagram to compare the multiples of 3 and 4 between the numbers 1 and 40.



(continued)

BLM 7.N.1.2: Divisibility Questions (continued)

4. Use a Carroll diagram to identify factors of 32 and 36 as prime numbers or composite numbers.

	Prime Numbers	Composite Numbers
Factors of 32		
Factors of 36		

5. Calculate the following.
   a) 743×2
   b) $\begin{array}{r} 96 \\ \times\ 15 \\ \hline \end{array}$
   c) 538×7
   d) $648 \div 9$
   e) $8\overline{)732}$

6. Express the following numbers using the stated place values.

   Example:

   3621 stated as hundreds and units is 36 hundreds and 21 units.

   a) 1400 (as hundreds)
   b) 364 (as tens and units)
   c) 45 407 (as thousands, tens, and units)

BLM 7.N.1.3: Applying Divisibility Rules

Number	Is it divisible by 2? How do you know?	Is it divisible by 3? How do you know?	Is it divisible by 4? How do you know?	Is it divisible by 5? How do you know?	Is it divisible by 6? How do you know?	Is it divisible by 8? How do you know?	Is it divisible by 9? How do you know?

BLM 7.N.2.1: Whole and Decimal Number Cards

1. Three hundred forty-five	2. Six hundred eighty-one and two tenths	3. One thousand nine hundred forty-two
4. Two hundred nine and two hundredths	5. Five hundred seventy-one and fifteen hundredths	6. Nine thousand six hundred twenty-seven and eight hundredths
7. Forty-five and two thousandths	8. Fifty-six and fifty-six hundredths	9. Three hundred ninety-five and nine hundred four thousandths

(continued)

BLM 7.N.2.1: Whole and Decimal Number Cards (continued)

10. Two and eight thousandths	11. Seventy-two and sixty-one thousandths	12. Eighty-five thousand four hundred ninety-three and seven tenths
13. Five hundred eighty-two and nine tenths	14. Eighty-seven and four hundredths	15. Nine hundred three thousand five hundred six
16. Ninety-four and nine thousandths	17. Eight hundred thirty and two hundred seven thousandths	18. Twenty-nine and three thousandths

(continued)

BLM 7.N.2.1: Whole and Decimal Number Cards (continued)

19. One hundred seven and forty-eight thousandths	20. Eighty-six and eight hundredths	21. Seven hundred eighty-two and one hundred ninety thousandths
22. Sixty and four hundred thirty thousandths	23. One and five hundred eighty-two thousandths	24. Three hundred three and seven thousandths
25. One hundred and thirty-four hundredths	26. Forty-seven and nine hundred one thousandths	27. Five hundred twenty-seven and nine hundred eight thousandths

(continued)

BLM 7.N.2.1: Whole and Decimal Number Cards (Answer Key) (continued)

1. 345
2. 681.2
3. 1942
4. 209.02
5. 571.15
6. 9627.08
7. 45.002
8. 56.56
9. 395.904
10. 2.008
11. 72.061
12. 85 493.7
13. 582.9
14. 87.04
15. 903 506
16. 94.009
17. 830.207
18. 29.003
19. 107.048
20. 86.08
21. 782.190
22. 60.430
23. 1.582
24. 303.007
25. 100.34
26. 47.901
27. 527.908

BLM 7.N.2.2: Operation Cards

Your number multiplied by 10	Your number multiplied by 100	Two tenths less than your number
Two units less than your number	Two units more than your number	Two tenths more than your number
Two hundredths less than your number	Two hundredths more than your number	Your number divided by 10

(continued)

BLM 7.N.2.2: Operation Cards (continued)

Your number divided by 100	How much would you add to make the units digit in your number zero?	How much would you subtract to make the units digit in your number zero?

BLM 7.N.2.3: Equivalent Percent, Fraction, and Decimal Cards

10%	0.1	0.100
1%	0.01	0.010
5%	0.05	0.050

(continued)

BLM 7.N.2.3: Equivalent Percent, Fraction, and Decimal Cards (continued)

75%	0.75	0.750
50%	0.5	0.500
25%	0.25	0.250

(continued)

BLM 7.N.2.3: Equivalent Percent, Fraction, and Decimal Cards (continued)

4%	0.04	0.040
40%	0.4	0.400
70%	0.7	0.700

(continued)

BLM 7.N.2.3: Equivalent Percent, Fraction, and Decimal Cards (continued)

100%	1.0	1.000
7%	0.07	0.070
$\frac{1}{10}$	$\frac{1}{100}$	$\frac{5}{100} = \frac{1}{20}$

(continued)

BLM 7.N.2.3: Equivalent Percent, Fraction, and Decimal Cards (continued)

$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
$\frac{4}{100} = \frac{1}{25}$	$\frac{4}{10} = \frac{2}{5}$	$\frac{7}{10}$
$\frac{1}{1}$	$\frac{7}{100}$	Wild Card

BLM 7.N.2.4: Order of Operations and Skill-Testing Questions

Kabir visited a recent Airplane Show, where Zodiac Travel sponsored a contest to win a free trip into space. He needed to answer some skill-testing questions before he could claim his prize. Use mental mathematics and the correct order of operations to check whether Kabir's answers are correct. If his answers are not correct, determine where he went wrong, and show how to obtain the correct answer.

1. $12 + 3 \times 2 + 6 \times 3 = 78$

2. $8 + 2 \times (10 - 4) \times 3 = 180$

3. $4 + 36 \times (8 + 2) \div 4 - 11 = 83$

4. $210 + 22 \div 2 + 4 \times 5 = 136$

5. $(416 + 12 \times 3 - 2) \times 2 = 448$

BLM 7.N.2.5: Money Problems

Germaine has been saving her money to buy skateboard equipment. She has a hundred-dollar bill and three twenty-dollar bills. She is shopping today because the store has a special sale. The store is paying the GST and PST.

Germaine has selected a skateboard for $89.99, a helmet for $25.95, kneepads for $9.99, and elbow pads for $10.99.

Use your mental mathematics skills to estimate the total cost of Germaine's selections, and determine whether she has enough money to purchase all the items.

1. What is your estimated cost for Germaine's planned purchases?

2. Do you think she has enough money to purchase the selected items? Explain.

3. Calculate the actual total of her bill.

4. Was your estimated cost over or under the actual cost? Explain.

5. How much more money will Germaine need, or how much change will she receive?

BLM 7.N.2.6: Restaurant Bills and Biking

The Cherry on Top Canteen is a popular lunch spot at school. All menu items are sold with tax included. Three students received the following bills.

Alexa's Bill		**Julio's Bill**		**Jennifer's Bill**	
1 cheese pizza	$2.25	2 cheese pizzas	$4.50	2 taco salads	$3.90
1 taco salad	1.95	1 taco salad	1.95	1 fruit smoothie	2.30
1 apple juice	1.25	1 lemonade	1.30	1 cookie	.50
2 cookies	.85	1 strawberry sundae	1.50		
Total	$6.50	Total	$8.75	Total	$6.70

1. Check whether the bills were totalled correctly, and correct any errors.

2. The principal was next in line, and offered to pay the bills of the three students. He handed the cashier a twenty-dollar bill. Is that enough money? How much change will he receive, or how much more money will he need to pay?

3. Jakob joined a cycling club that meets each Monday. He bought a digital odometer for his bicycle, began a trip log, and set a goal of cycling 50 km per week. The first week, he made the following entries: Monday 17.38 km, Tuesday 0 km, Wednesday 15.83 km, Thursday 0 km, Friday 12.25 km, and Saturday 0 km. Sunday morning he checked his progress. Will he need to cycle on Sunday to meet his goal? If so, how far will he need to go?

BLM 7.N.2.7: Sample Scenarios 1

1. Cassidy began a job delivering flyers. She decided to give 4% of the money she earns to her class's fund-raising project. If she earns $62.00, how much money will she contribute to the project?

2. Drexler took his brother out for pizza to celebrate his birthday. They had a great time, and Drexler wants to leave the server a 15% tip. The bill is $28.90. How much money will he leave for a tip?

3. Miss Cardinal is buying supplies for her 21 students to build birdfeeders. Each feeder requires a 52 cm length of cedar board. She is planning to buy 20% more cedar than required, to compensate for waste and errors. How much cedar will she buy?

4. Kyle plays on the school basketball team. His FGP (field goal percentage—percent of his play shots that make it through the hoop) is 56%. If he takes 30 shots in a game, about how many shots will score points?

Problem	Estimated Solution	Exact Solution
1.		
2.		
3.		
4.		

BLM 7.N.2.8: Sample Scenarios 2

1. Carlo is helping to decorate a hall for a party. His job is to hang lanterns from the ceiling. He needs 0.7 m of wire to hang each lantern. About how many lanterns will he be able to hang with one spool containing 15 m of wire?

2. Mita made an agreement to clear the snow from Mr. Ork's driveway during the month of January for $30.00. During the month, she worked $5\frac{1}{2}$ hours. About how much money did she earn per hour?

3. The cook bought 0.8 kg of oranges for $5.52. What was the approximate cost of the oranges per kg?

4. If a thermos jug holds 3.8 L and a glass holds 0.3 L of liquid, about how many glasses of a drink can be stored in the thermos jug?

Problem	Estimated Solution	Exact Solution
1.		
2.		
3.		
4.		

BLM 7.N.2.9: Sample Scenarios 3

1. Use estimation strategies to determine the placement of the decimal in the approximate answers shown below. (Note: Answers have been rounded.)

   a) $6.3 \times 4.9 \approx 309$

   b) $334 \approx 8.56 \times 3.9$

   c) $79.83 \times 65.7 \approx 52448$

   d) $30898 \approx 95.66 \times 3.23$

2. Estimate the answer to each of the following problems, and place the decimal point in the correct location.

   a) $3.25 \times 5.53 \approx 1797$

   b) $3673 \approx 43.21 \times 0.85$

   c) $386 \approx 1.84 \times 2.1$

   d) $0.65 \times 91 \approx 591$

   e) $14.74 \times 3.6 \approx 530$

Note:
Answers have been rounded. The symbol ≈ is used to show that the two sides of the equation are approximately equal.

3. Sheeba creates displays for a decorating company. She must submit a budget for each display. She plans to paint a feature wall with shimmering textured paint. The wall is 2.6 m × 3.73 m. The price of the paint used for calculating the budget is 2.20/m^2. Show your estimations, and then calculate both the area of the wall and the budget price for the paint.

	Estimate	Calculate
The area of the wall		
The budget cost of the paint		

The budget for the paint on the shimmering textured wall is $ _____ .

BLM 7.N.2.10: Decimal Problems

1. Use estimation strategies to place a decimal point in the correct position for each of the following problems.
   a) $3.5 \div 0.8 \approx 4375$
   b) $3095238 \approx 65 \div 2.1$
   c) $265 \div 0.8 \approx 33125$
   d) $215 \approx 0.86 \div 0.4$
   e) $6125 \approx 4.9 \div 0.8$
   f) $0.216 \div 0.5 \approx 432$

2. Estimate, and then calculate, solutions to the following number expressions.

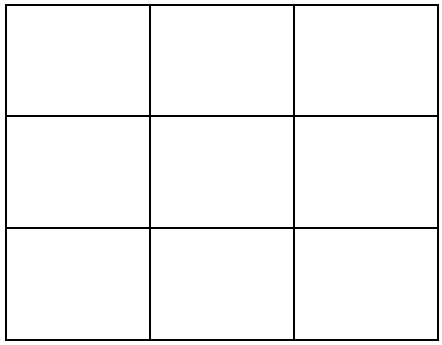
Expression	Estimation	Calculation	Strategy
2.97 ÷ 0 .9 =			
1.50 ÷ 0.1 =			
56.4 ÷ 0.6 =			

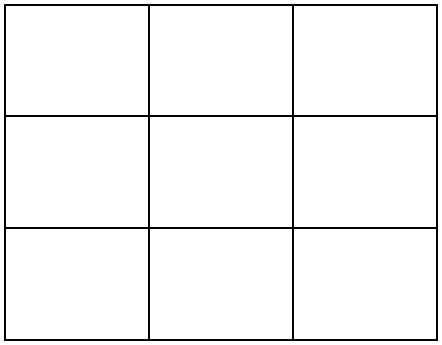
3. Write an equation to represent the following scenario. Solve the problem using the order of operations. List the operations as they appear in this scenario, and use the order of operations to find the change Ravi received.

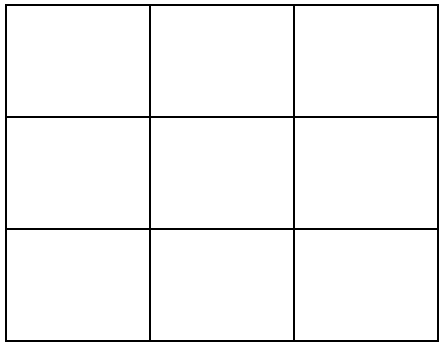
   Scenario:

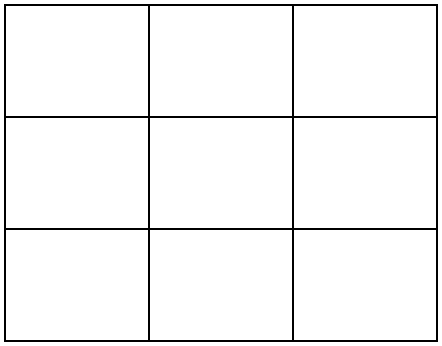
   Ravi was going to the hospital to visit his younger brother. On the way, he stopped to purchase a get-well gift to help entertain his brother during his hospital stay. He used a twenty-dollar bill and a ten-dollar bill to pay for the following items: one sketchpad for $8.95, three graphite drawing pencils for $1.75 each, one art eraser for $1.65, 10 coloured pencils for 65¢ each, and a pencil sharpener for $2.25. The taxes were $2.95.

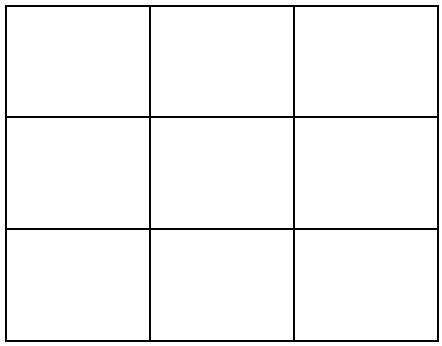
BLM 7.N.3.1A: Tic-Tac-Toe Frames

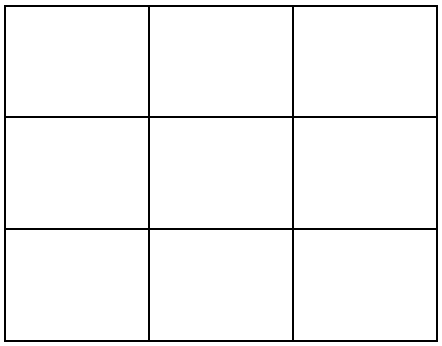


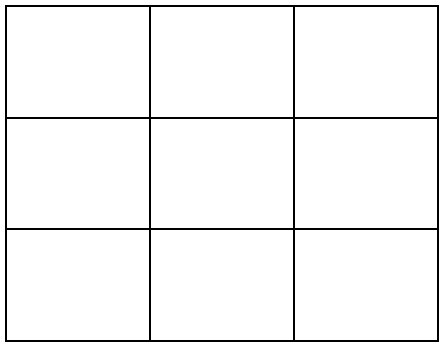


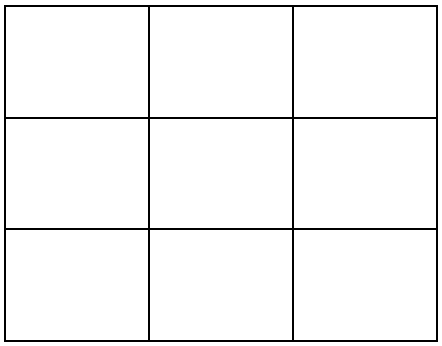




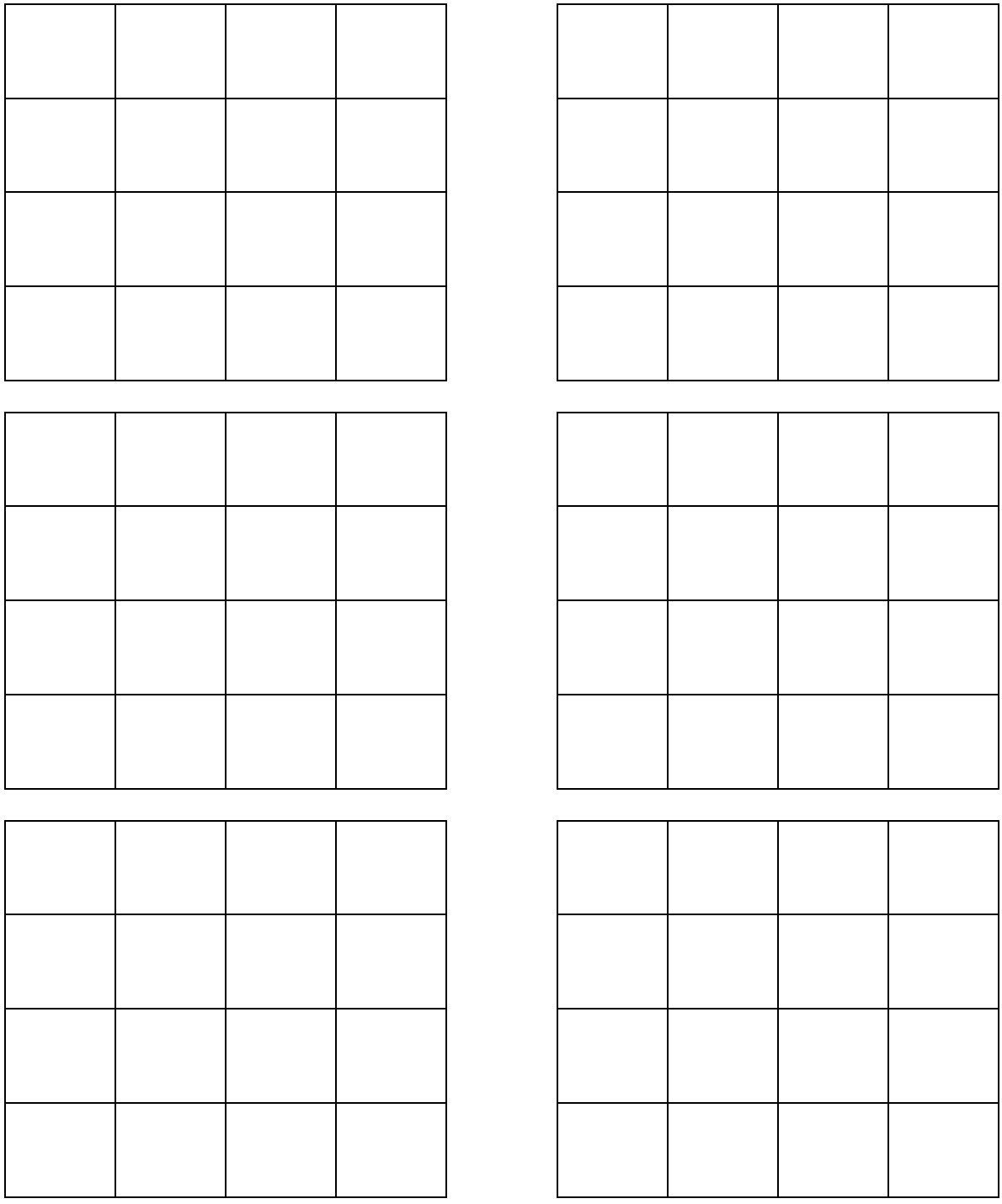








BLM 7.N.3.1B: Tic-Tac-Toe Frames (Medium Challenge)



BLM 7.N.3.1C: Tic-Tac-Toe Frame (Ultimate Challenge)

BLM 7.N.3.2: Equivalent Fraction Challenge

Background Information

The identity number for both multiplication and division is 1, so you may multiply or divide any number by 1 without changing the number's identity.

Equivalent fractions may be created by multiplying or dividing a fraction by any name for 1.

Example:

$$\frac{4}{5}\times\boxed{\frac{3}{3}}=\frac{12}{15} \qquad \left(\text{since } \frac{3}{3} \text{ or } 3 \div 3 = 1\right)$$

How to Play

Choose a partner for this game. To play the game, you need a number cube, two pens of different colours, and game cards to record play. Each player uses a different-coloured pen to record his or her play. Play proceeds as follows:

- **Step 1:** Both you and your partner roll one number cube and together create a proper fraction that will be used as the target fraction for a given round. Use the smaller numeral for the numerator and the larger numeral for the denominator. Record the fraction on your game card as the target fraction. For example, if you roll a 5 and a 2, record $\frac{2}{5}$. The player who rolled the highest numeral may play first.
- **Step 2:** Roll one number cube. Use this number to create a fraction name for 1. Record the number above the equivalent fraction square. For example, if you roll a 2, multiply (or divide, if possible) the fraction $\frac{2}{5}$ by $\frac{2}{2}$ and record the equivalent fraction in the game card.
- **Step 3:** If you can, use division to simplify or reduce the fraction. If not, multiply to create an equivalent fraction. Record your new fraction. If it matches the target fraction name, record your name in the winner's box. If not, play passes to the next player. If you make an error, you lose a turn.

How to Win

- The player who returns the fraction to its original target name wins the round.
- The player who wins the most rounds wins the game.

Sample Game Card

Target Fraction Name	Change Factors and Equivalent Fractions										
	$\frac{2}{2}$	$\frac{3}{3}$	$\frac{6}{6}$								Winner
$\frac{2}{5}$	$\frac{4}{10}$	$\frac{12}{30}$	$\frac{2}{5}$								Player 1

(continued)

BLM 7.N.3.2: Equivalent Fraction Challenge (continued)

Game Cards

Player 1 ____________________ **Player 2**___________________ **Date**_________________

Target Fraction Name	Change Factors and Equivalent Fractions											
												Winner

Target Fraction Name	Change Factors and Equivalent Fractions											
												Winner

Target Fraction Name	Change Factors and Equivalent Fractions											
												Winner

Target Fraction Name	Change Factors and Equivalent Fractions											
												Winner

Target Fraction Name	Change Factors and Equivalent Fractions											
												Winner

Target Fraction Name	Change Factors and Equivalent Fractions											
												Winner

BLM 7.N.3.3: It's Between: Rounding Decimal Numbers

Round to the Nearest Tenth

0.74 is between _____ and _____, but closer to _____.

0.49 is between _____ and _____, but closer to _____.

0.31 is between _____ and _____, but closer to _____.

Round to the Nearest Hundredth

0.561 is between _____ and _____, but closer to _____.

0.917 is between _____ and _____, but closer to _____.

0.848 is between _____ and _____, but closer to _____.

Round to the Nearest Thousandth

0.7538 is between _____ and _____, but closer to _____.

0.1642 is between _____ and _____, but closer to _____.

0.0602 is between _____ and _____, but closer to _____.

BLM 7.N.3.4: Choose Your Question

Point Sheet

Round to the Nearest Tenth	Round to the Nearest Hundredth	Round to the Nearest Thousandth	Express as a Percent	Express as a Percent
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

(continued)

BLM 7.N.3.4: Choose Your Question (continued)

Game Sheet 1

Round to the Nearest Tenth	Round to the Nearest Hundredth	Round to the Nearest Thousandth	Express as a Percent	Express as a Percent
0.29	0.683	0.1479	0.17	0.335
0.348	0.029	0.4005	0.4	$\frac{32}{50}$
0.719	0.003	0.4791	1.00	0.0909
0.0555	0.0901	0. 7098	$\frac{2}{5}$	0.9191
0.0067	0.6071	0.0606	$\frac{1}{8}$	$\frac{3}{8}$

(continued)

BLM 7.N.3.4: Choose Your Question (continued)

Game Sheet 1 Answer Key

Round to the Nearest Tenth	Round to the Nearest Hundredth	Round to the Nearest Thousandth	Express as a Percent	Express as a Percent
0.29 0.3	0.683 0.68	0.1479 0.148	0.17 17%	0.335 34% or 33.5%
0.348 0.3	0.029 0.03	0.4005 0.401	0.4 40%	$\frac{32}{50}$ 64%
0.719 0.7	0.003 0.00	0.4791 0.479	1.00 100%	0.0909 9% or 9.1%
0.0555 0.1	0.0901 0.09	0. 7098 0.710	$\frac{2}{5}$ 40%	0.9191 92% or 91.9%
0.0067 0.0	0.6071 0.61	0.0606 0.061	$\frac{1}{8}$ 12.5% or 13%	$\frac{3}{8}$ 38% or 37.5%

(continued)

BLM 7.N.3.4: Choose Your Question (continued)

Blank Game Sheet 1

Round to the Nearest Tenth	Round to the Nearest Hundredth	Round to the Nearest Thousandth	Express as a Percent	Express as a Percent

(continued)

BLM 7.N.3.4: Choose Your Question (continued)

Game Sheet 2

Express as a Part-to-Whole Ratio	Express as a Decimal	Express a Percent as a Fraction*	Express a Fraction as a Percent	Express as a Percent
▪ 18 tables ▪ 6 have broken legs	25%	80%	$\frac{82}{100}$	0.5734
▪ 40 of the 60 dogs are male	$6\frac{3}{4}$	18%	$\frac{7}{10}$	$\frac{250}{500}$
▪ 30 days in the month ▪ 6 had precipitation	$33\frac{1}{3}$	4%	$\frac{20}{25}$	$\frac{95}{1000}$
▪ 15 students in a class of 60 wear glasses	92.9%	55.5%	$\frac{8}{40}$	▪ 35 customers at the snack bar ▪ 7 return this week
▪ 350 passengers on a plane ▪ 50 are paying regular fare	$8\frac{1}{2}$	12.5%	$\frac{75}{1000}$	▪ 6 broken bones ▪ 240 falls from the tower

* Many answers are possible.

(continued)

BLM 7.N.3.4: Choose Your Question Game (continued)

Game Sheet 2 Answer Key

Express as a Part-to-Whole Ratio	Express as a Decimal	Express a Percent as a Fraction*	Express a Fraction as a Percent	Express as a Percent
▪ 18 tables ▪ 6 have broken legs broken : total 6 : 18 or 1 : 3	25% 0.25	80% $\frac{8}{10}$ or $\frac{4}{5}$	$\frac{82}{100}$ 82%	0.5734 57.34%
▪ 40 of the 60 dogs are male male : all dogs 40 : 60 or 2 : 3	$6\frac{3}{4}$ 6.75	18% $\frac{18}{100}$ or $\frac{9}{50}$	$\frac{7}{10}$ 70%	$\frac{250}{500}$ 50%
▪ 30 days in the month ▪ 6 had precipitation precipitation : total 6 : 30 or 1 : 5	$33\frac{1}{3}$ $33.\overline{3}$	4% $\frac{4}{100}$ or $\frac{1}{25}$	$\frac{20}{25}$ 80%	$\frac{95}{1000}$ 9.5%
▪ 15 students in a class of 60 wear glasses glasses : all students 15 : 60 or 1 : 4	92.9% 0.929	55.5% $\frac{555}{1000}$ or $\frac{111}{200}$	$\frac{8}{40}$ 20%	▪ 35 customers at the snack bar ▪ 7 return this week 20%
▪ 350 passengers on a plane ▪ 50 are paying regular fare regular : all passengers 15 : 350 or 1 : 7	$8\frac{1}{2}$ 8.5	12.5% $\frac{125}{1000}$ or $\frac{1}{8}$	$\frac{75}{1000}$ 7.5%	▪ 6 broken bones ▪ 240 falls from the tower 2.5%

* Many answers are possible. As an extension, ask for several fractions to represent each percentage.

(continued)

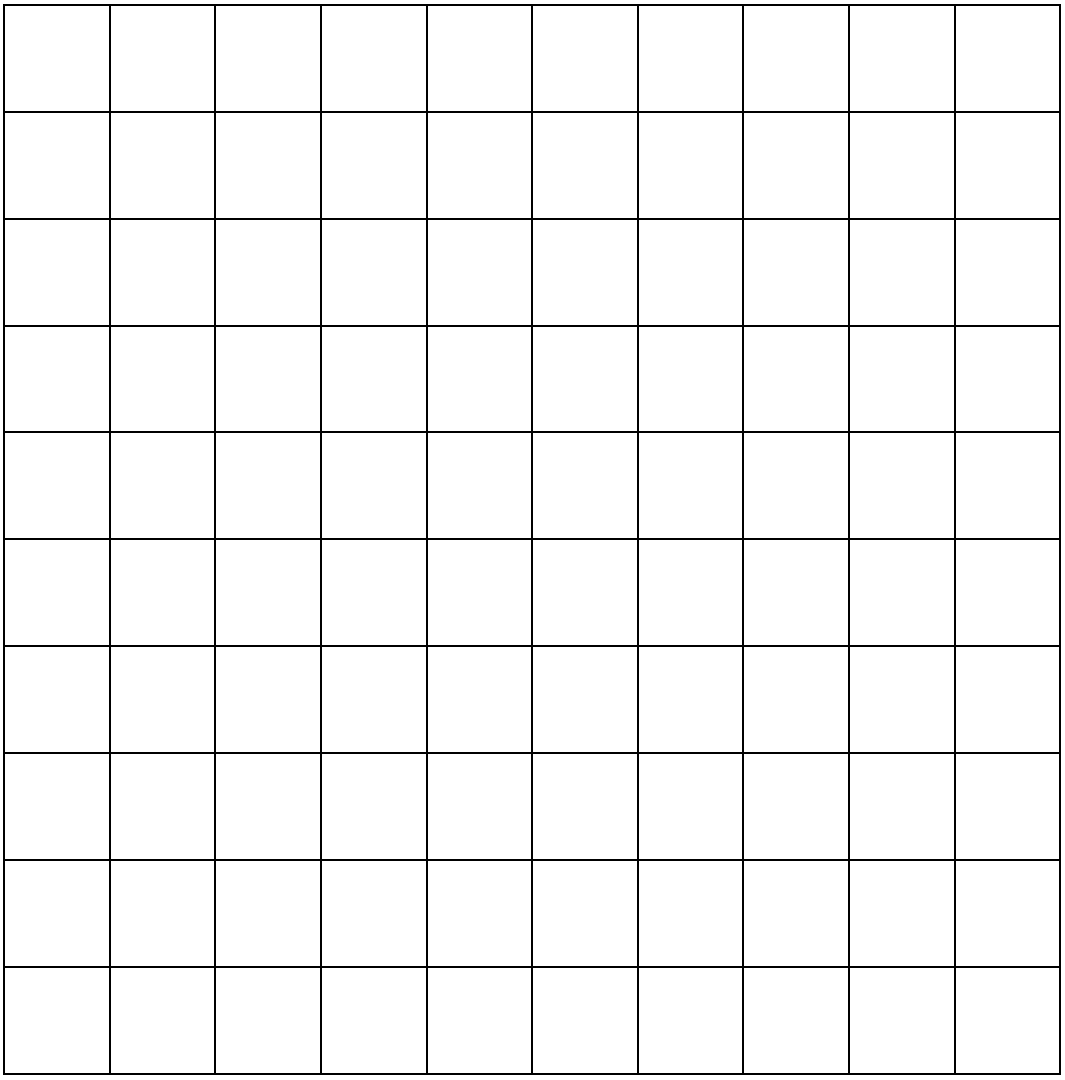
BLM 7.N.3.4: Choose Your Question (continued)

Blank Game Sheet 2

Express as a Part-to-Whole Ratio	Express as a Decimal	Express a Percent as a Fraction*	Express a Fraction as a Percent	Express as a Percent

* Many answers are possible.

BLM 7.N.3.5: Designing to Percent Specifications



Colour	Percent of Design	Percent Expressed as a Decimal	Percent Expressed as a Fraction out of 100	Percent Expressed as a Simplified Fraction
Red				
Blue				
Green				
Yellow				

BLM 7.N.3.6: Determining the Whole, the Part, and the Percent

For each situation given, provide the correct information in the appropriate column. Highlight the section that you are asked to find.

The Situation in a Phrase	The Whole	The Part	The Percent	Percent as a Decimal	Percent as a Fraction	The Solution and My Strategy

BLM 7.N.3.7: Finding the Missing Numbers in the Percent (Scenarios)

Find the Missing Number Scenarios	Method One	Method Two	Answer
Statistically, 40% of dogs have dental problems. There are 200 dogs in an animal shelter. How many of the dogs likely have dental problems?			
Of the 150 people who attended the school carnival, 30 people bought candy apples. What percent of the attendees bought candy apples?			
Justin has a scoring average of 35%. He took 320 shots on goal. How many of his shots were likely goals?			
Mickey took 240 shots at a basketball tournament. Of these shots, 80 scored baskets. What percent of his baskets scored points?			
A pair of skates is on sale for $45.00. The price has been reduced by 50%. What was the original price of the skates?			

(continued)

BLM 7.N.3.7: Finding the Missing Numbers in the Percent (Scenarios) (continued)

Find the Missing Number Scenarios	Method One	Method Two	Answer
Of the candy in a Candy Spots package, 75% are red. If a package has 12 red candies, how many candies were in the package?			
The number 18 is 60% of what number?			
One hundred paving stones have been placed on a patio. At this point, 45% of the patio area has been covered. How many paving stones will cover the entire patio?			
Of the 400 students attending Iluvit Middle School, 25% order a hot lunch. For how many students will the cooks need to prepare a hot lunch?			
Marc and Mae's garage sale made $250.00. If Marc's share of the profit is 60%, how much money will he get?			

BLM 7.N.3.8: Percent Problems

Complete the following percent problems.

1. You and your big brother Tristan go into business delivering flyers. As Tristan is the big brother, he agrees to deliver the flyers to 60% of the houses on the route. There are 198 houses on the route. To how many homes will each of you deliver flyers?

2. Walter and his friends Daniel and Brittany work in Willy's Widget Factory. Last year, the sales of widgets were wonderful, so Willy has decided to reward all his employees with a 4% wage increase. Walter was earning $8.75 per hour, Daniel was earning $9.50 per hour, and Brittany was earning $10.25 per hour. What will their new hourly wages be?

3. Iluvit Middle School is pleased with its state-of-the-art school bus fleet. Each bus carries 40 passengers. This year, the buses transport 260 children to and from school. Next year, there will be a 5% increase in the number of students requiring bus transportation. Will Iluvit Middle School need to acquire another bus? Explain.

4. The landscape designers included 550 trees in the plan for Pleasing Park. Of the 550 trees, 35% are evergreens. How many of the trees are deciduous trees?

5. Delly has a part-time job at her uncle's jewellery kiosk in the mall. He has agreed to pay Delly a commission of 10% of the sales she makes during the hours she works. Last month, she worked 12 hours and sold $995.00 worth of jewellery. Andrea works at the neighbourhood dollar store, and earns $9.00 per hour. She also worked 12 hours last month. Which of the two girls earned more money last month?

6. Mathias was excited about the fantastic deal he got on a new snowboard at the Snow's Your Friend Specialty Ski Shop. The Wolverine Glider he bought was discounted 40% off the manufacturer's suggested retail price of $200.00. You bought the same board at Fair Freddy's Sporting Goods Store for $119.75. Who found the better deal?

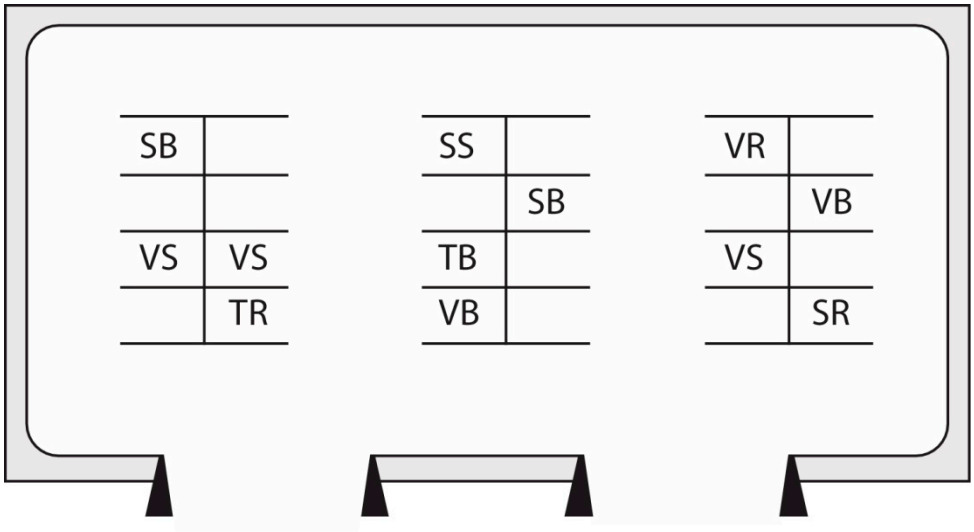
BLM 7.N.4.1: Table for Recording Fractions and Their Decimal Equivalents

Fraction	Decimal Equivalent	Notes

Findings

BLM 7.N.5.1: Interpreting and Recording Different Meanings of Fractions

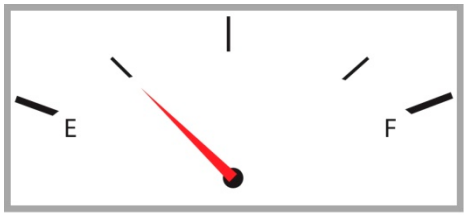
1. The following illustration represents the vehicles parked in a parking lot.



Sedans = S	Blue = B
Trucks = T	Red = R
Vans = V	Silver = S

a) What fraction of the vehicles are trucks? _____
b) What fraction of the vehicles are blue? _____
c) What fraction of the sedans are red? _____
d) What fraction of the parking-lot stalls are empty? _____
e) What fraction of the parking-lot stalls are occupied by silver vans? _____

2. The fuel gauge of this vehicle showed that the gas tank was full at the beginning of the trip. What fraction of the fuel has been used during the trip? _____



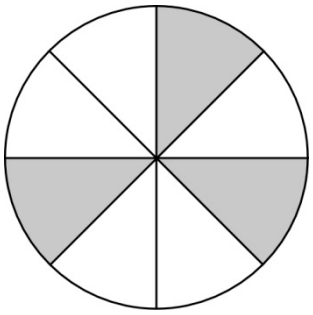
(continued)

BLM 7.N.5.1: Interpreting and Recording Different Meanings of Fractions (continued)

3. Represent the following division statements as fractions.
   a) 9 apples evenly shared with 3 horses _____
   b) 28 days divided into weeks _____
   c) 4 into 8 _____
   d) 5 divided by 10 _____

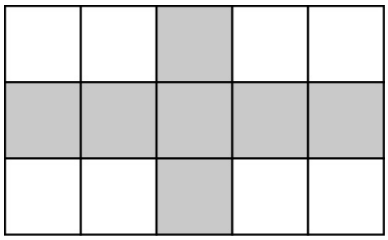
4. What fractions of the following patterns are shaded?

   a)



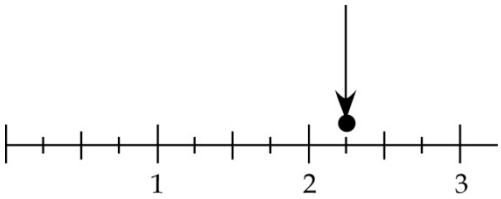
_____

   b)



_____

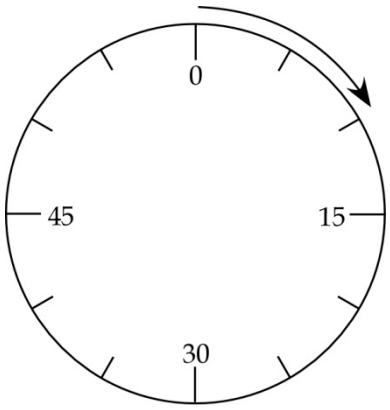
5. Name the measure indicated by the point on this number line. _____



(continued)

BLM 7.N.5.1: Interpreting and Recording Different Meanings of Fractions (continued)

6. To open the following lock, you must begin at 0, turn to the right, pass 30, and stop at 15. State this entire motion as a fraction. _____



7. Roger prepared his ultimate tasty punch for the class meeting.
   He added 6 litres of apple juice and 2 litres of ginger ale.
   Write the ratio of apple juice to the total amount of liquid as a fraction. _____

BLM 7.N.5.2: Improper Fraction and Mixed Number Cards

$\frac{11}{5}$	$2\frac{1}{5}$	$\frac{8}{5}$
$1\frac{3}{5}$	$\frac{19}{5}$	$3\frac{4}{5}$
$\frac{4}{3}$	$1\frac{1}{3}$	$\frac{8}{3}$

(continued)

BLM 7.N.5.2: Improper Fraction and Mixed Number Cards (continued)

$2\frac{2}{3}$	$\frac{12}{3}$	4
$\frac{7}{4}$	$1\frac{3}{4}$	$\frac{10}{4}$
$2\frac{2}{4}=2\frac{1}{2}$	$\frac{5}{4}$	$1\frac{1}{4}$

(continued)

BLM 7.N.5.2: Improper Fraction and Mixed Number Cards (continued)

$\frac{8}{6}$	$1\frac{2}{6} = 1\frac{1}{3}$	$\frac{13}{6}$
$2\frac{1}{6}$	$\frac{16}{6}$	$2\frac{4}{6} = 2\frac{2}{3}$
$\frac{10}{7}$	$1\frac{3}{7}$	$\frac{13}{9}$

(continued)

BLM 7.N.5.2: Improper Fraction and Mixed Number Cards (continued)

$1\frac{4}{9}$	$\frac{21}{9}$	$2\frac{3}{9}=2\frac{1}{3}$
$\frac{12}{10}$	$1\frac{2}{10}=1\frac{1}{5}$	$\frac{15}{10}$
$1\frac{5}{10}=1\frac{1}{2}$	$\frac{13}{10}$	$1\frac{3}{10}$

(continued)

BLM 7.N.5.2: Improper Fraction and Mixed Number Cards (continued)

$\frac{3}{2}$	$1\frac{1}{2}$	$\frac{5}{2}$
$2\frac{1}{2}$	$\frac{7}{2}$	$3\frac{1}{2}$
$\frac{14}{12}$	$1\frac{2}{12}=1\frac{1}{6}$	

BLM 7.N.5.3A: Ace Aviation: Adding Fractions

Ace Aviation surveyed its passengers on several flights and found the following results.

Fraction of Total Passengers	Reason for Air Travel
$\frac{1}{3}$	Business travellers
$\frac{1}{3}$	Tourists and vacationers
$\frac{1}{6}$	Passengers visiting family or friends
$\frac{1}{6}$	Other reason for flying

1. Does this information represent all of Ace Aviation's passengers? Explain.

2. Build a model and/or make a drawing that proves your answer to question 1.

3. Write an addition statement to match your illustration for question 2 and to prove your answer to question 1.

4. What fraction of Ace Aviation's passengers represent tourists and vacationers and passengers visiting family or friends? Build a model, illustrate your model, and write an addition sentence to show your thinking.

BLM 7.N.5.3B: Ace Aviation: Subtracting Fractions

Ace Aviation surveyed its passengers on several flights and found the following results.

Fraction of Total Passengers	Reason for Air Travel
$\frac{1}{3}$	Business travellers
$\frac{1}{3}$	Tourists and vacationers
$\frac{1}{6}$	Passengers visiting family or friends
$\frac{1}{6}$	Other reason for flying

1. One day, all the business travellers were asked to get off the plane. What fraction of the passengers were left on the plane?

2. Build a model to represent removing the business travellers.

3. Illustrate your model.

4. Write a subtraction sentence to match your model.

BLM 7.N.5.4A: Representing Recognizable Fractions and Writing Addition Statements

Complete the following.

1. $\frac{1}{2}+\frac{1}{4}=$ _____

2. $\frac{3}{8}+1\frac{1}{2}=$ _____

3. $1\frac{2}{6}+\frac{4}{12}=$ _____

4. $\frac{1}{3}+\frac{1}{2}=$ _____

5. $\frac{5}{8}+\frac{1}{2}=$ _____

6. $1\frac{1}{4}+\frac{3}{8}=$ _____

7. $\frac{6}{8}+\frac{3}{6}=$ _____

8. $2\frac{3}{4}+\frac{7}{8}=$ _____

9. $1\frac{5}{10}+1\frac{3}{5}=$ _____

10. $\frac{5}{8}+\frac{5}{10}=$ _____

BLM 7.N.5.4B: Representing Recognizable Fractions and Writing Subtraction Statements

Complete the following.

1. $\frac{5}{6}-\frac{1}{2}=$ _____

2. $\frac{3}{4}-\frac{3}{8}=$ _____

3. $1\frac{1}{2}-\frac{3}{4}=$ _____

4. $\frac{2}{3}-\frac{4}{8}=$ _____

5. $2\frac{1}{4}-\frac{3}{6}=$ _____

6. $1\frac{2}{5}-\frac{1}{2}=$ _____

7. $\frac{6}{10}-\frac{2}{5}=$ _____

8. $2\frac{1}{2}-\frac{4}{6}=$ _____

9. $2\frac{1}{4}-1\frac{3}{8}=$ _____

10. $3\frac{2}{3}-2\frac{5}{6}=$ _____

BLM 7.N.5.5: Adding and Subtracting Fractions (Scenarios)

Read the following scenarios and respond to the questions.

1. Arthur baked $1\frac{1}{2}$ dozen cookies. His sister and her friends ate $\frac{3}{4}$ of a dozen of those cookies. How many dozen cookies are left?

2. One and five-eighths pizzas were left after the school party was over. The principal planned to take the leftover pizza home for dinner. While the pizza was sitting in the office, the school receptionist ate one-quarter of a pizza. How much pizza was left for the principal to take home?

3. Everyone in the Bernstein family is quite busy. To get the family ironing done, they set up the ironing board and the iron in the family room, and anyone who has time to watch television irons during the commercials. This week, the father did $\frac{1}{4}$ of the ironing, the oldest son did $\frac{3}{8}$ of the ironing, and the mother finished the rest. What fraction of the ironing did the mother do?

4. Three-sixths of the students in a class have pet dogs. One-third of the students have pet cats. One-twelfth of the students in the class have pet rodents. The rest have no pets. How much more of the class has dogs than cats?

5. Students are making multi-grain bread rolls in their home economics class. The recipe calls for $1\frac{2}{3}$ cups of rye flour, $2\frac{1}{2}$ cups of whole-wheat flour, and $\frac{1}{2}$ cup of flax flour. How many cups of flour are required for the recipe?

BLM 7.N.5.6: Problems Involving Fractions

Complete the following fraction problems.*

1. Mr. Darwin owned $\frac{1}{4}$ of a section of land and inherited $\frac{3}{8}$ of a section when his father retired. How much land does he have now?

2. Luke walks into the convenience store to buy a snack. He has $1\frac{1}{2}$ dollars in one pocket, and $\frac{3}{4}$ of a dollar in another pocket. The drink he wants costs $2\frac{1}{4}$ dollars. Find the difference between the money he has and the money he needs.

3. Andrea studied for three-quarters of an hour and Marcia studied for one-third of an hour. What was the total time the girls studied? Who studied longer, and for how much longer?

4. A farmer has 8 fields of equal size. He plants 4 fields with wheat and 2 fields with barley. Write fractions in two different ways to represent the wheat and barley fields. What fraction of the fields has neither wheat nor barley?

5. Ella ordered three large pizzas for a party. One and one-half pepperoni pizzas and two-thirds of a pineapple pizza were eaten. Was there more than 1 large pizza left over? Explain how to estimate the answer. Show how you solved the problem.

6. Mr. Gazan's gas tank was seven-eighths full when he left home. He used three-fourths of a tank of gas on his errands. What fraction of a tank of gas was left? Show how to estimate the answer, and how to solve the problem.

7. Megan was cooking. Her recipe called for the following liquids: $\frac{1}{2}$ litre oil and $\frac{3}{4}$ litre milk. How much liquid did the recipe call for altogether? Explain how to solve this problem mentally in two different ways.

8. Edwin went on a five-day fishing trip with his uncle. Three-eighths of the fish they caught were perch and one-sixth were pickerel. The rest of their catch was jackfish. Express the amount of jackfish they caught as a fraction.

---

*Source: Manitoba Education and Training. *Grades 5 to 8 Mathematics: A Foundation for Implementation*. Winnipeg, MB: Manitoba Education and Training, 1997. Adapted from pages E–302 to E–309.

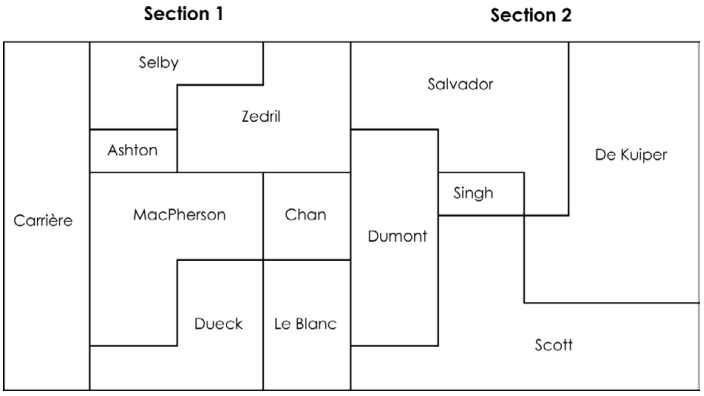
(continued)

BLM 7.N.5.6: Problems Involving Fractions (continued)

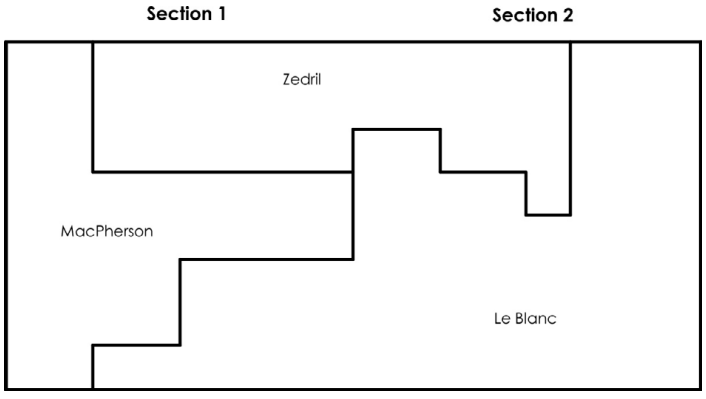
9. The map below shows land ownership in two sections of farmland in the Red River Valley Township (a section is a square measure of land used by pioneers). Last year, there was a flood in the township, and several of the neighbours wished to sell their land and move away. Three of the other landowners bought the land that was for sale, in such a way that the following statements are true:

   - Each landowner can walk all the way around the family farm.
   - One landowner owns the equivalent of one section.
   - Each of the other two landowners owns the equivalent of a half section.
   - Each former owner sold his or her entire property to one person.

   Who might the new owners be, and where would the new ownership lines be? Explain the strategies you used to arrive at your answer.



A possible student response follows.



(continued)

BLM 7.N.5.6: Problems Involving Fractions (continued)

10. The Eye of Horus was used as the fraction system in Ancient Egypt. Parts of the eye were assigned values based on halves. The largest part has a value of $\frac{1}{2}$, the next section has a value of $\frac{1}{2}$ of $\frac{1}{2}$ or $\frac{1}{4}$, and so on to $\frac{1}{64}$. Various fractions could be recorded by combining the symbols. For example, a value of $\frac{5}{8}$ would be represented by combining the areas of the symbol worth $\frac{1}{2}+\frac{1}{4}$. The entire eye represented a value of 1. If you add the value of all the fractional parts, is this correct?

Images of the Eye of Horus fractions are readily available online.

Sample Websites:

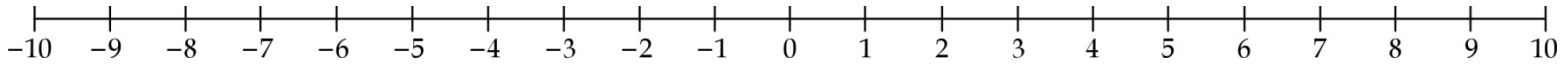
Barile, Margherita. "Eye of Horus Fractions." *MathWorld*. 1999–2012. A Wolfram Web Resource, created by Eric W. Weisstein. <http://mathworld.wolfram.com/EyeofHorusFraction.html>.

GreatScott.com. "Eye of Horus Fractions." *Hieroglyphs*. 1998–2011. <www.greatscott.com/hiero/eye.html>.

Lawrence, Snezana. "Eye of Horus Fractions." *Maths Is Good for You!* <www.mathsisgoodforyou.com/topicsPages/egyptianmaths/horusfractions.htm>.

BLM 7.N.6.1: Centimetre Number Line

Horizontal



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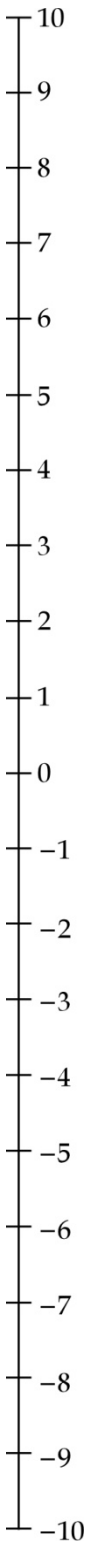
BLM 7.N.6.1: Centimetre Number Line (continued)

Vertical



BLM 7.N.6.2: Integer Football

The Football Field

- The field is 110 yards long.
- The centre line is 55 yards from each goal line.
- There are horizontal lines across the field every 5 yards.
- The 10-yard lines are labelled beginning at each goal line and increasing towards the centre of the field.
- Five 1-yard marks are made between each horizontal line.

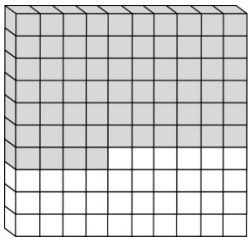
General Football Rules

- One team begins the game with a kickoff from their 35-yard line.
- The receiving team (offence) has three play options to move the ball over the opposite goal line: pass the ball, run the ball, or kick the ball.
- The team has three chances or three *downs* to move the ball 10 yards. If the team members succeed, they begin at down one again.
- If they score a touchdown by moving the ball past the goal line, they earn 6 points. They can then kick the ball through the goalposts for 1 extra point.
- If the team is unlikely to get to the goal line, or to earn a first down by the third down, it may choose to kick a field goal. If the field goal is successful, the team scores 3 points.
- After scoring, the team kicks the ball from their 35-yard line to the opposing team.

Note: Diagrams of Canadian football fields, with dimensions marked, are readily available online.

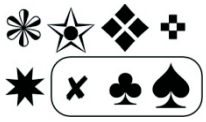
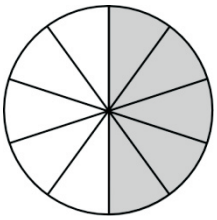
BLM 7.N.7.1: Equivalent Fractions and Decimals

Complete the following chart by filling in the equivalent notations for each quantity.

Varied Illustrations	Fraction Name	Decimal Number
	$\frac{4}{12}$	
		0.625
		1.9
	$\frac{3}{7}$	
	$1\frac{3}{5}$	
		0.55
	$\frac{10}{15}$	
		
		2.7
	$\frac{8}{11}$	

BLM 7.N.7.2: Equivalent Fractions, Decimals, and Percents

Complete the following chart by filling in the missing notations for each quantity.

Varied Illustrations	Fraction Name	Decimal Number	Percent
	$\frac{2}{3}$		
		1.25	
			75%
			
		0.60	
			
		0.25	
			80%
			
	$\frac{7}{9}$		

BLM 7.N.7.3: Comparing Fraction and Decimal Equivalents

Solve the following problems.

1. A bag is filled when it contains 5 marbles. If you have 17 marbles, how many bags can you fill? What fraction of the final bag is filled? Write the number of bags as a mixed number. Explain your answer.

2. Write decimal equivalents for the following fractions.

   $\frac{3}{2}$ $4\frac{2}{5}$ $7\frac{1}{9}$ $\frac{5}{3}$

   _____ _____ _____ _____

3. Julio was converting results from a probability experiment into decimal form so that the results would be easier to compare. Whenever possible, he used mental mathematics strategies to find an equivalent fraction with a denominator of base 10.

   a) Finish Julio's calculations below. (One example is provided.)

   $\frac{3}{5} = \frac{6}{10} = 0.6$

   $\frac{13}{25}$ = _____ = _____

   $\frac{2}{3}$ = _____ = _____

   $\frac{5}{8}$ = _____ = _____

   $\frac{7}{12}$ = _____ = _____

   $\frac{13}{20}$ = _____ = _____

   b) For which examples can you **not** use Julio's mental mathematics method? Explain why not.

4. Sometimes it is easier to compare numbers by converting decimals to fractions.

   a) Use base-10 blocks to show 3.45. Write this number as a fraction in lowest terms.

   b) Represent the following decimals as fractions in lowest terms. Show your thinking.

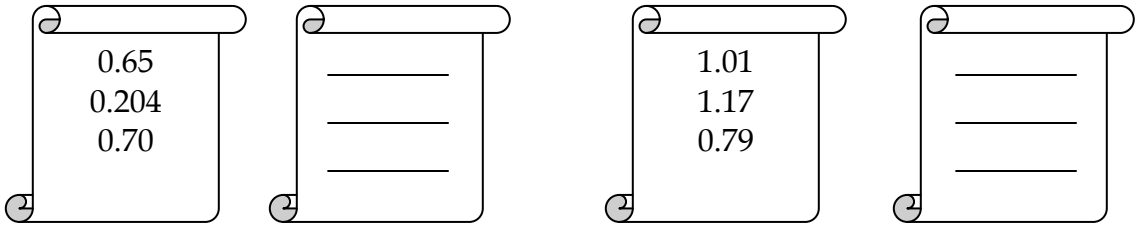
   0.245

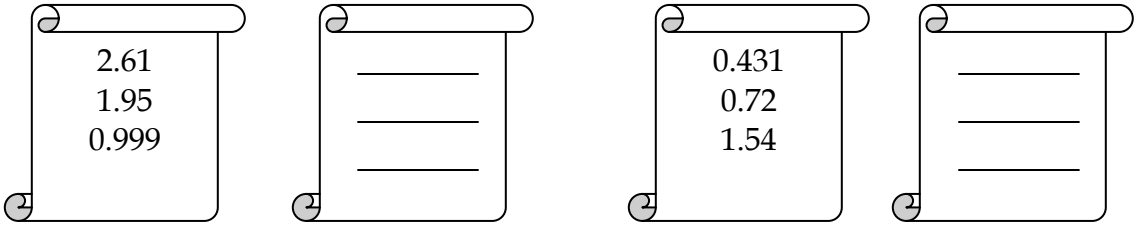
   1.62

5. Keith spent 1.8 h on his math homework. Marie spent $1\frac{3}{4}$ h on the same task. Each claims to have spent more time than the other. Who is right? Explain how you know.

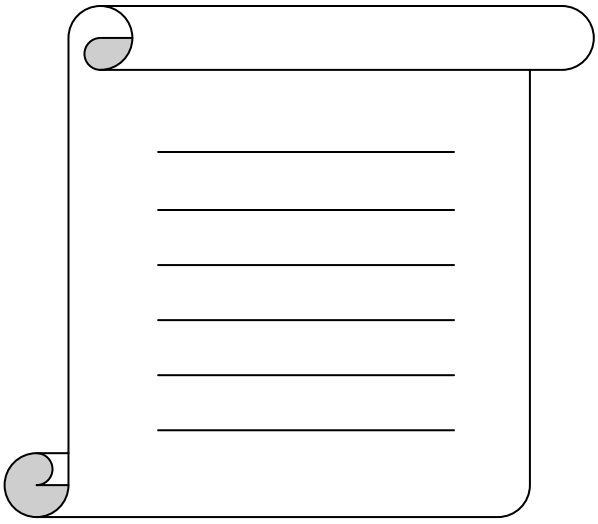
BLM 7.N.7.4: Ordering Decimal Numbers

1. Rewrite the following numbers in **ascending** order.





2. Choose six of the above numbers and write them in **descending** order.



BLM 7.N.7.5: Sequential Fractions and Their Decimal Equivalents

A set of sequential fractions is presented below. Note that the numerators are identical in each row, and the denominators are identical in each column.

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

(continued)

BLM 7.N.7.5: Sequential Fractions and Their Decimal Equivalents (continued)

1. Write the decimal equivalents below each of the fractions. Use your memory, mental mathematics, or a calculator as necessary.

2. Determine whether it is easier to compare the sizes of the fractions using decimal notation or fraction notation.

3. Use a coding system to mark equivalent fractions. Use the decimal equivalents to help you make generalizations about comparing the size of fractions. Record your generalizations.

BLM 7.N.7.6: Relating Numbers to Benchmarks

1. Complete the following columns by placing words, pictures, symbols, proper fractions, improper fractions, mixed numbers, decimals, integers, and percents in the appropriate boxes below.

Less Than One-Half	Equal to One-Half	Greater Than One-Half

2. Draw a number line below. Choose eight of the above numbers and place them on a number line by drawing a point and a label for each number. Explain why you placed the numbers where you did.

BLM 7.N.7.7: Ordering Numbers and Verifying the Order

For this task, you will need the following set of numbers:

$$137\%,\ \frac{6}{11},\ 1\frac{2}{3},\ \frac{4}{5},\ \frac{8}{9},\ 0.85,\ \frac{13}{10},\ 35\%,\ \frac{4}{15},\ 0.25,\ \frac{3}{8}$$

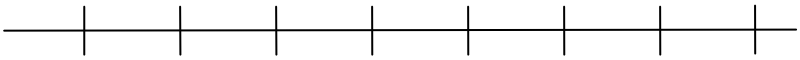
1. Draw either a horizontal or a vertical number line.
2. Place a point to represent each of the above numbers on the line. Label each point.
3. For each number, explain why you chose to place that number there. Use a variety of strategies in your explanations.

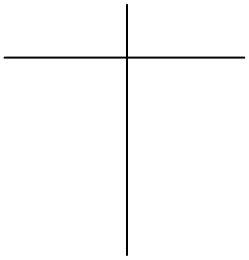
BLM 7.PR.1: Patterns: A Process*

Patterns

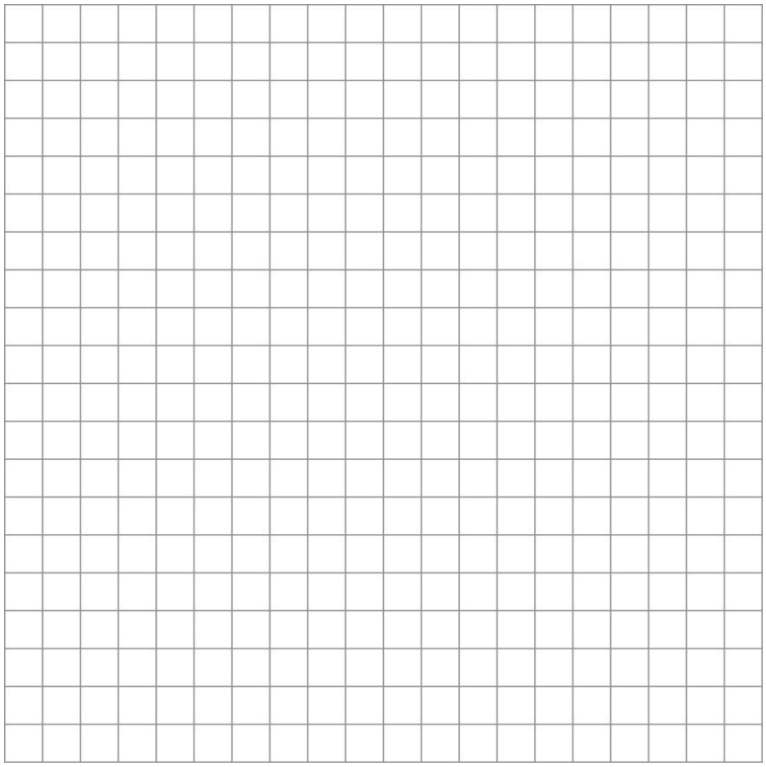
The following process flows from the concrete to the pictorial to the symbolic.

1. Construct and extend a pattern.
2. Draw a concrete/pictorial representation of the pattern.
3. Describe the pattern in your own words (using informal algebraic language).
4. Develop a chart.





5. Make predictions about the pattern.
6. Generate graphs (interpret, interpolate, extrapolate).



7. Write an algebraic equation for the pattern.
8. Predict the *n*th values.

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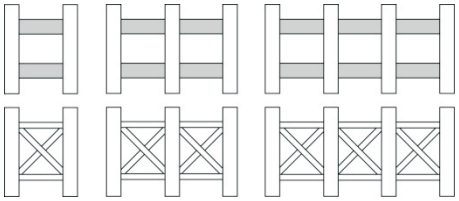
* Source: Manitoba Education. "Middle Years Activities and Games." *Mathematics.* <www.edu.gov.mb.ca/k12/cur/math/my_games/index.html>.

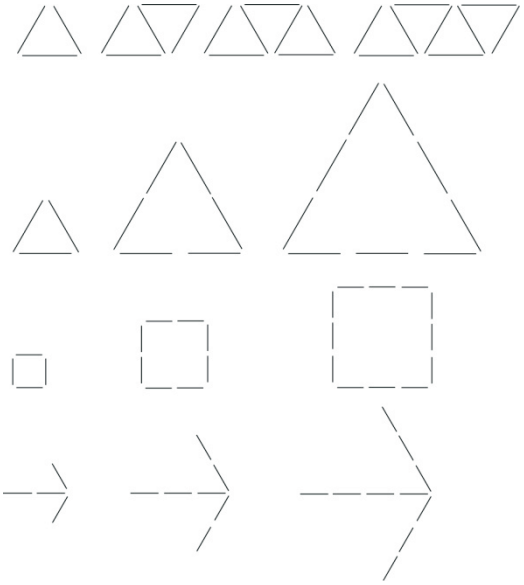
BLM 7.PR.2: Sample Patterns

Note: *x* represents the term number in all examples below.

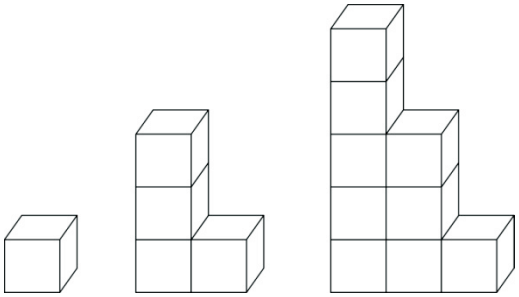
Fence Patterns



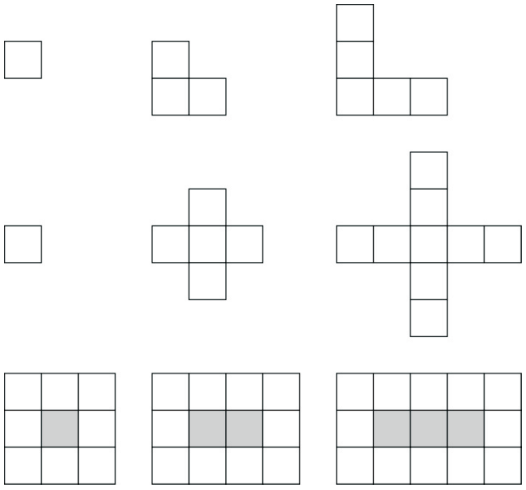
Toothpick Patterns



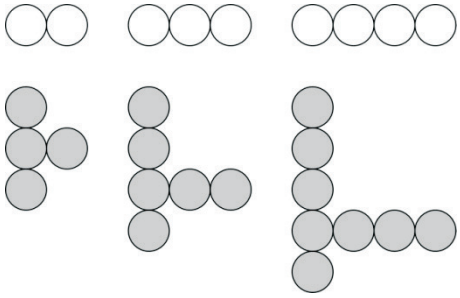
Hotel Patterns



Block Patterns



Dot Patterns



BLM 7.PR.3: Directions for Playing a Relations Game

This relations game can be adapted to any skill level, and can be used at the beginning or end of any class to keep students' relational thinking sharp.

Name of the Game

- Choose a name for the game (e.g., Guess My Number, Inputs and Outputs, Relation Machine).

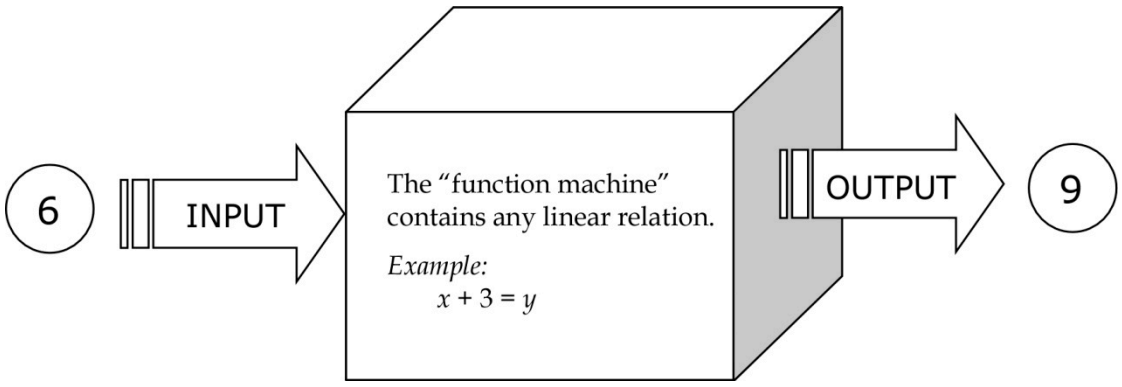
Structure of the Game

- Put a number into the relation and get another number out.
- The relation is available only to the operator and is hidden from everyone else.

Object of the Game

- Examine the inputs and outputs, and determine the explicit relation.

  Example:



Order of Play

- The operator creates a relation, or receives one from the director.
- Students suggest inputs, and the operator plugs the inputs into the x value of the equation and puts out the y value (output).
- Individuals or a class recorder keep track of the inputs and outputs in a table of values. Students look for the explicit relation between the numbers, and, when they determine the relation, they submit it to the operator or director. The person who guesses the relation or equation becomes the new operator and resets the machine with a new relation.

Note: Be aware of equivalent relations when selecting and determining relations and when evaluating options.

BLM 7.PR.4: Understanding Concepts in Patterns and Relations

What does it mean?	Word	Application in a Pattern or Context
Example		

What does it mean?	Word	Application in a Pattern or Context
Example		

What does it mean?	Word	Application in a Pattern or Context
Example		

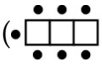
BLM 7.PR.5: Possible Word Pattern Contexts to Match a Relation

Relation			
Variable *x* Could represent the number of . . .	**A Coefficient of *x*** If a coefficient is present, it could symbolize . . .	**A Constant** If a constant is present, it could symbolize . . .	**Variable *y*** Could represent the number of . . .

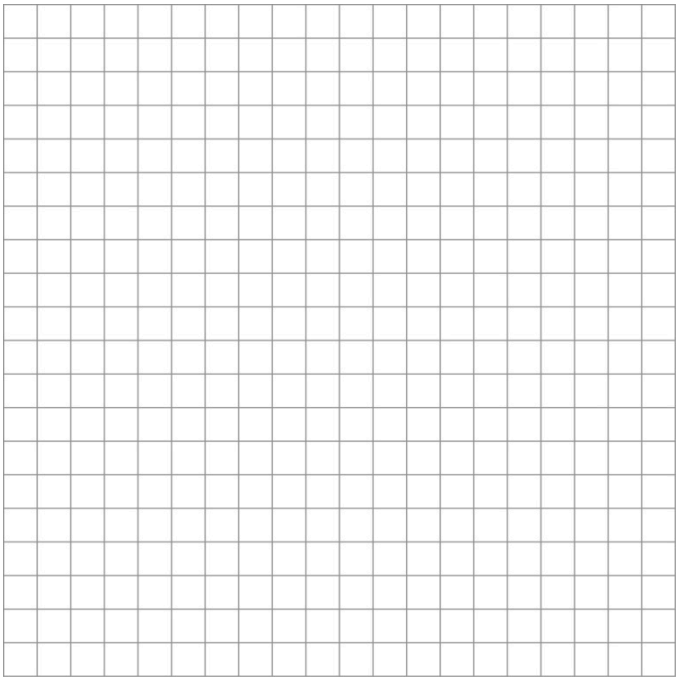
BLM 7.PR.6: Formulating Relations to Match Word Descriptions of Patterns

The Pattern Described in Words				
Variable *x* The quantity that changes in a step-by-step fashion, similar to a term value	**A Coefficient of *x*** Every *x* is multiplied or divided by this number	**A Constant** A quantity always there, or always subtracted	**Variable *y*** The total quantity after performing the operation(s) related to *x*	**Relation** The combined symbolized pieces of the pattern
Pattern in Words *Example:* Our class orders 3 more pizzas than Miss Frizzle's class does. Number of pizzas we order.				
x	N/A or 1	+ 3	y	$y = x + 3$
Pattern in Words There are twice as many eyes in a room as there are mammals. Number of eyes in the room.				
Pattern in Words There are 4 people seated at a table. Each additional table seats 2 more people. Number of people seated.				
Pattern in Words Jose is selling his puppies for $25 each. He paid $15 for advertising. Money he makes.				
Pattern in Words There are 12 wheels on the train engine. Each car has 8 additional wheels. Total number of wheels.				

BLM 7.PR.7: Creating Word Descriptions of Patterns and Matching Relations

Variable Represents the quantity that changes in a step-by-step fashion, similar to a term value	**A Coefficient of *x*** Every *x* is multiplied or divided by this number	**A Constant** A quantity always there, or always removed	**Variable** Represents the total quantity after performing the operation(s) related to *x*	**Relation** The combined symbolized pieces of the pattern
Pattern in Words *Example:* The number of chairs around one table () is 4, around 2 tables pushed together () is 6, and around 3 tables pushed together () is 8.				
t = # of tables	2	+ 2	c – # of chairs	$c = 2t + 2$
Pattern in Words				
Pattern in Words				
Pattern in Words				
Pattern in Words				

BLM 7.PR.8: Template for Creating and Solving Problems Using Information from a Graph



1. Identify a story context.
2. Become specific about the story and write a title for the graph.
3. Label the x- and y-axes.
4. Describe the graph.
5. Identify the recursive relationship. _____
6. Identify the explicit relation. _____
7. List questions that could be answered by using the graph as a source of information. State the answers.

Questions	Answers

BLM 7.PR.9: Associating Clue Words with Operations and Expressions

Operations and Clue Words	Example of How the Clue Words May Appear in a Problem Context	A Symbolic Expression or an Equation
Addition		
Subtraction		
Multiplication		
Division		
Equals		

(continued)

BLM 7.PR.9: Associating Clue Words with Operations and Expressions (Answer Key)

Operations and Clue Words	Example of How the Clue Words May Appear in a Problem Context	A Symbolic Expression or an Equation
Addition		
sum	find the sum of x and y	$x + y$
total	the total of a number and 2 is	$n + 2$
greater than	2 greater than a number	$n + 2$
increases by	a number increases by 2	$n + 2$
more than	2 more than a number	$n + 2$
and	2 and a number	$2 + n$
plus	a number plus 2	$n + 2$
Subtraction		
difference	the difference between a number and 2	$n - 2$
minus	a number minus 2	$n - 2$
less than	4 less than a number	$n - 4$
decreases by	a number decreases by 6	$n - 6$
fewer than	7 fewer than a number	$n - 7$
from	6 from a number	$n - 6$
minus	8 minus a number	$8 - n$
take away	4 take away a number	$4 - n$
Multiplication		
product	the product of 3 and a number	$3n$
double, triple, quadruple, etc.	a number tripled	$3n$
twice	twice a number	$2n$
at	buy a number at \$1.50 each	$(1.50)n$ or $n \cdot 1.50$
of	one-half of a number	$\frac{1}{2}n$
times	7 times a number	$7n$
Division		
quotient	the quotient of a number and 5	$\frac{n}{5}$
half, third, quarter, etc.	half of a number	$\frac{n}{2}$
per, shared between	35 km per hour	35/h
goes into	a number goes into 20	$\frac{20}{n}$
Equals is the same as gives, results in, will be, is equivalent to		

BLM 7.PR.10: Solving Single-Variable One-Step Equations

1. Solve the following equations. Explain what you thought or did to obtain each solution.

   a) $\frac{36}{b} = 9$

   b) $x - 3 = 17$

   c) $83 + 12 = t$

   d) $3z = 60$

   e) $\frac{k}{9} = 2$

   f) $n - 16 = 11$

   g) $y + 22 = 34$

   h) $4p = 100$

   i) $25 - j = 19$

BLM 7.PR.11: Writing Expressions and Solving Equations That Match Word Descriptions

1. Write each statement as an expression.

   a) A number increased by 24

   b) The quotient of a number and 6

   c) The difference between 27 and a number

   d) 54 take away a number

   e) The product of a number and 9

2. Write each statement as an equation and solve for the unknown.

   a) A number increased by 6 totals 21.

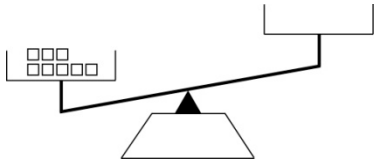
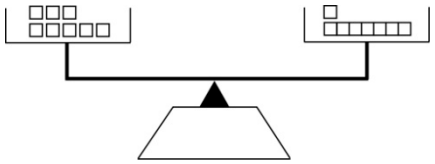
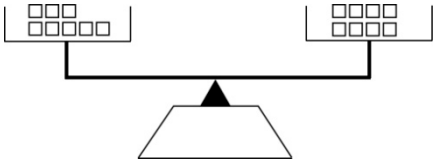
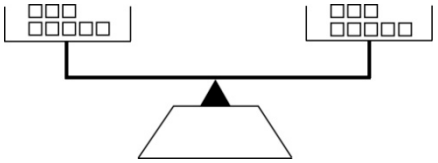
   b) 8 fewer than a number will leave 2.

   c) The product of 4, and a number less 1 is equivalent to 28.

   d) A number split into 3 equal portions equals 10.

   e) 7 more than double a number is 15.

BLM 7.PR.12A: Representing Equivalent Expressions on a Balance Scale (Sample)

Concrete Action	Pictorial Representation	Symbolic Representation
Step One One student places a quantity of blocks on one pan of the balance, counting them out loud. *Place 8 blocks on one pan and count to 8 while placing them.*		**8**
Step Two Another student balances the scale by placing an equal, but different, representation of the quantity on the other pan, stating the quantities. *Rebalance the scale.* *Place 7 joined blocks and 1 single block on the other pan. Say 8 equals 7 plus 1.*		**8 = 7 + 1**
Step Three Another student empties the second pan and rebalances the scale with a different, but equal, combination of blocks. *Rebalance the scale.* *Place 4 joined and 4 joined blocks on the other pan. Say 8 equals 4 plus 4.*		**8 = 4 + 4**
Step Four Another student empties the second pan again and rebalances the scale with a different, but equal, combination of blocks. *Rebalance the scale.* *Place 3 joined and 5 joined blocks on the other pan. Say 8 equals 3 plus 5.*		**8 = 3 + 5**

Equations representing equivalent expressions

7 + 1 = 4 + 4 **4 + 4 = 3 + 5** **7 + 1 = 3 + 5**

7 + 1 = 1 + 7 **3 + 5 = 5 + 3**

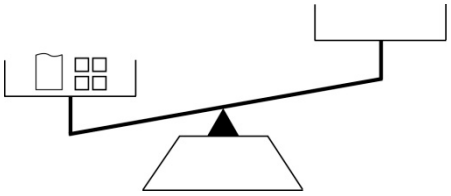
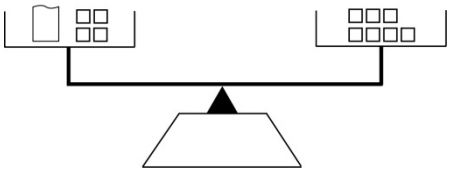
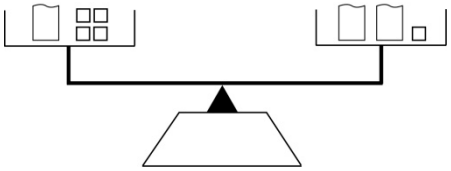
OR

8 = 1 + 7 = 7 + 1 = 4 + 4 = 3 + 5 = 5 + 3

BLM 7.PR.12B: Representing Equivalent Expressions on a Balance Scale (Template)

Concrete Action	Pictorial Representation	Symbolic Representation
Step One One student places a quantity of blocks on one pan of the balance, counting them out loud.		
Step Two Another student balances the scale by placing an equal, but different, representation of the quantity on the other pan, stating the quantities.		
Step Three Another student empties the second pan and rebalances the scale with a different, but equal, combination of blocks.		
Step Four Another student empties the second pan again, and rebalances the scale with a different, but equal, combination of blocks.		
Equations representing equivalent expressions		

BLM 7.PR.12C: Representing Equivalent Expressions on a Balance Scale Using Variables for Unknowns (Sample)

Concrete Action	Pictorial Representation	Symbolic Representation
Step One One student conceals the same quantity of blocks in one or more bags. The student places the bags and some blocks on one pan of the balance, counting them out loud ($b + 4$).	tipped scale with 1 bag and four blocks 	$b + 4$
Step Two Another student balances the scale by counting a quantity of blocks and placing them on the other pan, until it balances.	1 bag and 4 blocks balanced by 7 blocks 	$b + 4 = 7$
Step Three Another student who has determined how many blocks are in the bag can rearrange the quantity on the second pan by concealing the same number of blocks in each of a different number of bags, and leaving the remaining blocks separate. The scale will balance with 2 bags and 1 single block.	1 bag and 4 cubes balance 2 bags and 1 cube 	$b + 4 = 2b + 1$
Step Four If other students can rearrange the blocks in a different way, they demonstrate this. If not, they can tell how many blocks are in a bag, and explain how they know.		$b = 3$

BLM 7.PR.12D: Representing Equivalent Expressions on a Balance Scale Using Variables for Unknowns (Template)

Concrete Action	Pictorial Representation	Symbolic Representation
Step One Conceal the same quantity of blocks in one or more bags. Place the bag and some blocks on one pan of the balance, counting them out loud.		
Step Two Balance the scale by counting a quantity of blocks and placing them on the other pan, until it balances.		
Step Three Rearrange the quantity on the second pan by concealing the same number of blocks in each of a different number of bags, and leaving the remaining blocks separate.		
Step Four Rearrange the blocks in a different way, or tell how many blocks are in a bag. Explain how you know.		

BLM 7.PR.12E: Representing Equivalent Expressions (Template)

Concrete Action	Pictorial Representation	Symbolic Representation
Step One		
Step Two		
Step Three		
Step Four		
Equations representing equivalent expressions		

BLM 7.PR.13: Evaluating Expressions, Given a Value for the Variable

1. Substitute a value for a variable:

   Evaluate the following expressions if $n = 5$ and $v = 2$.

   a) $6n =$ _____

   b) $3 + v =$ _____

   c) $4(n + 2) =$ _____

   d) $10v =$ _____

   e) $n + 23 =$ _____

   f) $7v + 8 =$ _____

   g) $\frac{25}{n} =$ _____

   h) $35 - 2v =$ _____

   i) $6n - \frac{12}{2} =$ _____

BLM 7.PR.14A: Solving Linear Equations: Pictorial and Symbolic Representations

The Original Concrete Representation	The Original Linear Equation

The Solution	Verification of the Solution

Steps to Solve the Equation		
Pictorial Representation	**Description of Steps**	**Symbolic Representation**

Strategy: The Steps to Follow

BLM 7.PR.14B: Solving Linear Equations with Constants: Applying the Preservation of Equality

Solve each of the following equations by isolating the variable. Include a pictorial or symbolic representation of the steps. Verify your solution.

1. $68 + c = 139$

Pictorial Diagram	Symbolic Steps
Solution: In the equation $68 + c = 139$ $c =$	Verification

2. $t - 24 = 87$

Pictorial Diagram	Symbolic Steps
Solution: In the equation	Verification

BLM 7.PR.14C: Solving Linear Equations with Numerical Coefficients: Applying the Preservation of Equality

Solve each of the following equations by isolating the variable. Include a pictorial or symbolic representation of the steps. Verify your solution.

1. $7n = 91$

Pictorial Diagram	Symbolic Steps
Solution: In the equation $7n = 91$ $n =$	Verification

2. $14q = 42$

Pictorial Diagram	Symbolic Steps
Solution: In the equation	Verification

BLM 7.PR.14D: Solving Linear Equations with Constants and Numerical Coefficients: Applying the Preservation of Equality

Solve each of the following equations by isolating the variable. Include a pictorial or symbolic representation of the steps. Verify your solution.

1. $4x + 7 = 51$

Pictorial Diagram	Symbolic Steps
Solution: In the equation $4x + 7 = 51$ $x =$	Verification

2. $3x + 17 = 53$

Pictorial Diagram	Symbolic Steps
Solution: In the equation	Verification

BLM 7.PR.15: Problems to Represent with Linear Equations and with Concrete Materials

1. Myra keeps her pencils well organized. She keeps all the same brands together. She has a total of 23 pencils. An equal number of pencils are in 2 boxes and 7 are loose. How many pencils are in each box?	2. Georges received $38 for babysitting his neighbour's children one afternoon. He babysat for 3 hours and received a $5 bonus. What was his wage per hour?	3. Kingston's cousin is 24 years old. He is 2 years older than twice Kingston's age. How old is Kingston?
4. I have 14 collector pins from events I attended at the stadium. Together, my friend and I have 19 pins. How many pins does my friend have?	5. There are 23 students in our class. Of the 23 students, 9 walk or get rides to school and the rest come by bus. How many students in the class come to school by bus?	6. Evi brought 22 pencils to school and gave them all away. She gave 6 to school staff and 2 to each of her girlfriends. To how many girlfriends did she give pencils?
7. There were 18 cookies in a package. Aaron ate some of them. His friend Jaabir ate twice as many. There are 3 cookies left in the package. How many cookies did Aaron eat?	8. A shed is 2 metres tall. The tree beside it is 18 metres tall. How many times as tall as the shed is the tree?	9. A cat sleeps an average of 20 hours a day. The cat sleeps 4 hours more than twice as long as Allison sleeps. How many hours does Allison sleep in a day?

(continued)

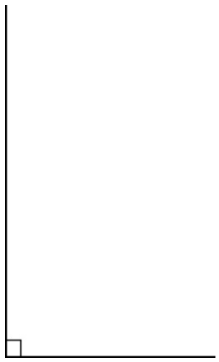
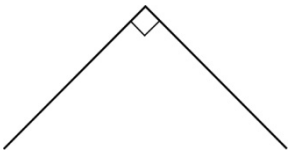
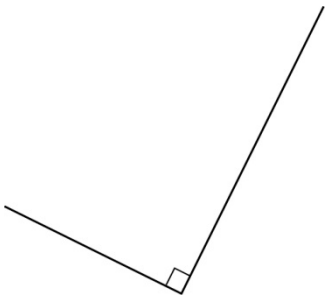
BLM 7.PR.15: Problems to Represent with Linear Equations and with Concrete Materials (continued)

10. I have $6. My brother has 3 times as much money as my sister. Together, the three of us have $18. How much money does my sister have?	11. I'm planning on saving money to go to the community fair. Prices are $5 for admission and $4 per ride. I'm not going to spend any money on food or souvenirs. If I save $25, how many rides can I go on?	12. A group of boys in the lunchroom are playing number games. Mati doubled his number and added 7 more. The total was 17. What was Mati's number?
13. Anna scored 85% on her math test. Sara scored 6% higher than Anna. What percent did Sara score?	14. Kristoff went into the mall with $24. When he left the mall, he had $6. He spent his money on 3 items that each cost the same amount of money. How much did each item cost?	15. You paid $10 for admission to the concert this weekend. Snacks were sold for $2 each. If you spent a total of $16, how many snacks did you buy?
16. Shane was watching animals catch fish. A pelican scooped up 21 fish. The pelican caught 3 times as many fish as the bear did. How many fish did the bear catch?	17. Madison likes to make up number riddles. She is thinking of a number, and 16 is 4 more than 3 times the number she is thinking of. What number is Madison thinking of?	18. In a basketball game, Andre scored 13 points. This was 5 more than double the points he scored in the last game. How many points did he score in the last game?

BLM 7.PR.15: Problems to Represent with Linear Equations and with Concrete Materials (Answer Key)

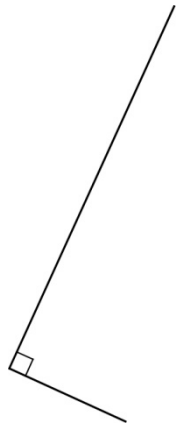
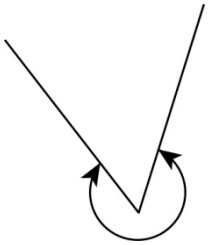
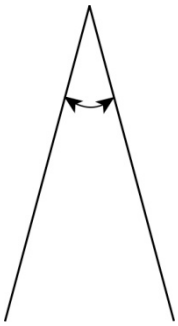
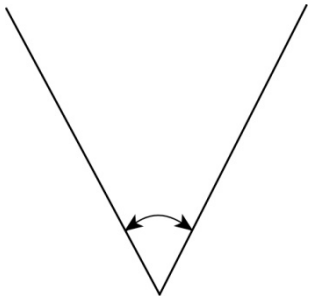
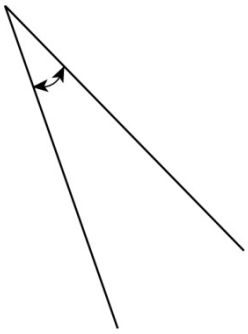
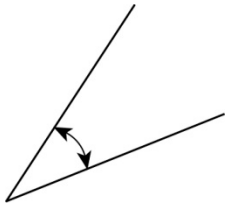
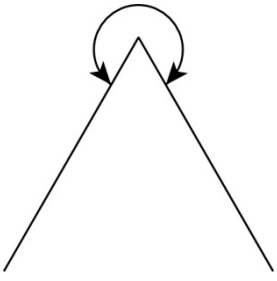
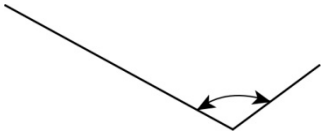
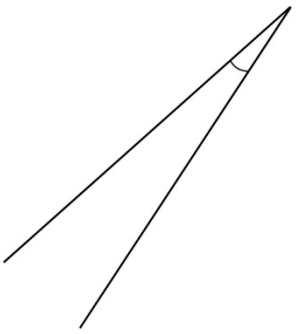
1.	$2b + 7 = 23$	$b = 8$
2.	$3w + 5 = 38$	$w = 11$
3.	$2k + 2 = 24$	$k = 11$
4.	$14 + f = 19$	$f = 5$
5.	$9 + b = 23$	$b = 14$
6.	$2f + 6 = 22$	$f = 8$
7.	$3a + 3 = 18$	$a = 5$
8.	$2s = 18$	$s = 9$
9.	$2a + 4 = 20$	$a = 8$
10.	$4s + 6 = 18$	$s = 3$
11.	$4x + 5 = 25$	$x = 5$
12.	$2x + 7 = 17$	$x = 5$
13.	$85 + 6 = s$	$s = 91$
14.	$3x + 6 = 24$	$x = 6$
15.	$2x + 10 = 16$	$x = 3$
16.	$3x = 21$	$x = 7$
17.	$3n + 4 = 16$	$n = 4$
18.	$2p + 5 = 13$	$p = 4$

BLM 7.SS.1.1: Assorted Angle Cards

ACUTE ANGLES	OBTUSE ANGLES	STRAIGHT ANGLES
REFLEX ANGLES	RIGHT ANGLES	
		

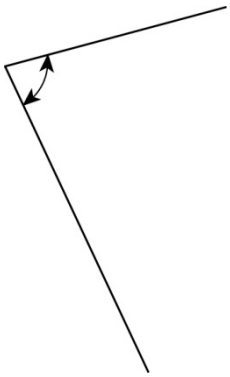
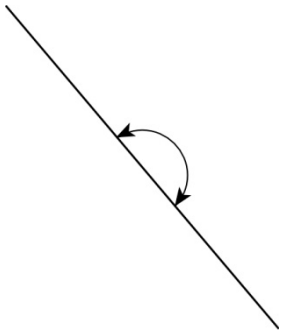
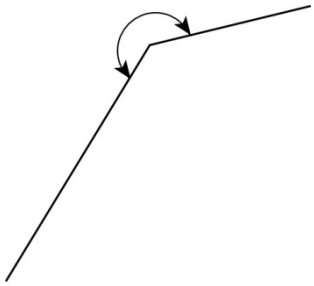
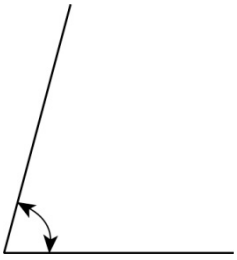
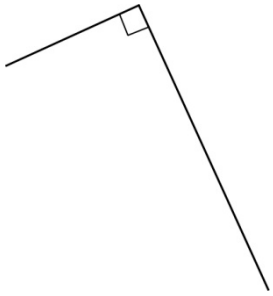
(continued)

BLM 7.SS.1.1: Assorted Angle Cards (continued)

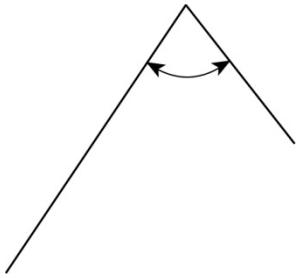
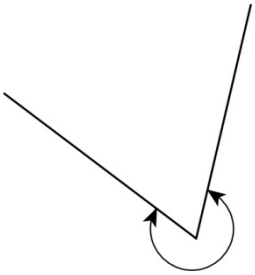
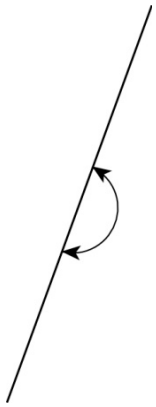
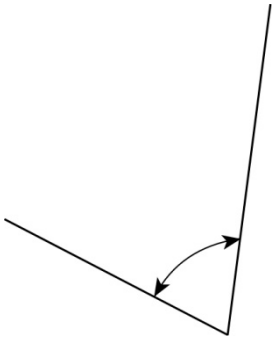
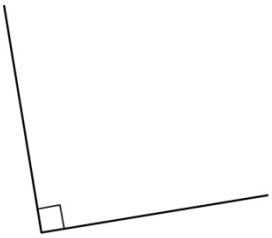
(continued)

BLM 7.SS.1.1: Assorted Angle Cards (continued)

(continued)

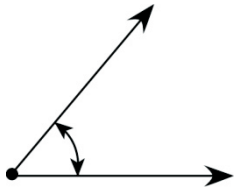
BLM 7.SS.1.1: Assorted Angle Cards (continued)

BLM 7.SS.1.2: Angle Classifications, Angle Estimations and Measures, and Perimeter

1. For each angle below, identify the angle classification, estimate the angle measure, and measure each angle.

a)

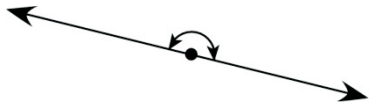


Angle classification _____

Estimate of angle measure _____

Measure of the angle _____

b)

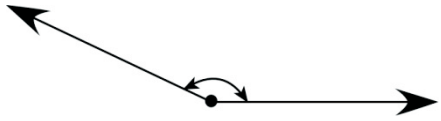


Angle classification _____

Estimate of angle measure _____

Measure of the angle _____

c)

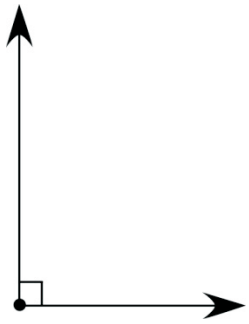


Angle classification _____

Estimate of angle measure _____

Measure of the angle _____

d)

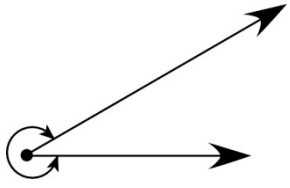


Angle classification _____

Estimate of angle measure _____

Measure of the angle _____

e)



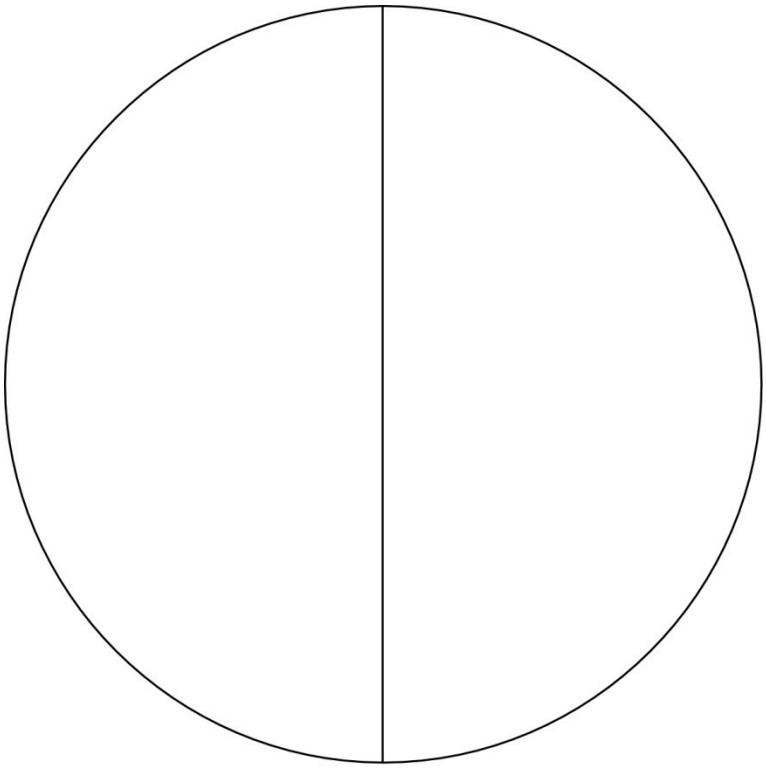
Angle classification _____

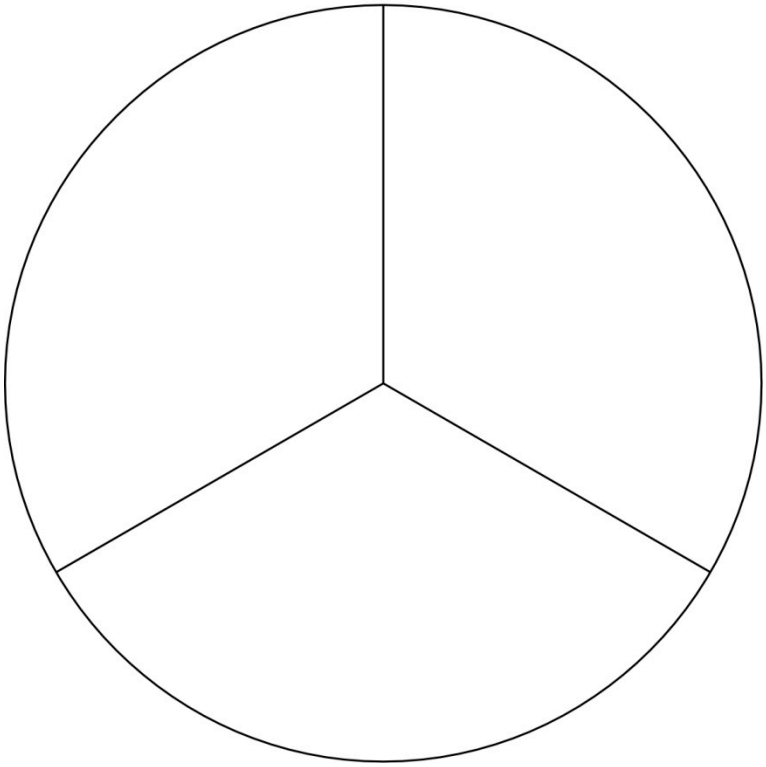
Estimate of angle measure _____

Measure of the angle _____

2. Explain what a perimeter is, and how to measure it. Use two examples.

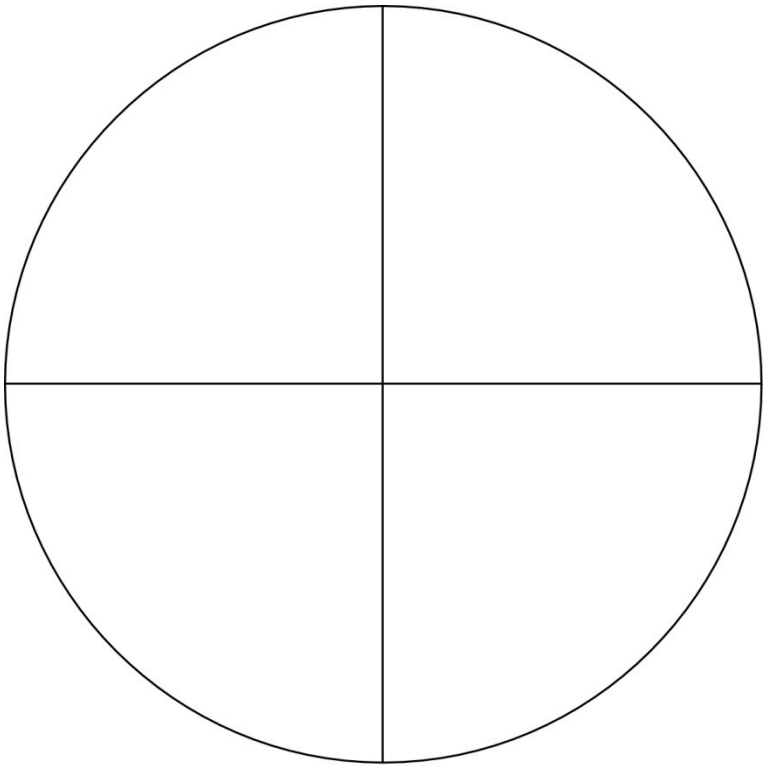
BLM 7.SS.1.3: Cut-outs for Angles of Different Measures

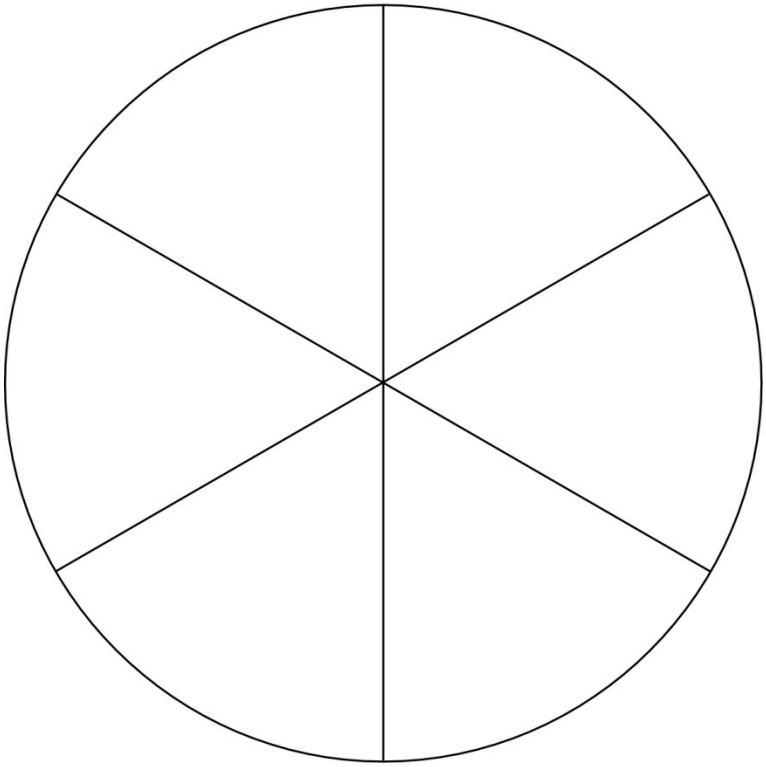




(continued)

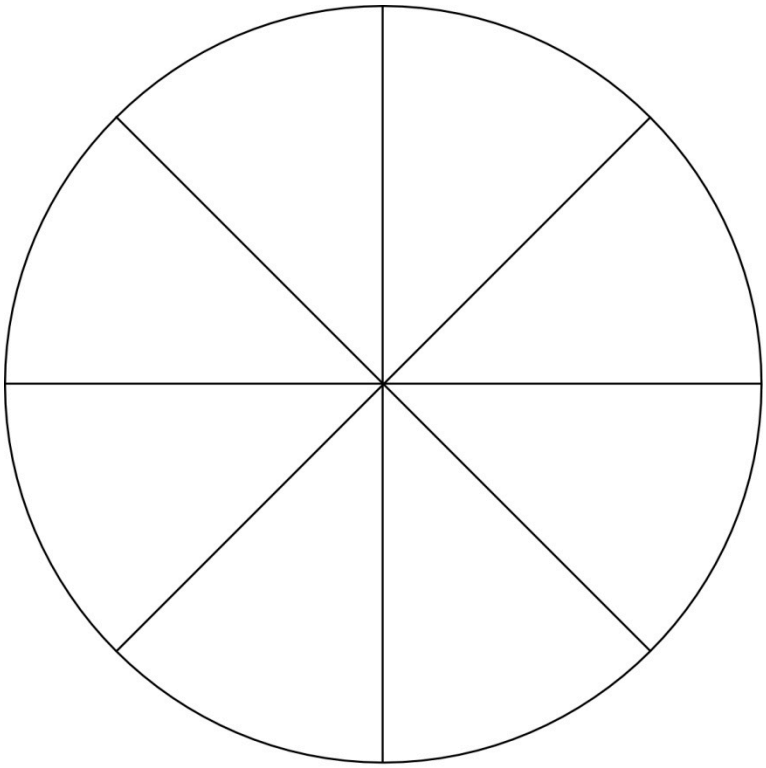
BLM 7.SS.1.3: Cut-outs for Angles of Different Measures (continued)

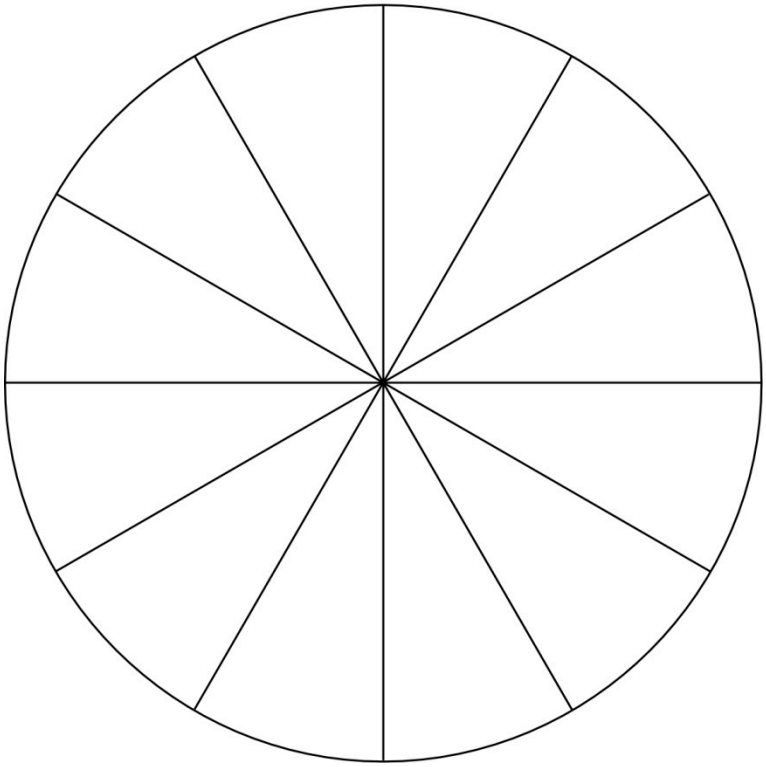




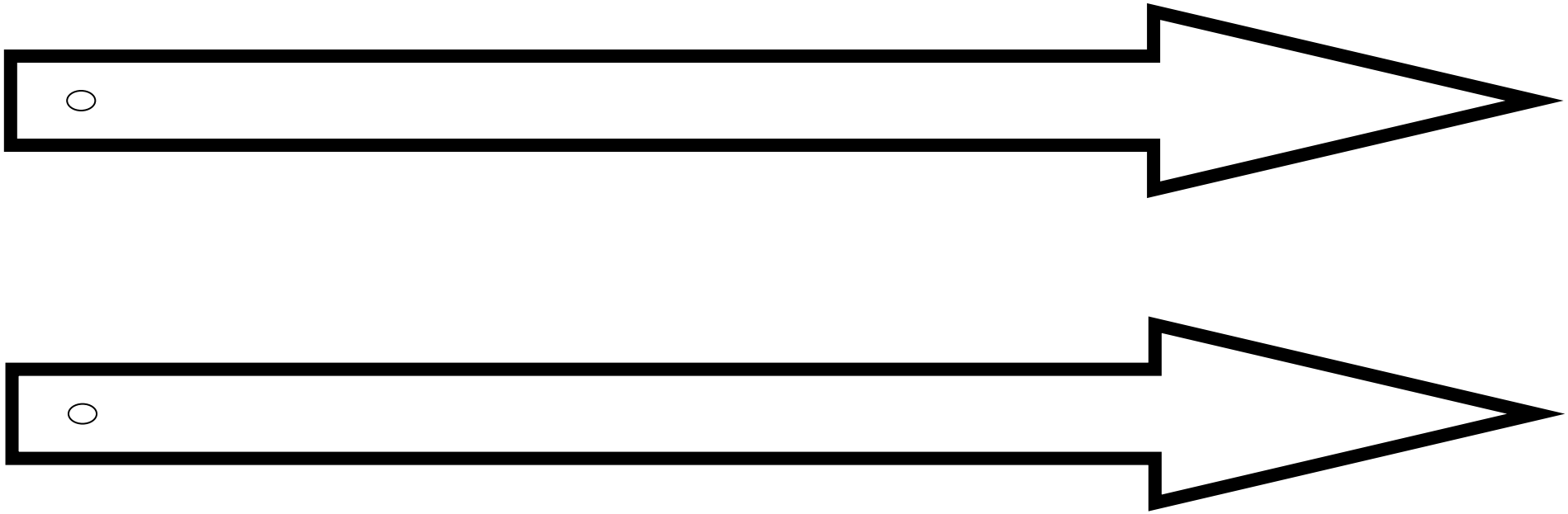
(continued)

BLM 7.SS.1.3: Cut-outs for Angles of Different Measures (continued)





BLM 7.SS.1.4: Hinge Templates for Making Angles

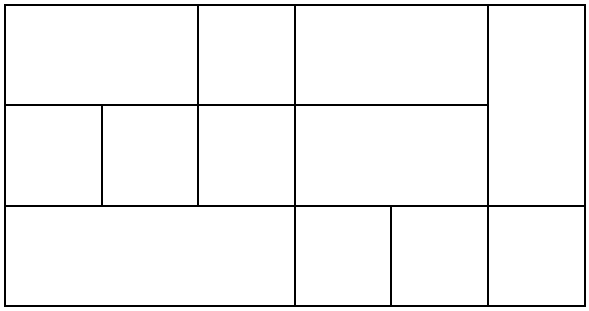


BLM 7.SS.1.5: A Table to Compare Measures of Circles

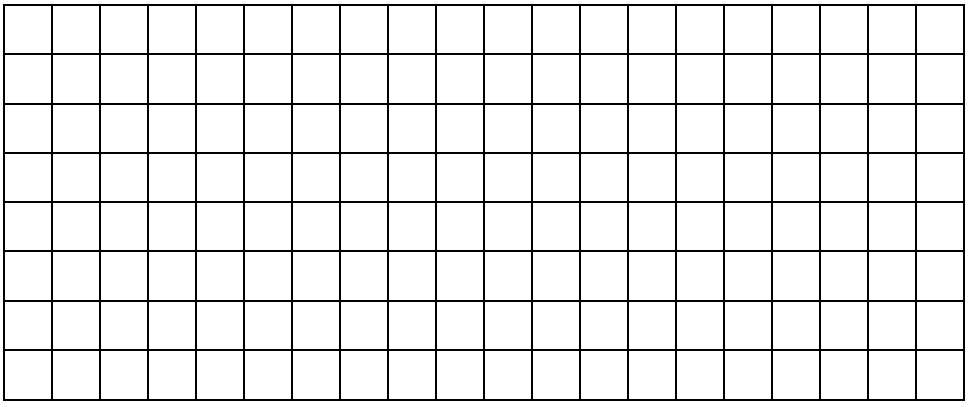
Object	Radius	Diameter	Circumference	Calculate $\frac{C}{d}$

BLM 7.SS.2.1: The Area of Rectangles (Assessing Prior Knowledge)

1. Find the area of this rectangle and record it using square units.

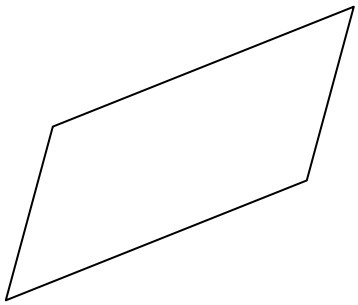


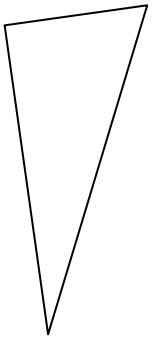
2. Draw two different rectangles with the same area. Record the dimensions and area of each rectangle.



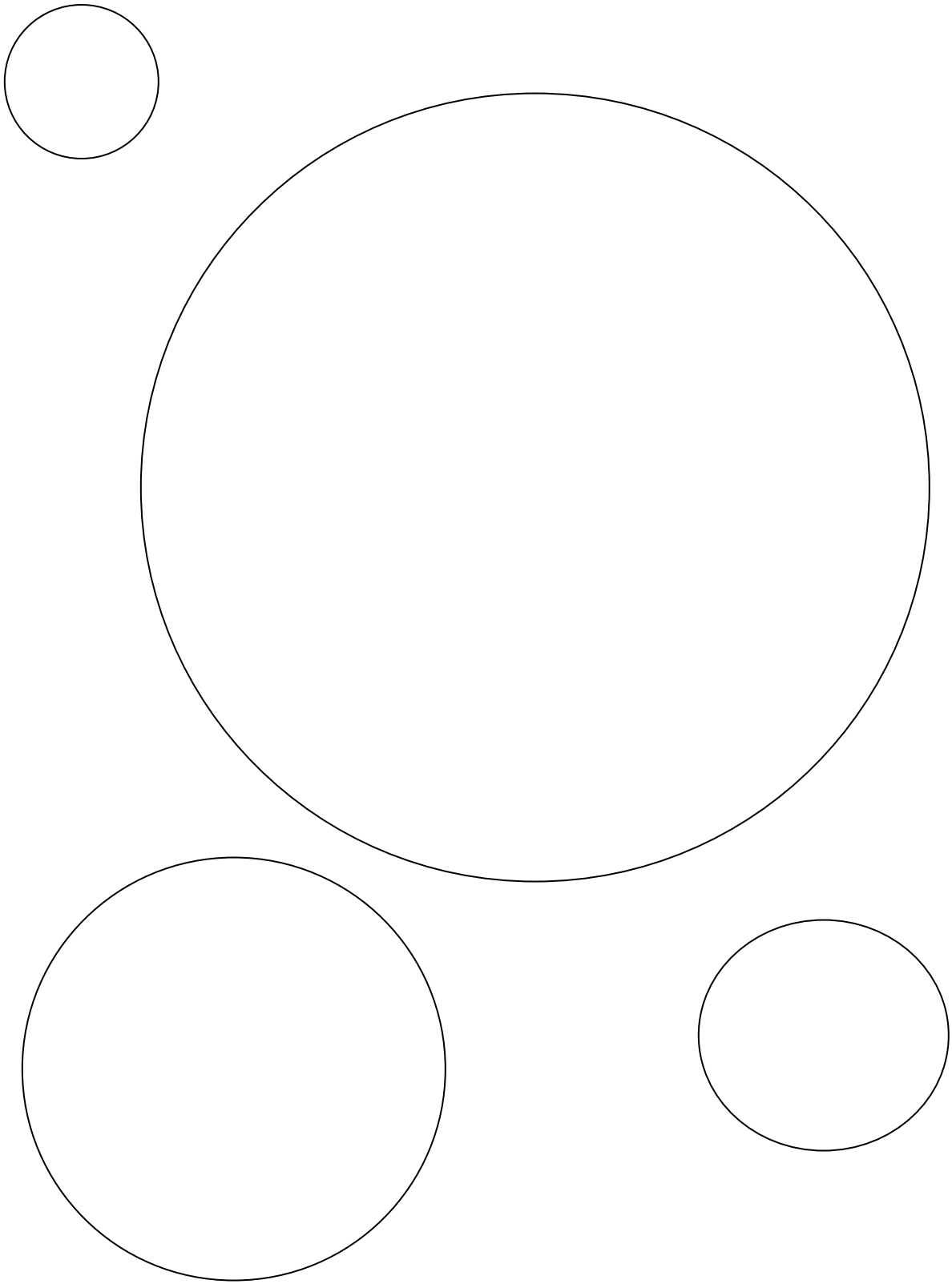
3. If a rectangle has an area of 36 cm and the length of one side is 9 cm, what is the length of the other side?

4. Indicate the base and height of each of the following figures.



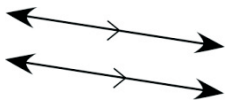


BLM 7.SS.2.2: Circles for Estimating Area

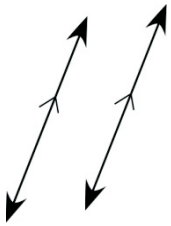


BLM 7.SS.3.1: Parallel and Perpendicular Lines (Assessing Prior Knowledge)

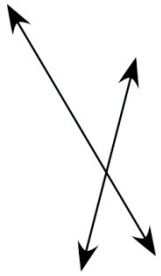
1. Identify each set of lines below. Write parallel, intersecting, or perpendicular to describe each set of lines.

a) 

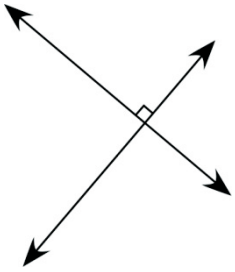
_____

b) 

_____

c) 

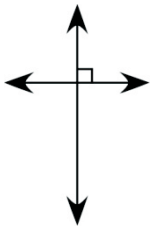
_____

d) 

_____

e) 

_____

f) 

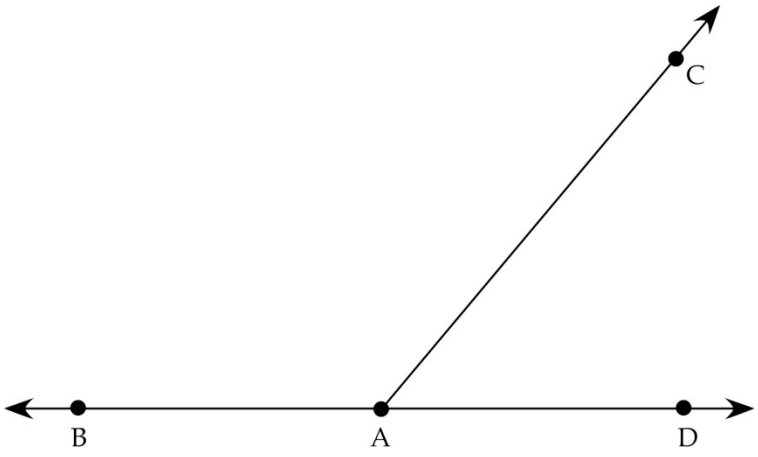
_____

2. Use the diagram below to name the following:

a) a ray

b) a line

c) a line segment



3. Draw and label the following:

a) $\angle$ LMN 60°

b) $\angle$ PQR 110°

c) $\overleftrightarrow{EF}$

d) $\overline{GH}$ 3 cm

e) $\overrightarrow{XY}$

f) $\overline{ST}$ 4 cm

BLM 7.SS.3.2: Creating Perpendicular Lines

Use a square corner.	
Use a protractor.	
Use a straightedge and a compass.	
Use a Mira.	
Use tracing paper.	

BLM 7.SS.3.3: Creating Perpendicular Bisectors

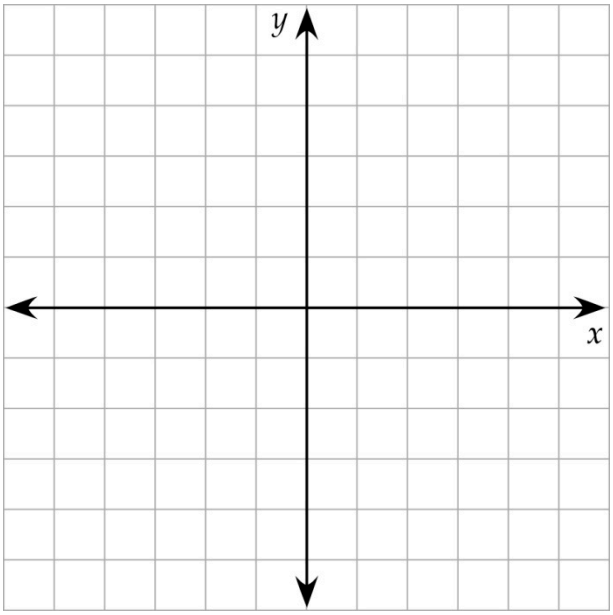
Use a square corner.	
Use a protractor.	
Use a straightedge and a compass.	
Use a Mira.	
Use tracing paper.	
Use a ruler to create a rhombus.	

BLM 7.SS.4.1: Plotting Points on a Cartesian Plane

For each set of ordered pairs below, choose an appropriate scale and label the *x*-axis and the *y*-axis. Plot the ordered pairs, label the points, and draw a line to connect the points in order and connect the last point with the first. State the quadrant(s) in which the figure is located.

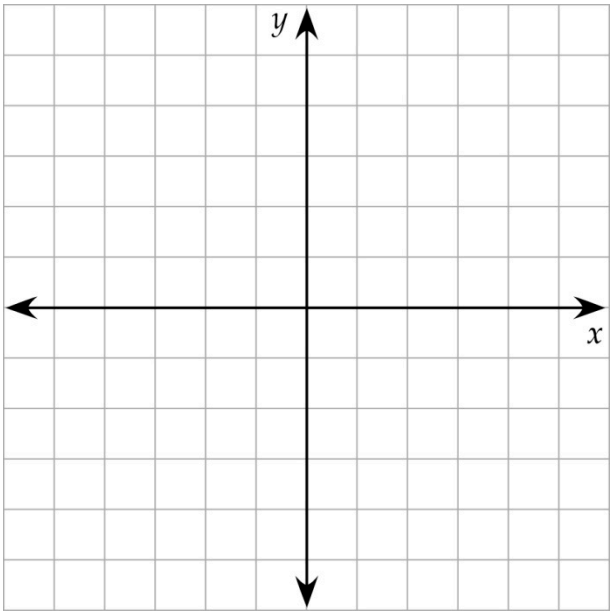
1. A (5, 5) B(3, 5) C(3, 3) D(5, 3)

   The figure is in quadrant(s) _____



2. A(–6, 8) B(–9, 3) C(1, 3) D(4, 8)

   The figure is in quadrant(s) _____

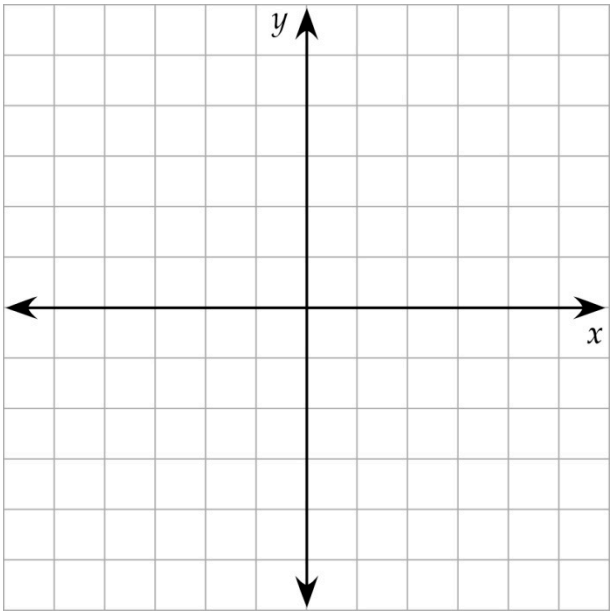


(continued)

BLM 7.SS.4.1: Plotting Points on a Cartesian Plane (continued)

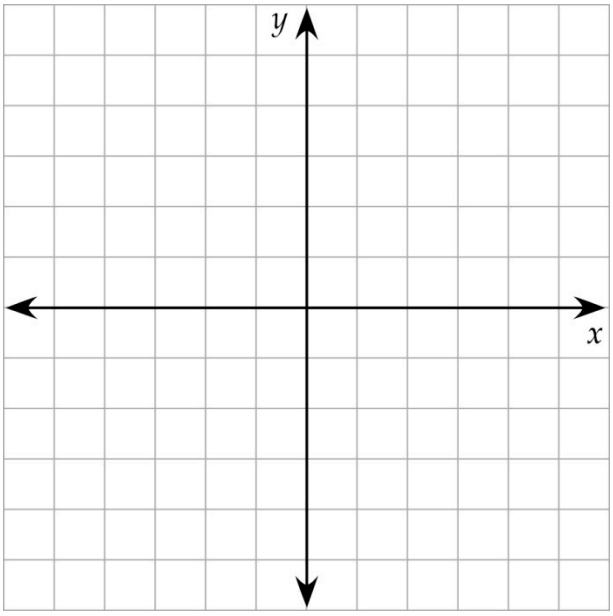
3. A(10, 12) B(–15, –8) C(22, –22)

   The figure is in quadrant(s) _____



4. A(–30, –25) B(25, 40) C(–30, 40)

   The figure is in quadrant(s) _____



BLM 7.SS.4.2: Cartesian Plane Quadrant Cards

CARTESIAN PLANE **QUADRANT I**	CARTESIAN PLANE **QUADRANT II**	CARTESIAN PLANE **QUADRANT III**
CARTESIAN PLANE **QUADRANT IV**	CARTESIAN PLANE **QUADRANTS I and II**	CARTESIAN PLANE **QUADRANTS II and III**
CARTESIAN PLANE **QUADRANTS III and IV**	CARTESIAN PLANE **QUADRANTS I and IV**	CARTESIAN PLANE **QUADRANT CARDS**

(continued)

BLM 7.SS.4.2: Cartesian Plane Quadrant Cards (continued)

CARTESIAN PLANE **(13, 6)** **(4, 12)** **(8, 2)**	CARTESIAN PLANE **(–10, 5)** **(–5, 10)** **(–15, 15)**	CARTESIAN PLANE **(–7, –9)** **(–15, –12)** **(–12, –6)**
CARTESIAN PLANE **(2, –10)** **(8, –6)** **(5, –5)**	CARTESIAN PLANE **(5, 10)** **(–6, 10)** **(–6, 4)**	CARTESIAN PLANE **(–5, -10)** **(–2, 4)** **(–5, 3)**
CARTESIAN PLANE **(–4, –5)** **(2, –2)** **(5, –4)**	CARTESIAN PLANE **(4, 3)** **(7, 3)** **(6, –5)**	CARTESIAN PLANE **ORDERED PAIR CARDS**

BLM 7.SS.4.3: Plot This Picture

Part A
Start
(–2, –12)
(–4, –12)
(–4, –14)
(–5, –18)
(–6, –14)
(–6, –12)
(–10, –12)
(–6, –8)
(–6, –4)
(–4, 0)
(–4, 4)
(–2, 8)
(–2, 12)
(–1, 16)
(0, 12)
(0, 8)
(2, 4)
(2, 0)
(4, –4)
(4, –8)
(8, –12)
(4, –12)
(4, –14)
(3, –18)
(2, –14)
(2, –12)
(0, –12)
(0, –14)
(–1, –18)
(–2, –14)
(–2, –12)
Lift
(4, –14)
(2, –14)
Lift
(0, –14)
(–2, –14)
Lift
(–4, –14)
(–6, –14)
Stop

(continued)

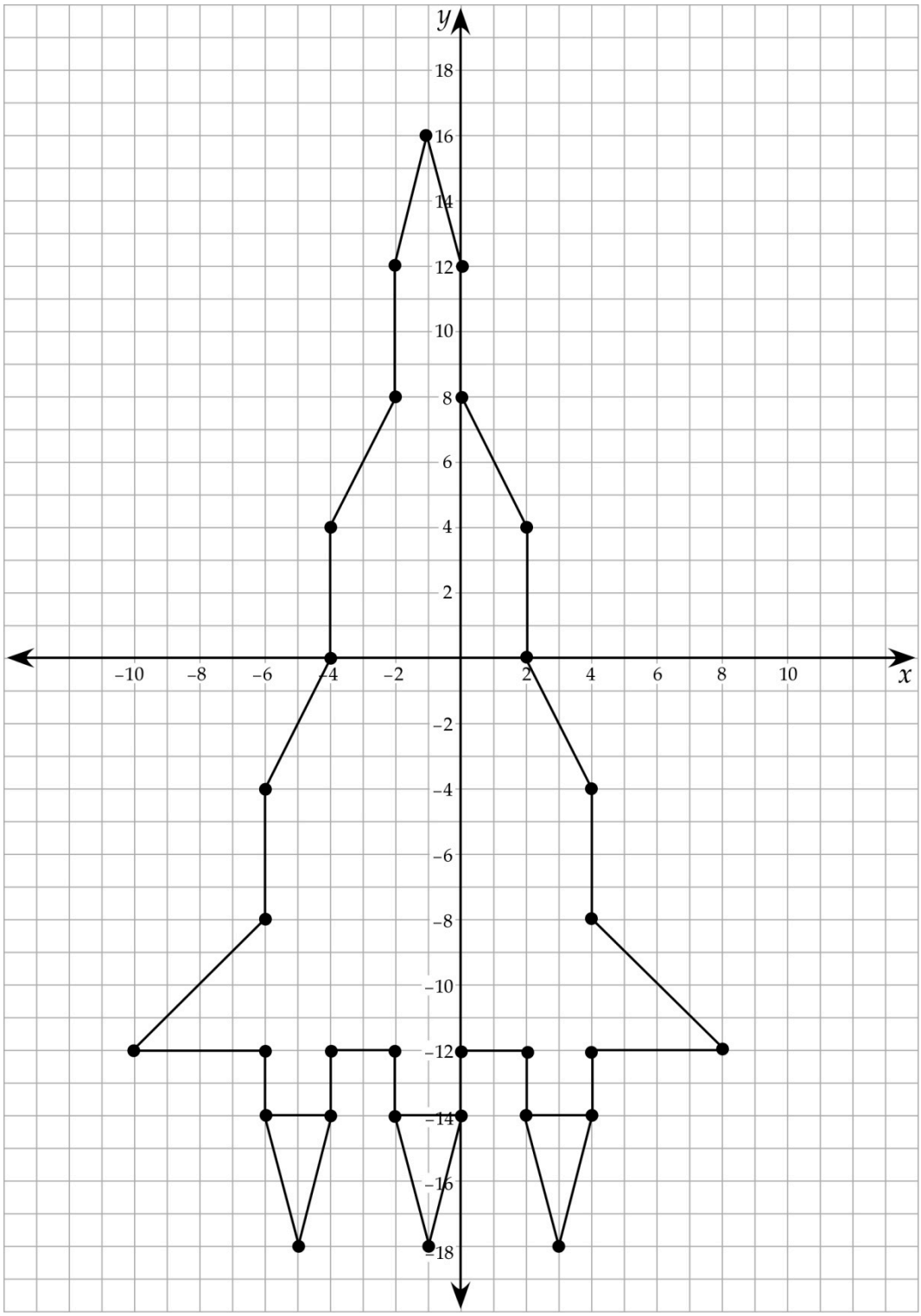
BLM 7.SS.4.3: Plot This Picture (continued)

Part B

Start
(–4, –15)
(–5, –9)
(–6, –9)
(–6, –7)
(–1, –7)
(–1, –5)
(–8, 2)
(–7, 0)
(–8, –2)
(–9, 0)
(–8, 2)
(–10, 1)
(–12, 2)
(–10, 3)
(–8, 2)
(–9, 4)
(–8, 6)
(–7, 4)
(–8, 2)
(–6, 3)
(–4, 2)
(–6, 1)
(–8, 2)
(–1, –5)
(4, 0)
(2, –1)
(0, 0)
(2, 1)
(4, 0)
(3, 2)
(4, 4)
(5, 2)
(4, 0)
(6, 1)
(8, 0)
(6, –1)
(4, 0)
(5, –2)
(4, –4)
(3, –2)
(4, 0)
(–1, –5)
(–1, 3)
(–2, 6)
(–1, 9)
(–4, 8)
(–7, 9)
(–4, 10)
(–1, 9)
(–2, 12)
(–1, 15)
(0, 12)
(–1, 9)
(2, 10)
(5, 9)
(2, 8)
(–1, 9)
(0, 6)
(–1, 3)
(–1, –7)
(4, –7)
(4, –9)
(3, –9)
(2, –15)
(–4, –15)
Stop

BLM 7.SS.4.3: Plot This Picture (Answer Key)

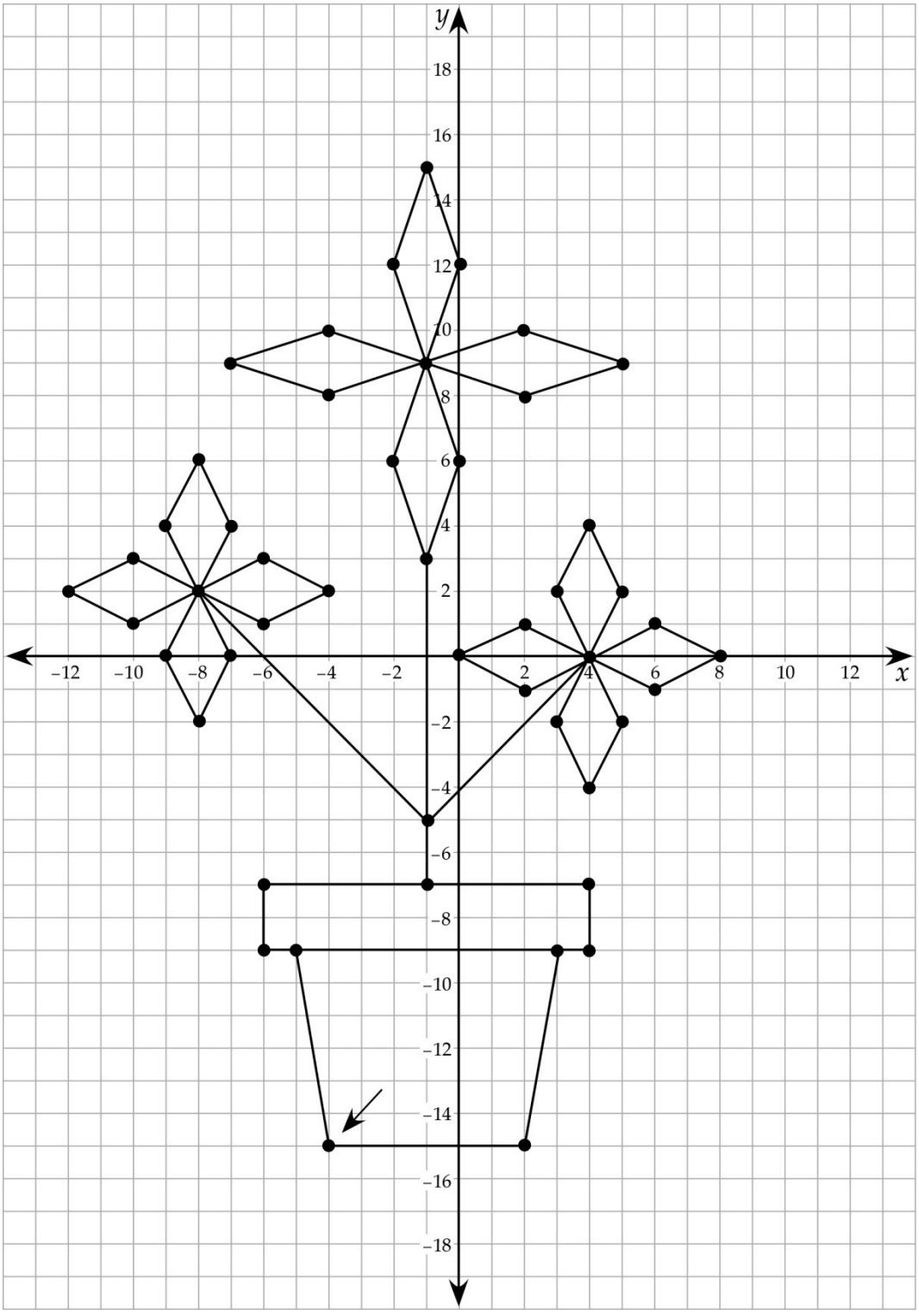
Part A



(continued)

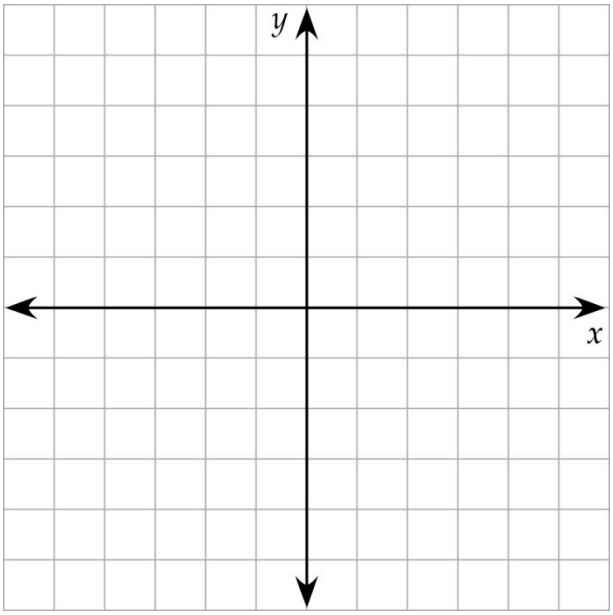
BLM 7.SS.4.3: Plot This Picture (Answer Key) (continued)

Part B



BLM 7.SS.5.1: Comparing Points

1. Generate a list of points and record them in the chart below. Complete the chart by comparing each new point to the previous point, and describe the difference in position of the two points.



2. Name the point that is
   a) farthest left _____
   b) highest _____
   c) lowest _____
   d) closest to the origin _____
   e) farthest right _____

Point	Coordinates	Distance between the Points *x* left/right *y* up/down	Justify Your Decision

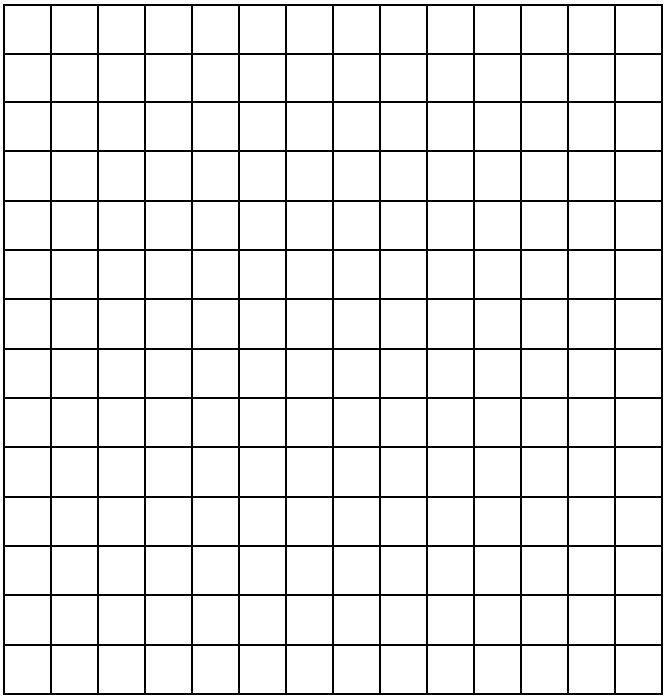
3. Join points to form a quadrilateral. Using the *y*-axis as the line of reflection, reflect the quadrilateral. Describe the difference in position.

Vertex Pre-image	Coordinates Pre-image	Vertex Image	Coordinates Image	Describe how the vertices of the image differ from those of the pre-image

BLM 7.SS.5.2: A Coordinate Map

Steps

1. Create a point map of a community by placing dots on the grid below to represent places in the community on six intersections scattered around the grid. Label each point with a capital letter (e.g., H for home, S for school, D for dentist). Write the places and symbols in the Places in the Community chart beside the grid.
2. Make five trips around the community. Record each trip in words and in symbols and record a description of the movement. You must stay on the lines; do not take any shortcuts.
3. Add axes to your grid to create a Cartesian plane. Include all four quadrants. Label the axes. Remember that you do not need to number every line.
4. Add a column to the Places in the Community chart for the x- and y-coordinates of your points. Record the ordered pairs to represent each place.
5. Record the coordinates of your trips in the fourth column of the trip chart.
6. The final column may be used to record the movement between the coordinates.

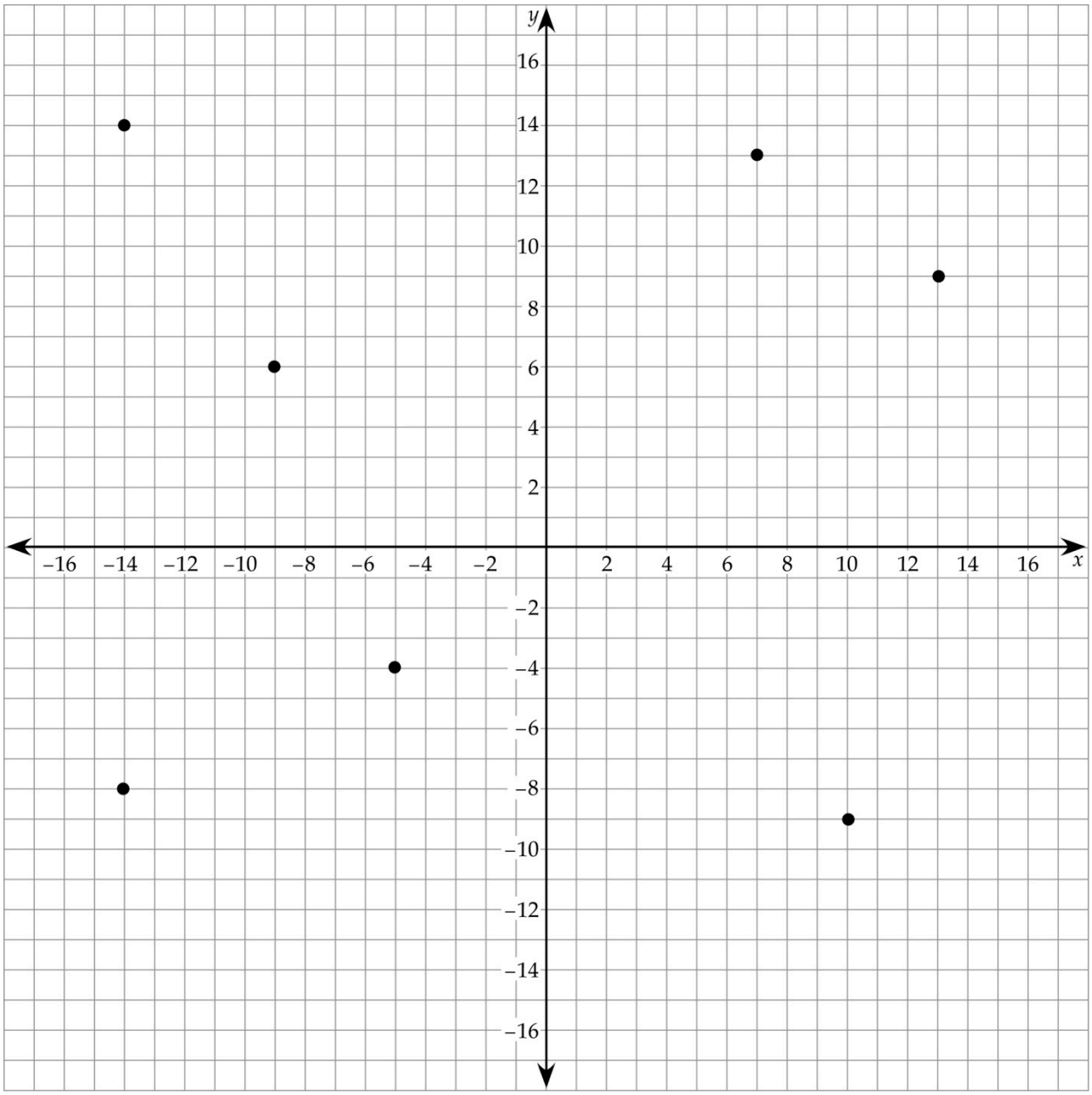


Places in the Community		
Places	**Symbols**	**Coordinates (Ordered Pairs)**

Trips around the Community				
Trips in Words	**Symbols**	**Describe the Movement Horizontal / Vertical Change**	**Coordinates of Trip**	**Movement between Coordinates**
Example: Home to pizza	H → P	5 units right, 9 units up	(9, –8) → (14, 1)	x = (14 – 9) y = (1 – –8) x changes by +5 y changes by +9

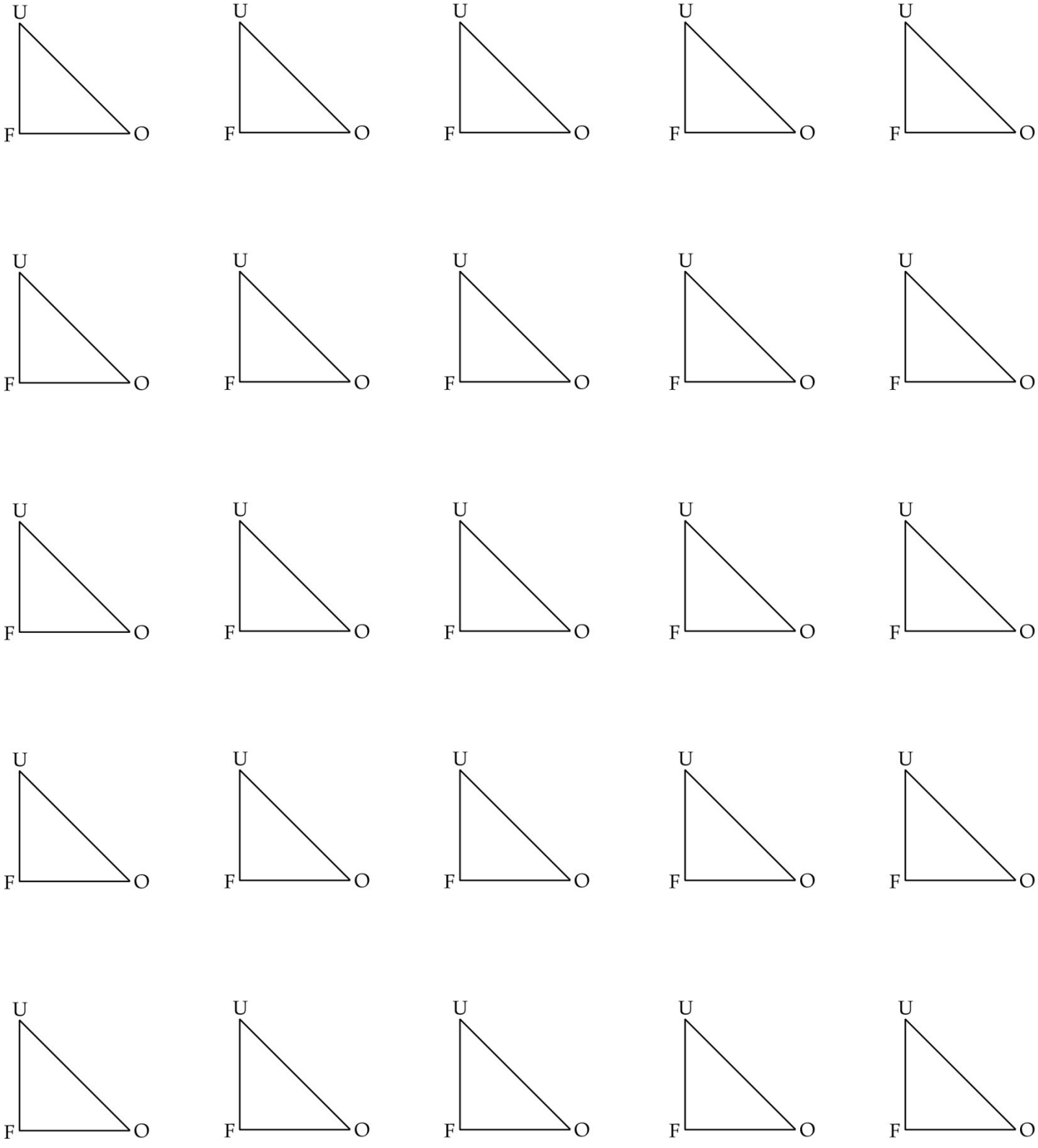
BLM 7.SS.5.3: Cartesian Plane Map and UFO Templates

Scale: 1 unit = 0.5 cm



(continued)

BLM 7.SS.5.3: Cartesian Plane Map and UFO Templates (continued)



BLM 7.SS.5.4: Exploring Transformations: UFO Pilot Training

Instructions

1. Explore to discover the images that result from the translations, reflections, and rotations, and combinations of these transformations.
2. Identify applications for the transformations (e.g., to change the direction in which a figure is pointing, to make a turn, to appear instantly).
3. Find a way to predict the image or the pre-image (shape) or the transformation, given descriptions or coordinates.
4. Record your discoveries in the chart below.

Remember to do the following:

- Explore reflections in different lines (x-axis, y-axis, the line x or $y = a$, or a diagonal).
- Explore what happens when placing the lines of reflection adjacent to the image, far from the image, and inside the image.
- Explore rotations clockwise (cw) and counter-clockwise (ccw), and rotate different degrees, around different vertices, and different points inside and outside the image.

Observations			
Transformation	**Helpful Hints for Transforming, Predicting, and Applying**	**Describing Changes in Location, or Type of Movement**	**Comments on Orientation**

(continued)

BLM 7.SS.5.4: Exploring Transformations: UFO Pilot Training (continued)

Observations			
Transformation	**Helpful Hints For Transforming, Predicting, and Applying**	**Describing Changes in Location, or Type of Movement**	**Comments on Orientation**

BLM 7.SS.5.5: Recording Transformations: Travel Logbook

Logbook for ______________________________________

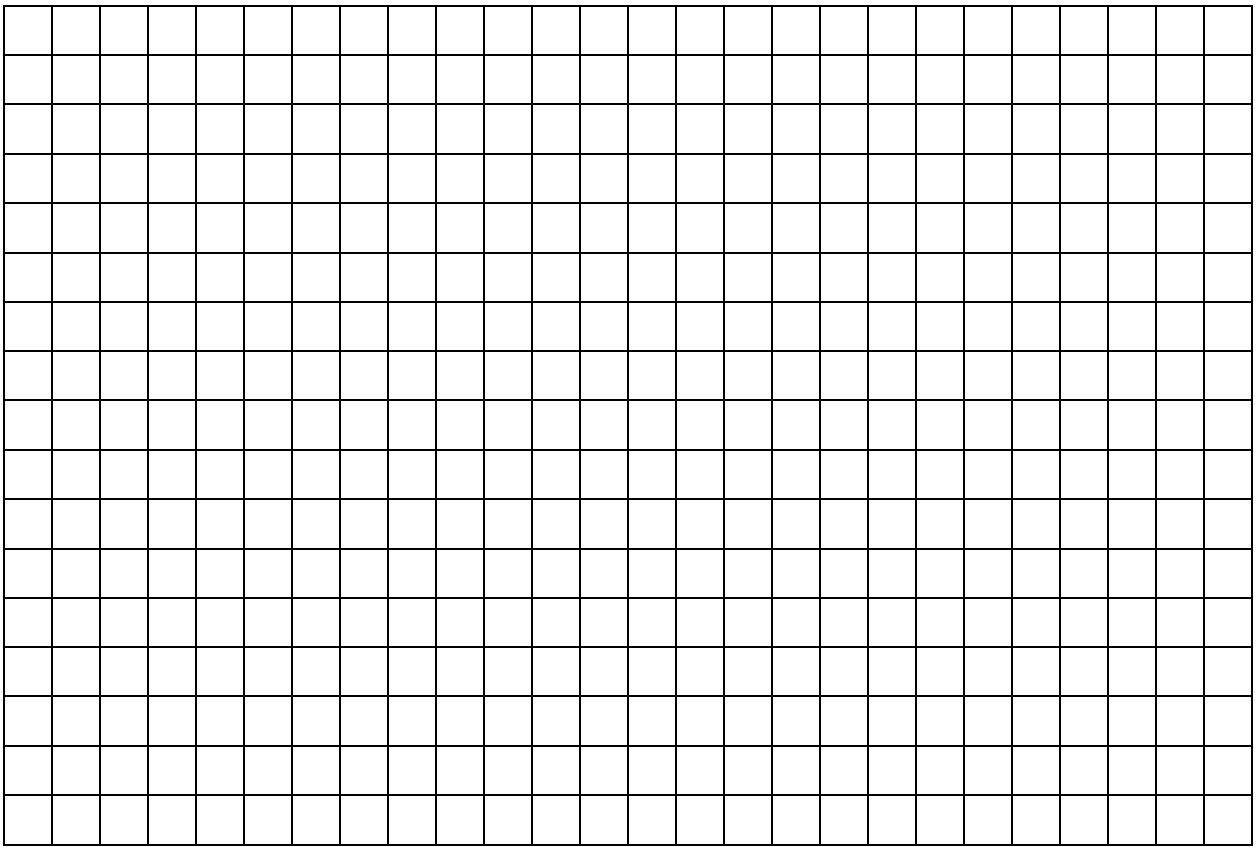
Trip/Shape Transformation Number Vertex	Coordinates of the Pre-image (Shape)	Identification of the Transformation(s) (Translation, Reflection, Rotation, and Directions)	Coordinates of the Image	Description of Horizontal and Vertical Movements	Changes in the *x*/*y* Coordinates (image x – shape x), (image y – shape y)	Changes or Constants in the Orientation of the Image Compared to the Shape

BLM 7.SS.5.6: Creating a Design Using Reflections

Instructions

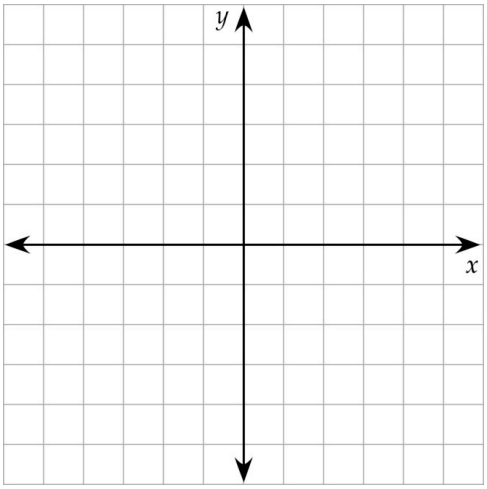
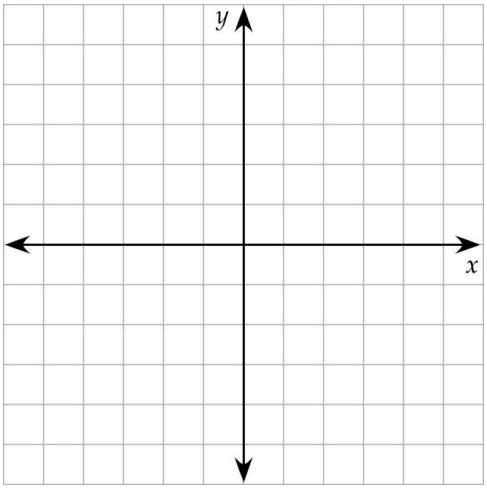
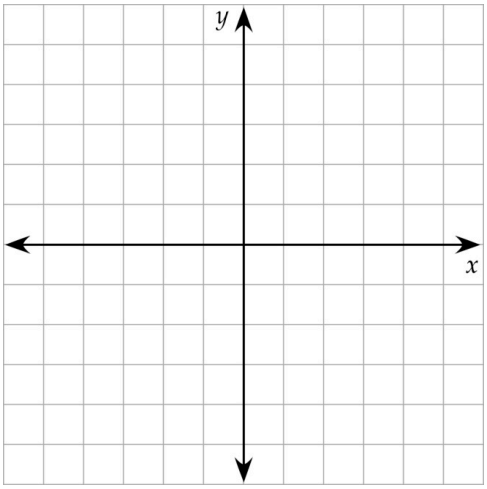
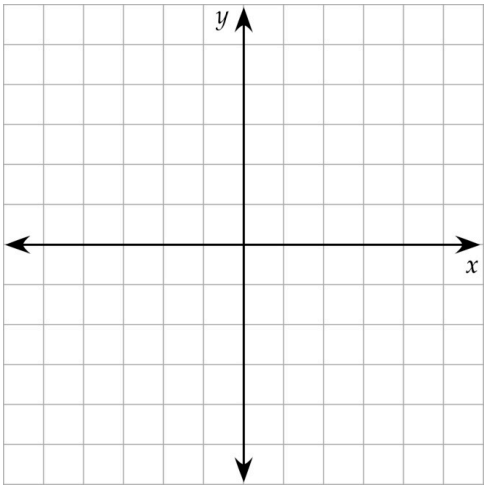
1. Plot the points listed in the following table on a Cartesian plane.
2. Use a ruler to draw a line that connects the points in alphabetical order.
3. Use a ruler to draw a line to connect each point to the origin.
4. Reflect the shape on the *y*-axis to create an image, and label and record the points and coordinates.
5. Reflect this image on the *x*-axis to create a second image, and record the coordinates.
6. Describe the changes between the initial shape and the images.

Shape Points	Shape Coordinates	Image 1 Points	Image 1 Coordinates	Image 2 Points	Image 2 Coordinates
A	(7, 0)				
B	(4, 2)				
C	(4, 4)				
D	(2, 4)				
E	(0, 7)				
Describe the changes between the initial shape and the images.					



BLM 7.SS.5.7: Which Plot Is Correct?

Puzzle Number _____ **Created by** _____

List Points and Coordinates of the Shape	Directions for the Transformation(s)
The correct shape is _____	The correct image is _____
A 	**B** 
C 	**D** 

(continued)

BLM 7.SS.5.7: Which Plot Is Correct? (continued)

Record of Solutions to Puzzles

Number	Puzzle Number	I Think the Correct Shape Is	I Think the Correct Image Is	Comments
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

BLM 7.SP.1.1: Finding the Centre of a Graph and Comparing the Values

1. Build a concrete model of your graph using cubes or modelling clay.
2. Identify the range.
3. How can the graph be arranged to emphasize the range?
4. Are there any outliers or extreme values in your graph?
5. Identify the mode.
6. How can the graph be rearranged to emphasize the mode?
7. Identify the median value.
8. How can the graph be rearranged to emphasize the median?
9. Level the data to find the balance point, or the centre of the data. (This is not the middle value or median.)
   a) Explain what you did to find the centre point.
   b) Identify the centre point.
10. List the mean, median, and mode for your data.
    a) Compare the values. Do these values each represent the entire set of data well?
    b) Is one value more representative than the others? Explain.

BLM 7.SP.1.2: Exploring Measures of Central Tendency

Data Set	Range	Outliers	Mean	Median	Mode

Observations

(continued)

BLM 7.SP.1.2: Exploring Measures of Central Tendency (continued)

Data Set	Range	Outliers	Mean	Median	Mode

Observations

BLM 7.SP.1.3A: Simone's Spelling Scores (Questions)

Simone writes a spelling quiz each week. Each quiz is scored out of 10.

1. So far, Simone has written seven spelling quizzes. Her scores for the seven quizzes are 8, 8, 7, 9, 6, 10, and 8.

2. What score would best represent Simone's spelling performance? Explain why you chose that score.

3. Simone writes three more quizzes, with scores of 3, 7, and 8. What score do you think best represents her performance now? Why?

4. Simone's scores on the next three quizzes are 9, 10, and 0. How will you adjust her spelling score? Why?

5. Identify the outliers in this set of data.

6. What are some possible reasons for the outliers?

7. How do the outliers affect the averages?

8. Should the outliers be included in the averages? Why, or why not?

BLM 7.SP.1.3B: Simone's Spelling Performance Record

Scores Out of 10 Points	Mean	Median	Mode	Range	Outliers	Best Representative Value

Comments on the effect of outliers on the following:

- Mean
- Median
- Mode
- Range

Should outliers be included in measures of central tendency? Why, or why not?

BLM 7.SP.1.4: Using Central Tendency to Choose a Quarterback

Rodney and Jezreel both want the position of quarterback on the football team for the next game. They were told that the choice of quarterback would be based on their performance at a practice. During the practice, receivers ran around the field in approximate target zones. The quarterbacks could choose from the targets. If they got the ball to the receiver, they scored that number of yards, whether or not the receiver caught the ball. If the quarterbacks missed the receiver, they scored zero. Each quarterback got 10 throws.

1. The team collected the following data for each candidate competing for the position of quarterback. Review the data. Then, based on the performance of the two candidates at the football practice, decide who would be the best choice of quarterback for the game.

Throw Number	Rodney	Jezreel
1	10	25
2	15	0
3	0	20
4	25	0
5	0	0
6	15	25
7	10	0
8	15	Smudged—can't read
9	10	20
10	0	0
Range		
Mean		
Median		
Mode		

2. Make a recommendation for the best choice of quarterback, and provide reasons for the choice.

BLM 7.SP.3.1: Calculating the Percent of the Total

1. Convert the following fractions to percents:

   a) $\frac{4}{16} =$

   b) $\frac{15}{25} =$

   c) $\frac{70}{125} =$

   d) $\frac{32}{40} =$

2. A Grade 7 class conducted a food drive to help the local food bank. The class collected 25 packages of pasta, 32 cans of soup, 14 cans of fruit, 7 cans of vegetables, 16 packages of cookies, and 6 packages of rice. What percent of the items collected were cans of fruit?

3. The students at Boreal Forest Middle School were excited about the dog show the student council planned for spirit week. The following dogs were entered in the show: 9 German shepherds, 5 golden retrievers, 3 collies, 2 cocker spaniels, and 1 bloodhound. What percent of the dogs were bloodhounds?

4. There are 12 girls and 9 boys in Tanya's class. What percent of the class are girls?

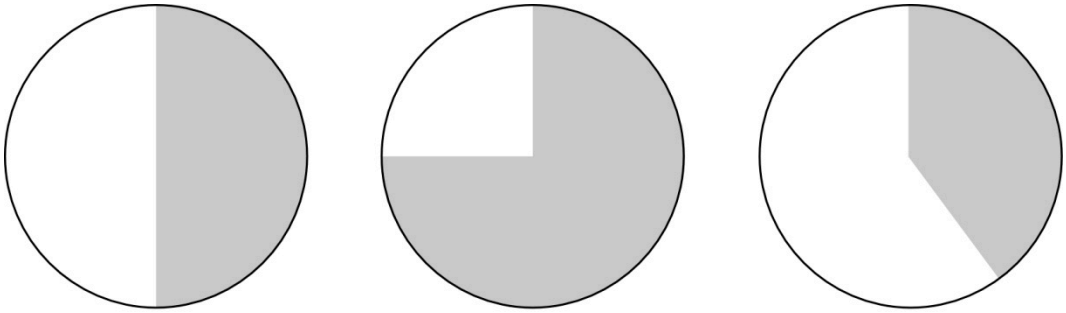
5. If 8 of the 12 players on the basketball team scored baskets and 4 players scored no baskets, what percent of the players scored baskets?

6. Which quantity is greater, 25% of 240, or 8% of 850? Explain how you know your answer is correct.

7. Create and solve your own percent question.

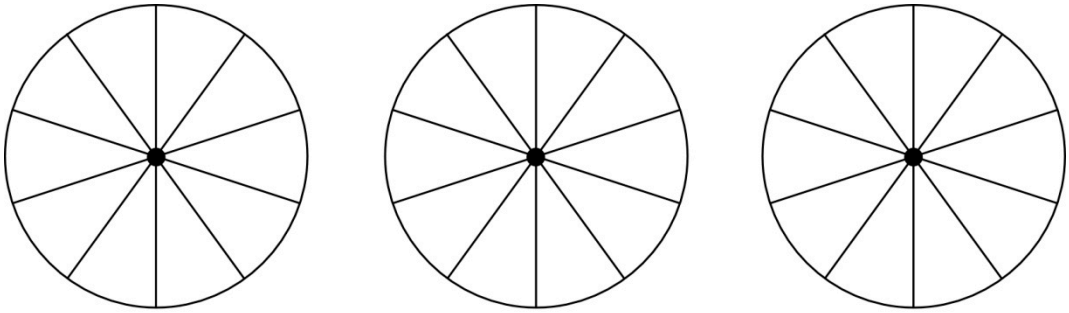
BLM 7.SP.3.2: Percent of a Circle

1. What percent of each of the following circles is shaded?



a) _____ b) _____ c) _____

2. Shade the designated percent of each of the following circles.



a) 80% a) 10% a) 30%

3. The sum of the angles in a circle measure 360°.
   a) Calculate the measure of the angle that would represent each percent of a circle.
   b) Use a protractor to draw each of the angles.
   c) 50% of 360° = _____
   d) 25% of 360° = _____
   e) 13% of 360° = _____

BLM 7.SP.3.3: Data Chart for Creating Circle Graphs

Category	Quantity	Fraction of the Whole	Percent of the Whole	Percent Times 360° in the Circle	Size of the Central Angle
Totals					

BLM 7.SP.3.4: Comparing Examples of Circle Graphs

Source	Descriptive Title	Legend	Category Labels	Data Reported as a Percent of Total	Sum of Percents Equals 100%	Sum of the Central Angles Is 360°	Comment

BLM 7.SP.3.5: Translating Percentages in a Circle Graph into Quantities

Working with your group, search through various media sources to find five examples of circle graphs, including any titles, legends, or captions that accompany the graphs. Analyze your selected graphs to determine whether or not each graph includes the common attributes of circle graphs. Using the space provided below, record three questions and one problem that can be answered using information from one of the graphs. Record your responses on the reverse side of this sheet.

1. Paste one of your selected circle graphs here.

2. Prepare three questions related to the graph.

   a)

   b)

   c)

3. Identify a problem that could be solved using information from the graph.

(continued)

BLM 7.SP.3.5: Translating Percentages in a Circle Graph into Quantities (continued)

4. Prepare responses to your three questions related to the graph.

   a)

   b)

   c)

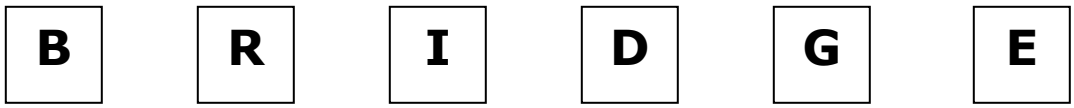
5. Provide a solution to the problem that could be solved using information from the graph.

BLM 7.SP.4.1: Recording Sheet for Fraction–Decimal–Percent Equivalents

Number	Proper Fraction	Decimal Equivalent	Percent Equivalent	✓
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

BLM 7.SP.4.2: What Is the Probability?

The following six letter tiles are placed in a bag.



1. You are asked to shake the bag containing the six letters and draw one letter from the bag.
   a) How many different outcomes (letter tiles) are possible in this situation?
   b) What is the theoretical probability of drawing an E tile from the bag?
2. Lee shakes the bag containing the six tiles, draws a letter tile from the bag, records the letter he drew, returns the letter to the bag, and repeats the process 36 times. He drew the following:

   B – 6 times

   R – 4

   I – 12

   D – 9

   G – 2

   E – 3

   Compare Lee's experimental results and the theoretical probability of drawing the letter I in this situation.
3. Theoretically, in this situation, which is a more likely event, drawing a consonant from the bag, or drawing a vowel? Explain your thinking.
4. Describe one event that would be
   a) impossible in this situation
   b) certain in this situation
5. Create another question and answer related to probability using this situation.

BLM 7.SP.4.3: Experimental Probability Tally Sheet and Probability of Outcomes

Possible Outcomes	Tally of Results of Experiment	Ratio of Results to the Number of Trials	Experimental Probability as a Fraction	Experimental Probability as a Decimal	Experimental Probability as a Percent
Totals					

BLM 7.SP.5.1: Which Conditions Affect Probability?

1. Name outcomes that are possible when tossing a coin, and specify the probability of each outcome.

2. Indicate whether or not each of the following conditions will affect the theoretical probability of the next coin toss. Mark a Y (yes) or an N (no) beside each condition, and explain why you believe your answer is correct.

   a) ____ The outcome from the previous toss

   b) ____ Using a different coin on the next toss

   c) ____ Tossing one coin 10 times or 10 coins one time each

   d) ____ Tossing six heads in a row

   e) ____ Tossing two coins at the same time

3. If you enter three tickets in a draw, and there are nine tickets entered in the draw, what is the theoretical probability that your name will be drawn?

4. Consider the following situations. Mark a Y (yes) or an N (no) to indicate whether or not each situation will affect the theoretical probability of your name being chosen on the next draw. Explain why you believe your answer is correct.

   a) ____ Someone else's name was drawn and then returned to the draw.

   b) ____ Your name has been drawn the last six times. Each time your name was returned to the draw.

   c) ____ Drawing someone else's name and not returning the name to the draw.

5. Make a general statement about conditions that affect probability and conditions that do not affect probability.

BLM 7.SP.5.2: Examples of Two Independent Events

Event One	Event Two	Explanation of Why These Two Events Are Independent

Two events are independent events when _____

BLM 7.SP.6.1: Frequency Chart for Organizing Outcomes for Two Independent Events

		Possible Outcomes of Event One					
Possible Outcomes of Event Two							

BLM 7.SP.6.2: Probability Problems Involving Two Independent Events

1. Elliot puts a quarter, a dime, a nickel, and a penny into a container. Elliot then shakes the container, spills out one coin, places the coin back in the container, shakes the container again, and spills out another coin. What is the probability that the sum of the two spilled coins will be more than 25 cents?

2. Ramone has two pairs of orange socks, a pair of blue socks, and two pairs of green socks. She also has an orange shirt, two blue shirts, and a green shirt. If she selects a pair of socks at random, and a shirt at random, what is the probability that her shirt and socks will be the same colour?

3. A computer game randomly selects two numbers from 1 to 9 and multiplies the numbers.

   a) What is the probability that the product will be greater than or equal to 50?

   b) If the range of the numbers multiplied is increased to include all the numbers from 0 to 10, what is the probability that the product will be greater than or equal to zero?

4. Samantha's little brother removed all the labels from the cans of soup in the pantry. He also removed the labels from the canned fruit. There are four cans of tomato soup, two cans of chicken noodle soup, and one can of cream of mushroom soup. There are two cans of peaches, and one can of pears. The soup and fruit come in cans of different sizes. If one can of soup is opened, and one can of fruit is opened, what is the probability that the combination will be chicken noodle soup and peaches?

5. If a person rolls two number cubes, what is the probability that the sum of the cubes will be 9 or greater?

6. Write your own probability problem involving two independent events. Include the solution to the problem.