Name _____   Period _____   Date _____

6-7 ESSENTIAL SKILLS

EXPLORING PATTERNS

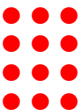For each dot pattern, the first three steps are shown. First draw the 4th step in the sequence. Then do parts a and b.

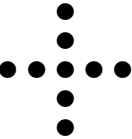1.   step 1   step 2   step 3   step 4

   a. Describe how the pattern is growing in words.
      Descriptions may vary. For the 4th step, add 3 more dots to continue the array.

   b. How many dots will be in the 10th step of the pattern? Explain.
      30. Each step adds 3 dots. Each step is a product of the step number and 3.
      3(10) = 30.

2.   step 1   step 2   step 3   step 4

   a. Describe how the pattern is growing in words.
      Descriptions may vary. For the 4th step, add 4 dots total, one to each
      of the "arms."

   b. How many dots will be in the 10th step of the pattern? Explain.
      37. Each arm will have 9 (1 less than the picture number). The middle dot must also be counted.
      9(4) + 1 = 37.

Study each pattern and draw the next two steps, and then draw the 10th and 100th steps.

3. □△□△ □ △

   a. 10th term in the sequence: △

   b. 100th term in the sequence: △

4. □△○□△○ □ △

   a. 10th term in the sequence: □

   b. 100th term in the sequence: □

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EXPLORING PATTERNS
Continued

Find the next two numbers in each pattern. Then describe it in words.
Pattern descriptions may vary.

5. 3, 4, 5, 6, __7__, __8__, … Description: Start with 3. Add 1 each time.

6. 1, 3, 5, 7, 9, __11__, __13__, … Description: Start with 1. Add 2 each time.

7. 2, 7, 12, 17, 22, __27__, __32__, … Description: Start with 2. Add 5 each time.

8. 68, 58, 48, 38, 28, __18__, __8__, … Description: Start with 68. Subtract 10 each time

9. Write the first 5 numbers for the pattern that starts with 0 and adds 2 at each step.
    __0__, __2__, __4__, __6__, __8__, …

10. Write the first 5 numbers for the pattern that starts with 0 and adds 4 at each step.

    __0__, __4__, __8__, __12__, __16__, …

11. Write the patterns of ordered pairs, using the numbers in problem 9 as the *x*-coordinates and the numbers in problem 10 as the *y*-coordinates in the order that they occur above.

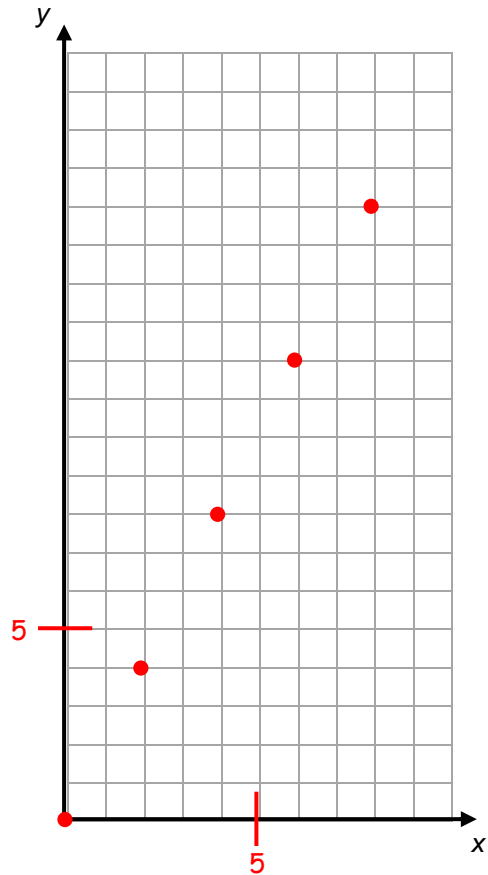   (,   ), (,   ), (,   ), (,   ), (,   )

12. Graph the ordered pairs to the right. Be sure to number the axes. What do you notice?
    The points lie along a straight line path.

13. What is the next ordered pair that would be in this pattern? (10, 20)

    Does it follow the graphed pattern started? yes

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BATTLING SHIPS

The Setup:

Each player uses two coordinate grids. Label the axes from 0 – 10. One grid should be labeled "Self" and the other "Opponent."

Each player then decides where to place three rectangular ships: a **B**attleship (5 units x 1 unit), a **C**ruiser (3 units x 1 unit), and a **D**estroyer (2 units x 1 unit) so that edges and corners are on the grid lines. All ships must be placed either horizontally or vertically, and therefore all ordered pairs will have whole number coordinates. Two ships may be adjacent to each other, but they cannot overlap. Label the ships B, C, and D.
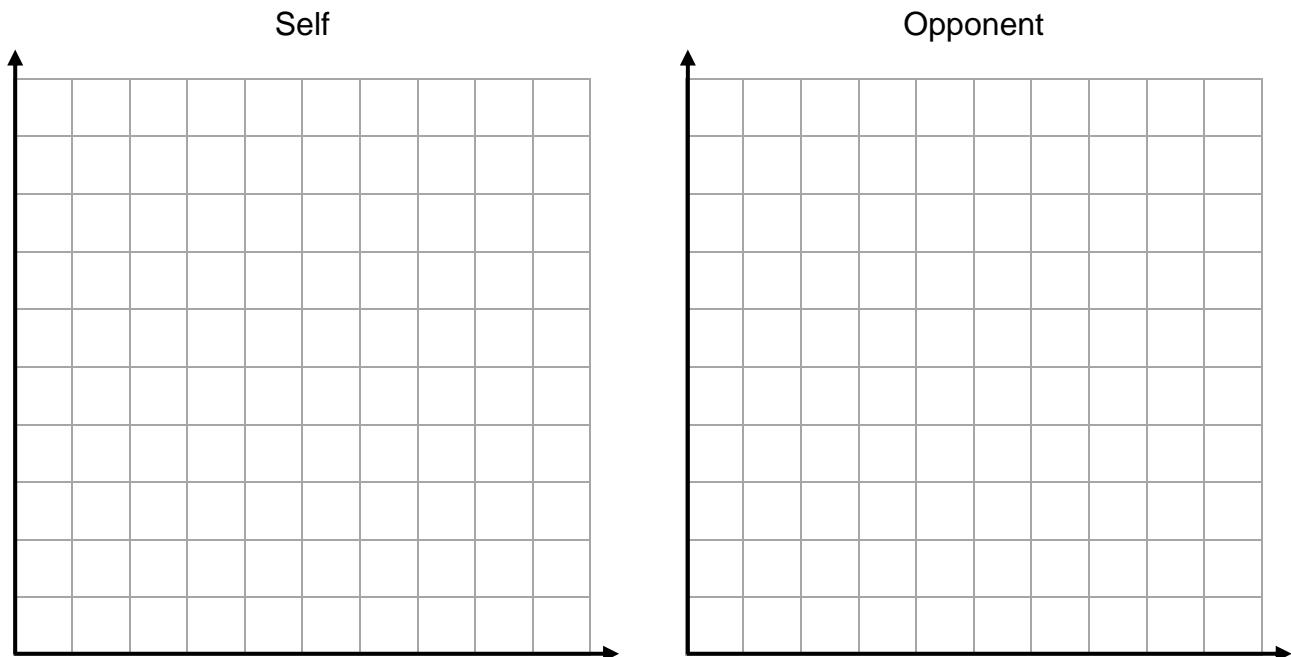
The Game:

Players take turns calling out one ordered pair of whole numbers at a time. If a player calls an ordered pair where an edge or corner of a ship is located, the opponent says "hit" and the player gets another turn. If no ship is located at the ordered pair, the opponent says "miss," and players change roles.

Players should take care to record their hits and misses on their "Opponent" grid so that they do not call an ordered pair more than once. Players should also mark the "Self" grid with shots taken by their opponent.

A ship is sunk when all of its corner points have been hit. When this happens, the player whose ship was sunk says, "You sank my _____."

You win by sinking all of your opponent's ships. If time is called, the player who has sunk more of the opponent ships wins. If tied, the winner is the one who scored the most hits. Make sure to exchange grids afterward to check that both players marked coordinates correctly.

Self

Opponent

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FOUR IN A ROW: DECIMAL DIVISION

Players: 2+

Objective: Be the first player to claim 4 spaces in a row, column, or diagonal to win the game.

Materials: Board game, 2 sets of colored counters (for the game board), 2 objects (e.g. cubes, paperclips, cut up paper) that will cover numbers in Box A and Box B

Rules: Two players alternate finding the quotient by choosing a constant from Box A and a variable expression from Box B. Players check the product (answer key provided) and, if successful, place their colored counter on a space with the appropriate product.

BOX A: DIVIDEND		
1.2	9.6	6
3.6	7.2	2.40

BOX B: DIVISOR		
2	10	6
3	5	4

GAME BOARD: $A \div B$					
2	0.60	1.2	1.92	1.20	1.80
0.20	0.96	0.72	4.80	0.30	0.6
1.20	3.20	0.36	2.40	1.2	0.40
0.8	1	1.44	0.60	3	0.24
0.24	1.8	0.90	0.12	0.48	2.4
0.72	1.60	0.4	3.60	0.6	1.20

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FOUR IN A ROW: DECIMAL DIVISION
ANSWER KEY

		BOX B					
	A÷B	2	10	6	3	5	4
BOX A	1.2	0.6	0.12	0.2	0.4	0.24	0.3
	9.6	4.8	0.96	1.6	3.2	1.92	2.4
	6	3	0.6	1	2	1.2	1.5
	3.6	1.8	0.36	06	1.2	0.72	0.9
	7.2	3.6	0.72	1.2	2.4	1.44	1.8
	2.4	1.2	0.24	0.4	0.8	0.48	0.6