Name: _____ Date: _____

BLM 5.5.1

Practice: First Differences

1. Consider the relation $y = 2x - 3$.
- **a)** Make a table of values for x-values from 0 to 5.
- **b)** Graph the relation.
- **c)** Classify the relation as linear or non-linear.
- **d)** Add a third column to the table in part a). Label the column "First Differences." Find the differences between consecutive y-values and record them in this column.

2. Consider the relation $y = \frac{1}{2}x^2$.
- **a)** Make a table of values for x-values from 0 to 5.
- **b)** Graph the relation.
- **c)** Classify the relation as linear or non-linear.
- **d)** Find the differences between consecutive y-values. Add a column to your table in part a) to record the first differences.

3. Refer to your answers to questions 1 and 2. How can you use first differences to tell if a relation is linear or non-linear?

4. Copy and complete each table. State whether each relation is linear or non-linear.

a)

x	y	First Differences
0	8	
1	10	
2	13	
3	17	

b)

x	y	First Differences
0	2	
1	6	
2	10	
3	14	

5. Copy and complete the table for each equation. Identify each relation as linear or non-linear.

x	y	First Differences
1		
2		
3		
4		

a) $y = 2^x$ **b)** $y = -3x$
c) $y = x + 1$ **d)** $y = x^2 + 1$

6. Collect like terms. Then, simplify.
- **a)** $4b + 3 - 2b + 1$
- **b)** $2p - 7 - p + 4$
- **c)** $1 + 3y + 4 + y$
- **d)** $5 - x - 1 - 2x$
- **e)** $6a - 2b + 3b + 2a$
- **f)** $7r + 2 + 3r - r - 1$
- **g)** $9s - 2s + 5t - 4s$
- **h)** $-g - 3h + 5h + 2g - h$

7. Simplify.
- **a)** $4 + v + 5v - 10$
- **b)** $7a - 2b - a - 3b$
- **c)** $8k + 1 + 3k - 5k + 4 + k$
- **d)** $2x^2 - 4x + 8x^2 + 5x$
- **e)** $12 - 4m^2 - 8 - m^2 + 2m^2$
- **f)** $-6y + 4y + 10 - 2y - 6 - y$
- **g)** $5 + 3h + h - 4 + h + 6 + 2h$
- **h)** $4p^2 + 2q^2 - p^2 + 3p^2 - 7q^2$

8. Simplify.
- **a)** $2a + 6b - 2 + b - 4 + a$
- **b)** $4x + 3xy + y + 5x - 2xy - 3y$
- **c)** $m^4 - m^2 + 1 + 3 - 2m^2 + m^4$
- **d)** $x^2 + 3xy + 2y^2 - x^2 + 2xy - y^2$

9. The length of a rectangle is 2 times the width of the rectangle. Let x represent the width of the rectangle.
- **a)** Write an expression to represent the length of the rectangle.
- **b)** Write a simplified expression for the perimeter of the rectangle.
- **c)** Suppose the width is 6 cm. Find the perimeter of the rectangle.