BIG PICTURE of this UNIT:	• What is meant by the term FUNCTIONS and how do we work with them? • mastery with working with basics & applications of linear functions • mastery with working with basics & applications of linear systems • understanding basics of function concepts and apply them to lines & linear systems

Part 1 - Skills/Concepts Review

1. Leah's monthly earnings are modeled by the following relation: she earns $1200/month plus a 3.5% sales commision.

    a. Create an equation she can use to determine what her monthly earnings should be.
    b. Last month, Leah had $96,174 in monthly sales. What should her monthly earnings be?
    c. If her monthly earnings need to be $6,000 per month, what should her monthly sales be?
   d. Graph this relation on your calculator and record your window settings.

2. For the following questions, the functions $y = f(x)$ and $y = g(x)$ are defined as follows:

    $f = \{(-3,5), (-7,-3), (-3/2,4), (1.2,5)\}$ and $g = \{(0,6), (2,6), (6,0), (1,0)\}$

    a. Draw a mapping diagram for f.
    b. State the domain and range of f and g.
    c. For what value(s) of x is $f(x) = 5$? $f(x) = -3$?
    d. For what value(s) of x is $g(x) = 0$? $g(x) = 6$?
    e. Evaluate $f(-7)$ and $g(0)$.

3. Judy is considering two sales positions. SAM'S store offers $1600/month plus 2.5% in commission in sales and CAROL'S store offers $1000/month plus 5% in commission on sales. In past sales experiences, Judy usually has sales around $15,000 per month.

    a. Represent the offer from SAM'S store as an equation so Judy can predict what her monthly earnings might be.
    b. Which offer should Judy take? Explain your reasoning.
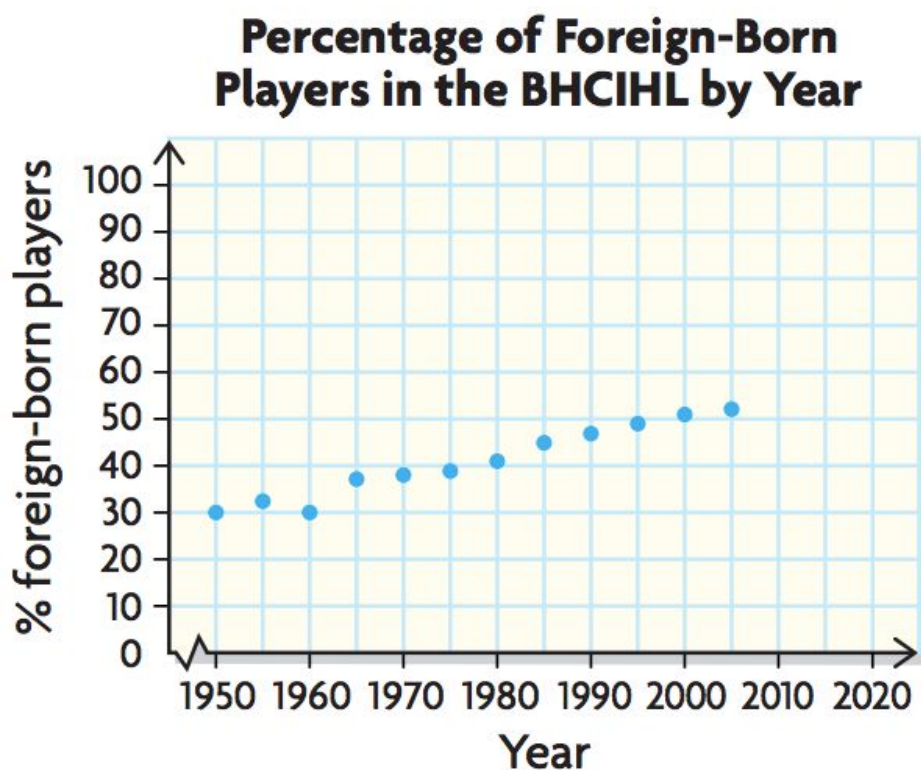
4. The graph of the function $y = K(x)$ is provided for you.

    a. Find: (i) $K(0)$,   (ii) $K(-5)$,   (iii) $K(1)$.
    b. Solve: (i) $K(x) = 0$,   (ii) $K(x) = 3$.
    c. State the domain and range of $K(x)$.
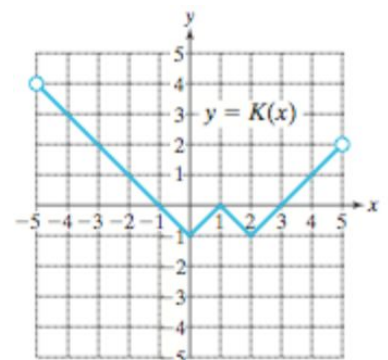
5. Over the past 50 years, the percentage of foreign born players in the Black Horse Corners International Hockey League has increased. The data is summarized in the table and the scatter plot.
   a. Use the **scatter plot** to estimate and then compare the number of foreign born players in 1993 to that of 2020.
   b. Use **an equation** to estimate and then compare the number of foreign born players in 1993 to that of 2020.

Percentage of Foreign-Born Players in the BHCIHL by Year

Year	Percentage of Foreign-Born Players in the BHCIHL
1950	30
1955	33
1960	30
1965	37
1970	38
1975	39
1980	41
1985	45
1990	47
1995	49
2000	51
2005	52

Part 2 - Skills/Concepts Application Problems

6. A relation is defined by the following description: ***To "create/generate" a new value, a number is doubled and then increased by four.*** The CONDITION on the "starting" number is that it must be a real number between and including 0 and 10.

   a. Create a table of values for this relation.
   b. Create a mapping diagram for this relation.
   c. Create a list of ordered pairs for this relation.
   d. Create an equation for this relation.
   e. Graph this relation.

7. You are given two linear functions: $f(x) = 5x - 1$ and $g(x) = -2x + 20$.

   a. State 2 ordered pairs that satisfy each function and one ordered pair that does not.
   b. Is there an ordered pair that satisfies BOTH functions? If so, how do you know that there is and what is this ordered pair? If not, how do you know that their isn't?

8. In this data set, x represents the number of people enrolled in yoga classes at a health club and y represents the number in each class that are male.

x	19	10	6	16	15	9	12	21
y	10	4	2	5	7	3	8	8

    a. Construct a scatter plot for the data.
    b. Sketch the line of best fit and determine its equation.
    c. Use the line of best fit to determine the value of y when $x = 14$.
    d. Use the line of best fit to determine the value of y when $x = 27$.

9. The scatter plot shows a relation. The scaling on each axis indicates single units.

    a. State the domain and range of this relation.
    b. Draw a mapping diagram for this relation.
    c. Is this relation a function? Explain your reasoning.
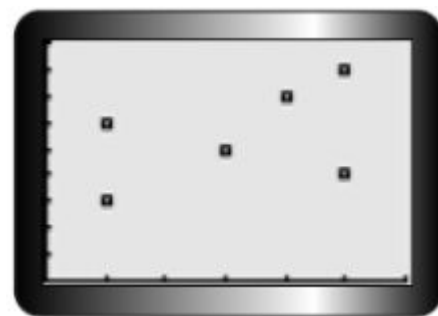
10. Solve the following equations:

    a. $3x - 15 = 15 - 2x$
    b. $3(2 - x) = -(2 - x)$

Part 3 - Extension Problems

11. A function is defined as follows: $f(n) = 4 \times f(n - 1)$ where n is an integer greater than 0 and you are given that $f(1) = \frac{1}{8}$. Evaluate $f(2)$ and $f(3)$ and $f(4)$ and $f(5)$.

12. A function is defined as follows: $f(n + 2) = f(n) + f(n + 1)$ where n is an integer greater than 0 and you are given that $f(1) = 1$ and $f(2) = 1$. Evaluate $f(3)$ and $f(4)$ and $f(5)$

HOMEWORK PROBLEMS:

(1) Function Notation: Nelson 11, Chap 1.2, p22, Q4,6,8
(2) Linear Relations: Nelson 10, Chap 1.1, p12, Q4,8,10