Course: Grade 12 U Advanced Functions

Lesson : <u>2 - 2</u>

Unit/Chapter: <u>Functions</u>

Topic: <u>Functions Types</u>

homework check: <u>ASM12</u> p. 22 exercise 1.1 p. 25 exercise 1.2

note: <u>Function Types</u>

As grade 12 students, you should be familiar with these different types of functions - their basic shape and equation:

- 1. linear functions of the form y = mx + b (draw line)
- 2. quadratic functions of the form $y = Ax^2 + Bx + C$ or $y = a(x-g)^2 + h$ (draw parabola)
- 3. rational functions of the form $y = \frac{a}{(x-g)} + h$ (draw basic rational)
- 4. cubic functions of the form $y = a(x-g)^3 + h$ (draw basic cubic)
- 5. absolute value functions of the form y = a|x g| + h (draw basic absolute)
- 6. radical functions of the form $y = a\sqrt{x-g} + h$ (draw basic rational)

Recall the purpose of each letter in the equation. The "a" defines a vertical stretch or compression, the "g" defines a horizontal translation to the left or right, and the "H" defines a vertical translation up or down. These transformations help to define the domain or range of the function as well as their graph positions. For example,

a) $y = 2x^2 - 8x + 6$ *we cannot graph this function in this form, so we complete the square

 $y = 2(x^2 - 4x + 4) - 8 + 6$ $y = 2(x - 2)^2 - 2$ "a"= 2, vertical stretch by a factor of 2 "g"= -2. horizontal translation of 2 units to the right "h"= -2, vertical translation down by 2 units (3.0) (3.0) (2.-2) (2.-2)



homework assignment: <u>FM12</u> p. 193 exercise 6.5 #4, 5(odds),6 – 8

EXERCISE 6.5

4. Use transformations to graph the following functions starting from the graph of $y = x^2$.

(a) $y = 3x^2 - 1$ (b) $y = -2x^2$ (c) $y = -\frac{1}{2}(x - 3)^2$ (d) $y = -2(x + 3)^2 + 4$

5. Complete the square and use transformations to graph the following functions.

(a)
$$y = x^2 + 2x + 2$$

(b) $y = x^2 - 6x$
(c) $y = x^2 - x + 3$

(d) $y = x^2 - 5x - 5$ (e) $y = -x^2 + 8x - 12$ (f) $y = 3x - x^2$ (g) $y = 2x^2 + 8x - 3$ (h) $y = 3x^2 - 6x + 1$ (i) $y = x^2 + x + 1$ (j) $y = -2x^2 - 16x + 5$

6. Use transformations to graph the following functions starting from the graph of $y = x^3$.

7. Use transformations to graph the following functions starting from the graph of y = |x|.

(a) $y = -x^3$ (a) y = |x - 4|(b) $y = x^3 - 1$ (b) y = -|x| + 1(c) $y = \frac{1}{3}x^3$ (c) $y = \frac{1}{2}|x + 2|$ (d) $y = (x + 5)^3$ (d) y = |x - 3| - 5

8. Use transformations to graph the following functions starting from the graph of $y = \frac{1}{v}$.

(a) $y = \frac{1}{x - 1}$ (b) $y = \frac{1}{x} - 1$ (c) $y = \frac{2}{x} + 3$ (d) $y = -\frac{1}{x + 2}$