COLLEGE ALGEBRA

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GPS # 4 **1.4** **EQUATIONS OF LINES**

Class Time: T/R 11:30 Date: 1-10-08

Useful Guidelines:

* The slope-intercept form of the equation of a line with slope m and y-intercept b: $y = mx + b$
* The point-slope form of the equation of a line with slope m passing through the point (x_1, y_1): $y - y_1 = m(x - x_1)$
* The general form or standard form of the equation of a line with slope m and y-intercept b: $ax + by = c$
* **Average rage of change** of $f(x)$ with respect to x over the interval from $x = a$ to $x = b$: $\dfrac{f(b) - f(a)}{b - a}$
* The **difference quotient**: $\dfrac{f(x+h) - f(x)}{h}$

20/20 Good Job!

1. Find the equation in slope-intercept form of the line satisfying the given conditions.

a) slope 4; y-intercept (0,9)

$Y = 4X + 9$

b) slope $-\frac{7}{4}$; y-intercept (0,-2)

$Y = -\frac{7}{4} - 2$

2. Using the point-slope form to find an equation of the line that satisfies the given conditions. Write the equation in slope-intercept form and in standard form.

a) Through (6, 1); slope $-\frac{1}{3}$

$Y - 1 = -\frac{1}{3}(X - 6)$ point-slope form

$Y = -\frac{1}{3}X + 2 + 1$

$Y = -\frac{1}{3}X + 3$ - slope intercept form

$+\frac{1}{3}X = 3$

$Y + X = 9$ standard form

b) Through (-3,-2); slope $-\frac{4}{3}$

$Y + 2 = -\frac{4}{3}(X + 3)$ - point slope form

$Y = -\frac{4}{3}X - 4 - 2$

$Y = -\frac{4}{3}X - 6$ - slope intercept form

$Y = -\frac{4}{3}X - 6$

$Y + \frac{4}{3}X = 6$

$3Y + 4X = -18$ standard form

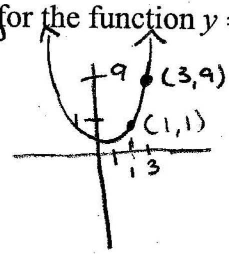
3. a) Write an equation in standard form where the line goes through the point (-2, 4), and is horizontal.

$Y = 4$

b) Write an equation in standard form of the line passing through the points (3, 2) and (3, -2). (vertical)

$X = 3$

4. Compute the average (non linear) rate of change (slope) for the function $y = x^2$, between $x = -3$ (B) and $x = 2$ (A).



$f(3)\ X = 9$

$f(2)\ X = 4$

$\dfrac{f(b) - f(a)}{b - a} = \dfrac{f(-3) - f(2)}{-3 - 2}$

$\dfrac{9 - 4}{-3 - 2} = \dfrac{5}{-5} = -1$

5. a) Find the difference quotient for the function $f(x) = 3x - 5$ and simplify it.

$\dfrac{f(x+h) - f(x)}{h} = 3(x+h) - 5 = \dfrac{[\cancel{3x} + 3h - \cancel{5}] - [\cancel{3x} - \cancel{5}]}{h} = \dfrac{3h}{h} = 3$

b) Find the difference quotient for the function $f(x) = x^2 + 2$ and simplify it.

$\dfrac{f(x+h) - f(x)}{h} = [(x+h)^2 + 2] = \dfrac{[\cancel{x^2} + 2xh + h^2 + \cancel{2}] - [\cancel{x^2} + \cancel{2}]}{h}$

$= \dfrac{2xh + h^2}{h} = \dfrac{\cancel{h}(2x + h)}{\cancel{h}} = 2x + h$