

COLLEGE ALGEBRA

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GPS #4

1.4

EQUATIONS OF LINES

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 rate of change of $f(x)$ with respect to x over the interval from $x = a$ to $x = b$: $\frac{f(b) - f(a)}{b - a}$
- * The difference quotient: $\frac{f(x+h) - f(x)}{h}$

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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 $(0, -2)$

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

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 $-\frac{1}{3}$

$$Y - 1 = -\frac{1}{3}(x - 6)$$

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

$$Y = -\frac{1}{3}x + 3$$

$$Y = -\frac{1}{3}x + 3$$

$$3Y = -x + 9$$

$$3Y + x = 9$$

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

$$Y + 2 = -\frac{4}{3}(x + 3)$$

$$Y + 2 = -\frac{4}{3}x - 4$$

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

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

$$3Y = -4x - 18$$

$$3Y + 4x = -18$$

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

$$Y = mx + b$$

$$m = 0$$

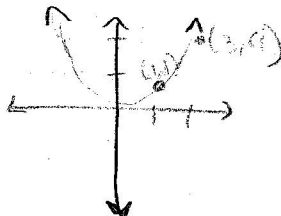
$$Y = 4$$

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

$$X = 3$$

slope = undefined

4. Compute the average rate of change for the function $y = x^2$, between $x = -3$ and $x = 2$.



$$\frac{f(b) - f(a)}{b - a}$$

$$f(-3) = 9 \quad f(2) = 4$$

$$\frac{f(-3) - f(2)}{-3 - 2} = \frac{9 - 4}{-3 - 2} = \frac{5}{-5} = -1$$

$$-1$$

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

$$f(x+h) = 3(x+h) - 5$$

$$3x + 3h - 5$$

$$\frac{(3x + 3h - 5) - (3x - 5)}{h} = \frac{3h}{h} = 3$$

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

$$f(x+h) = (x+h)^2 + 2$$

$$\frac{(x^2 + 2xh + h^2 + 2) - (x^2 + 2)}{h} = \frac{2xh + h^2}{h} = 2x + h$$