

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**: $\frac{f(x+h) - f(x)}{h}$

my guide

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 $-\frac{1}{3}$

$$y - 1 = -\frac{1}{3}(x - 6) \quad x + 3y = 9 \text{ (standard)}$$

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

$$y = -\frac{1}{3}x + 3 \text{ (slope-intercept)}$$

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

$$y + 2 = -\frac{4}{3}(x + 3) \quad 4x + 3y = -18 \text{ (standard)}$$

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

$$y = -\frac{4}{3}x - 6 \text{ (slope intercept)}$$

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

$$y = mx + b$$

$$m = 0$$

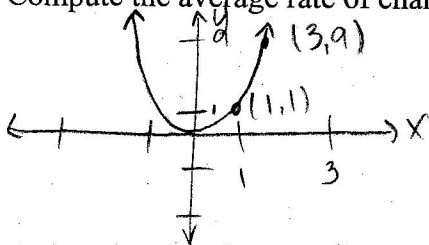
$$y = 4 \text{ (standard form)}$$

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

$$x = 3 \text{ (standard form)}$$

Slope = 0
"undefined"

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



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

$$x = -3 \quad x = 2$$

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

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

average rate of change = -1

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

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

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

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

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

$$x^2 + xh + xh + h^2$$

$$x^2 + 2xh + h^2$$