rk: HW 1.3

1 2 3 4 5 6 7 8 9 10

x. Score: 0 of 1 pt HW Score: 0% (0 of 10 pts) 0 of 10

(a) Find a simplified form of the difference quotient and (b) complete the following table.

$f(x) = 2x^2$

$f'(x) = 4x$

x	h	$\frac{f(x+h)-f(x)}{h}$
5	2	$20+2h = 24$
5	1	$20+2h = 22$
5	0.1	$20+2h = 20.2$
5	0.01	$20+2h = 20.02$

a) $\frac{f(x+h)-f(x)}{h} =$ ☐

D.Q.

$(a+b)^2 = a^2+2ab+b^2$

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

$= 2(x^2+2xh+h^2) = 2x^2+4xh+2h^2$

a) $\frac{f(x+h)-f(x)}{h} = \frac{2x^2+4xh+2h^2-2x^2}{h}$

$= \frac{h(4x+2h)}{h} = 4x+2h$

1 2 3 4 5 6 7 8 9 10

. Score: 0 of 1 pt HW Score: 0% (0 of 10 pts)

Compute the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the function $f(x)=\frac{8}{x+10}$.

$= 8(x+10)^{-1}$

$f'(x) = -8(x+10)^{-2}$

$= \frac{-8}{(x+10)^2}$

$\frac{f(x+h)-f(x)}{h} =$ ☐

$f(x+h) = \frac{8}{(x+h)+10}$

$$\frac{f(x+h)-f(x)}{h} = \left(\frac{8}{x+h+10} - \frac{8}{x+10}\right)\cdot\frac{1}{h}$$

$$= \frac{8(x+10)-8(x+h+10)}{(x+h+10)(x+10)}\cdot\frac{1}{h}$$

$$= \frac{8x+80-8x-8h-80}{(x+h+10)(x+10)}\cdot\frac{1}{h}$$

$$= \frac{-8h}{(x+h+10)(x+10)}\cdot\frac{1}{h}$$

$$= \frac{-8}{(x+h+10)(x+10)}$$

ork: HW 1.3

1 2 3 4 5 6 7 8 9 10

Ex. Score: 0 of 1 pt **HW Score:** 0% (0 of 10 pts)

Compute the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the function $f(x) = -4x^2 - 3x - 4$

$f'(x) = -8x - 3$

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

$f(x+h) = -4(x+h)^2 - 3(x+h) - 4$

$= -4(x^2+2xh+h^2) - 3x - 3h - 4$

$= -4x^2 - 8xh - 4h^2 - 3x - 3h - 4$

$$\frac{f(x+h)-f(x)}{h} = \frac{-4x^2-8xh-4h^2-3x-3h-4-(-4x^2-3x-4)}{h}$$

$$= \frac{-4x^2-8xh-4h^2-3x-3h-4+4x^2+3x+4}{h}$$

$$= \frac{-8xh-4h^2-3h}{h}$$

$$= \frac{h(-8x-4h-3)}{h} = -8x-4h-3$$

ork: HW 1.3

1 2 3 4 5 6 7 8 9 10

Ex. Score: 0 of 1 pt **HW Score:** 0%

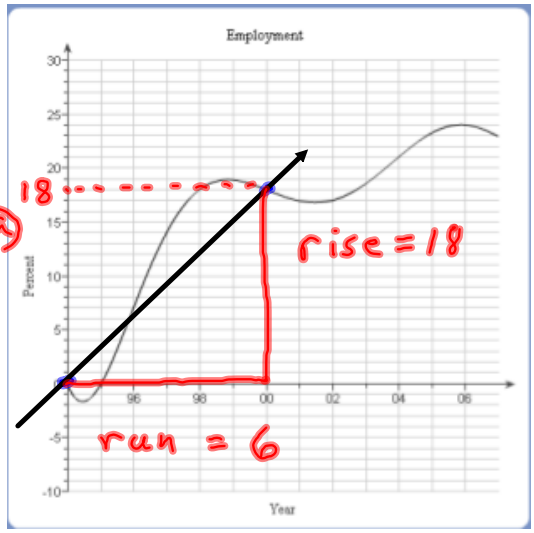
Use the graph to estimate the average rate of change of the percentage of new employees from 1994 to 2000, from 2000 to 2006, and from 1994 to 2006. (a)

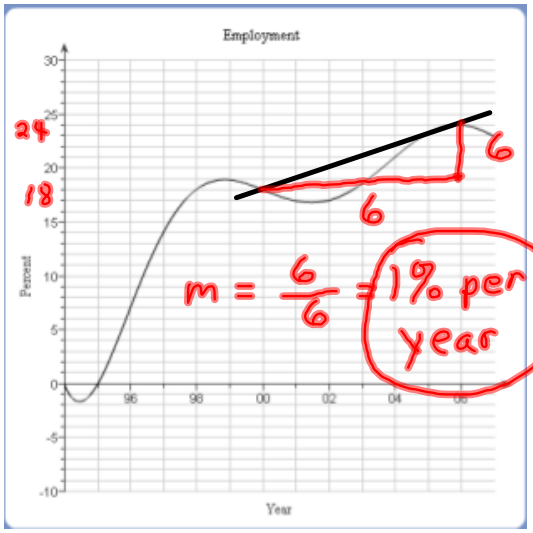
(b) (c)

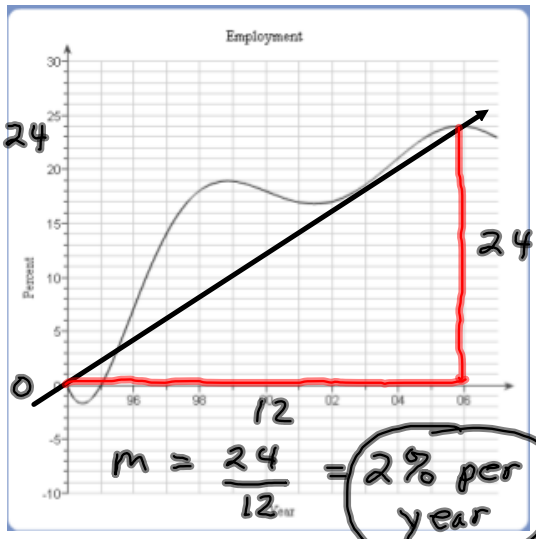
What is the average rate of change of the percentage of new employees from 1994 to 2000?

3 % per year $m = \frac{18}{6} = 3$

(Type an integer or a decimal rounded to two decimal places as needed.)







An object dropped from rest from the top of a tall building on Planet X falls a distance $d(t) = 20t^2$ feet in the first t seconds. Find the average rate of change of distance with respect to time as t changes from $t_1 = 4$ to $t_2 = 7$. This rate is known as the average velocity, or speed.

The average velocity as t changes from 4 to 7 seconds is $\square$ $\frac{\text{feet}}{\text{sec}}$.

x_1 to x_2

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

$$\text{avg vel.} = \frac{\Delta \text{ distance}}{\Delta \text{ time}}$$

$$= \frac{d(t_2) - d(t_1)}{t_2 - t_1}$$

$$= \frac{d(7) - d(4)}{7 - 4}$$

$$= \frac{980 - 320}{3} = \frac{660}{3} = 220 \frac{ft}{sec}$$