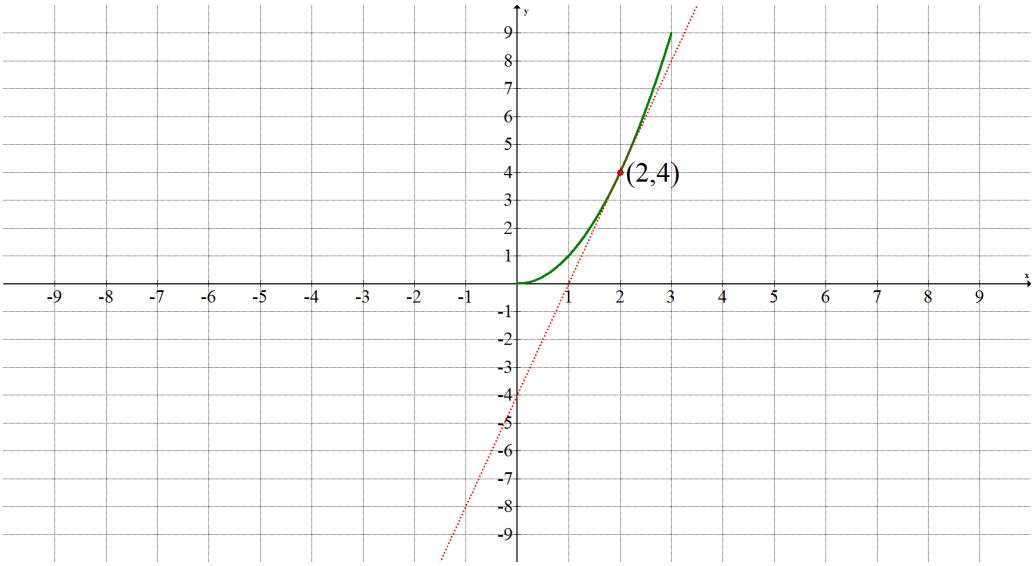
Section 1.5 Definition of Derivatives (Minimum Homework: 1, 3, 5, 7, 9, 11, 13, 15, 19, 21, 25, 29)

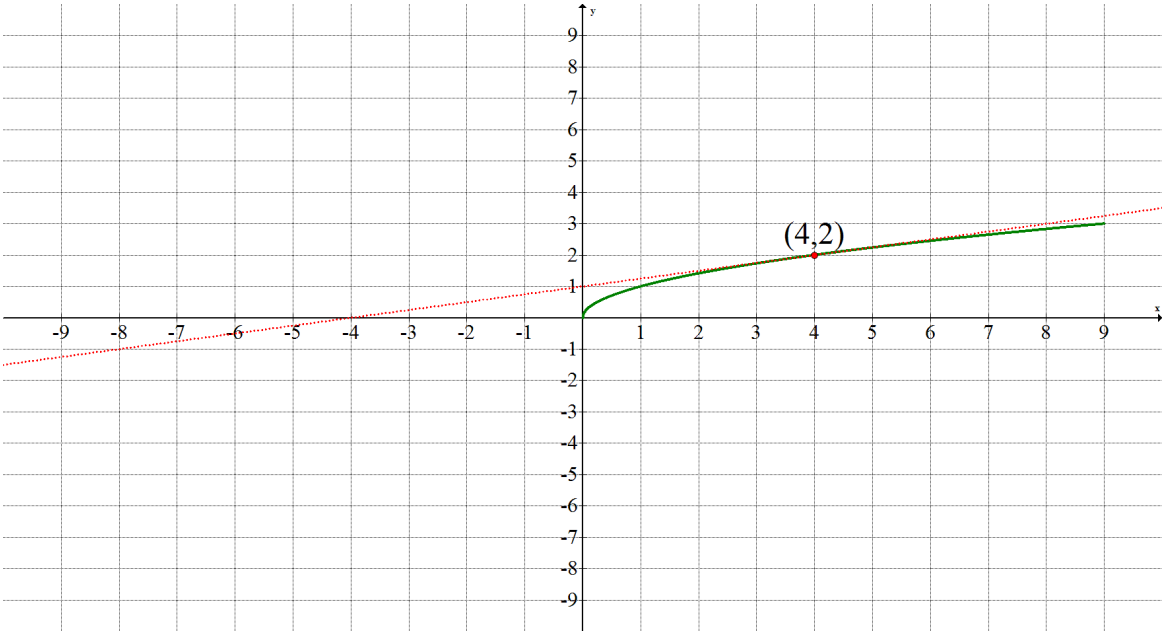
#1-4: Find the slope of the tangent line at the given point (x,y).

1)

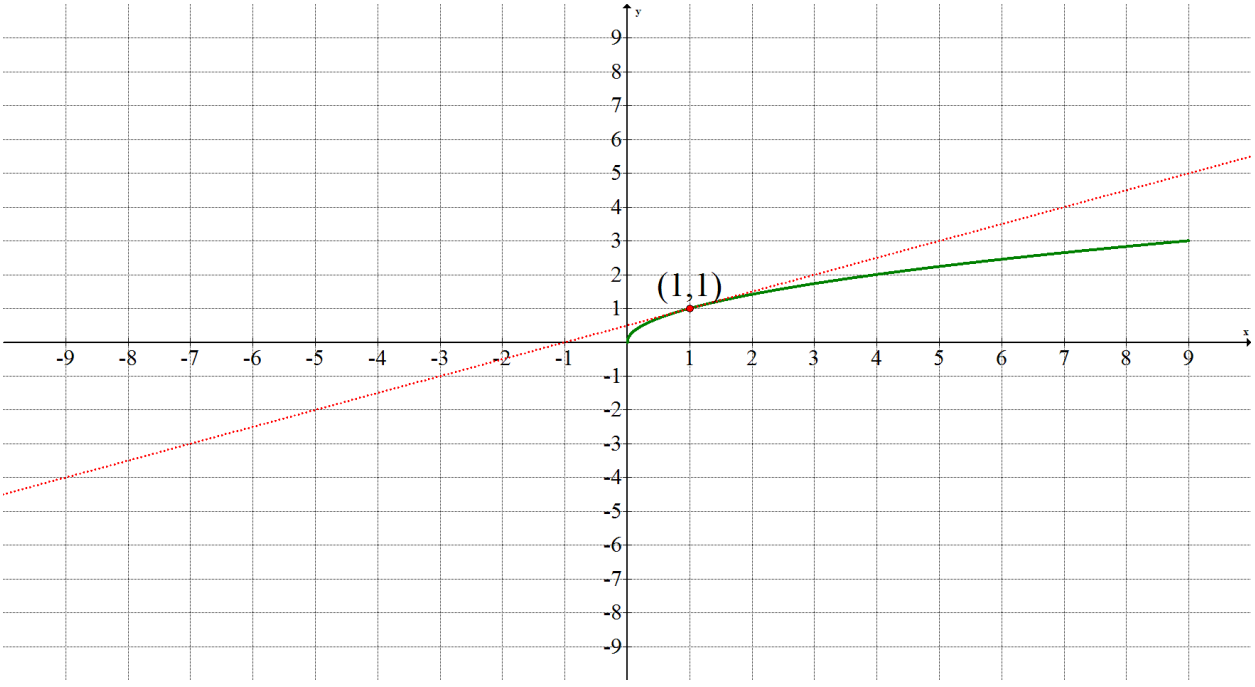


2)

3)



4)



#5-14: For each problem complete the following.

a) Use the definition of the derivative to find f'(x)

b) Find f'(4)

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

6) $f(x) = x^2 - 5x + 7$

7) $f(x) = 6x^2 + 12$

8) $f(x) = 3x^2 - 4$

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

10) $f(x) = 5x^2 - 6x + 1$

11) $f(x) = \frac{2}{x}$

12) $f(x) = \frac{3}{x}$

13) $f(x) = \frac{5}{x}$

14) $f(x) = \frac{7}{x}$

#15-24: For each problem complete the following:

a) Find a formula to find the slope of a tangent line.

b) Find the equation of the tangent line through the given value of x.

15) $f(x) = x^2 + x - 4,\ x = 3$

16) $f(x) = x^2 - 2x + 3,\ x = 4$

17) $f(x) = 3x^2 + 7,\ x = 3$

18) $f(x) = 2x^2 - 1,\ x = -2$

19) $f(x) = 3x^2 - 2x + 3,\ x = 1$

20) $f(x) = 5x^2 - 2x + 8,\ x = 0$

21) $f(x) = \frac{-8}{x},\ x = -3$

22) $f(x) = -\frac{6}{x},\ x = -5$

23) $f(x) = \frac{-3}{x},\ x = 2$

24) $f(x) = \frac{-4}{x},\ x = 2$

25) A toy rocket is launched straight up so that its height *s*, in meters, at time *t*, in seconds, is given by $s(t) = -2t^2 + 30t + 5$.

a) Find s'(t)

b) Find s'(2) and interpret your answer

26) If a baseball is projected upward from ground level with an initial velocity of 64 feet per second, then its height is a function of time, given by $s(t) = -16t^2 + 64t$

a) Find s'(t)

b) Find s'(2) and interpret your answer

27) A pebble is dropped from a cliff, 50 m high. After t sec, the pebble is s meters above the ground, where $s(t)=50-2t^2$.

a) Find s'(t)
b) Find s'(1) and interpret your answer

28) A cannon ball is dropped from a building. Suppose that the height of the cannon ball (in meters) after t seconds is given by the quadratic function: $f(t) = -4.4t^2 + 50$.

a) Find f'(t)
b) Find f'(1) and interpret your answer

29) The profit from sale of x car seats for is given by the formula: $P(x)= 45x - 0.0025x^2 - 5000$
a) Find the marginal profit function P'(x)
b) Find P'(800) and interpret your answer

30) The profit from sale of x cell phones is given by the formula: $P(x)= 450x - 0.055x^2 - 300000$
a) Find the marginal profit function P'(x)
b) Find P'(1000) and interpret your answer

31) The cost of manufacturing x chairs is given by the function: $C(x) = x^2 + 40x + 800$
a) Find the marginal cost function C'(x)
b) Find C'(30) and interpret your answer

32) The cost of manufacturing x books is given by the function: $C(x) = x^2 + 30x + 50$
a) Find the marginal cost function C'(x)
b) Find C'(20) and interpret your answer