February 25

If f'(1) = -7 and f(1) = 10, write an equation of a line tangent to f(x) at x = 1.

$x = 1$

$y = 10$

slope $= -7$

$y - 10 = -7(x - 1)$

$y = -7x + 17$

February 25

Students will verbally explain how to find derivative, using the definition of the derivative.

(using the words:
limit, expand, simplify...)

Definition of the Derivative

$$\lim_{h\to 0} \frac{f(x+h)-f(x)}{h} = f'(x)$$

$y = x^2 - 7x + 20$

Find $\frac{dy}{dx}$

$(y', f'(x))$

$$f'(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$$

$$f(x) = x^2 - 7x + 20$$

$$f(x+h) = (x+h)^2 - 7(x+h) + 20$$

$$f'(x) = \lim_{h\to 0} \frac{(x+h)^2 - 7(x+h) + 20 - (x^2 - 7x + 20)}{h}$$

$$\lim_{h\to 0} \frac{(x+h)(x+h) - 7x - 7h + 20 - x^2 + 7x - 20}{h}$$

$$\lim_{h\to 0} \frac{x^2 + 2xh + h^2 - 7x - 7h + 20 - x^2 + 7x - 20}{h}$$

$$\lim_{h\to 0} \frac{2xh + h^2 - 7h}{h} = \lim_{h\to 0} \frac{h(2x + h - 7)}{h}$$

$$\lim_{h\to 0} 2x + h - 7 = 2x - 7$$

$$f'(x) = 2x - 7$$

Pg 125 #3, 5 (only use EQ 1), 19, 20, 27, 29, 31, 33, 35, 51 – 56 (all)

In Exercises 3–6, compute $f'(a)$ in two ways, using Eq. (1) and Eq. (2).

3. $f(x) = x^2 + 9x,\ a = 0$

Show Answer

4. $f(x) = x^2 + 9x,\ a = 2$

5. $f(x) = 3x^2 + 4x + 2,\ a = -1$

In Exercises 27–44, use the limit definition to compute $f'(a)$ and find an equation of the tangent line.

27. $f(x) = 2x^2 + 10x,\ a = 3$

Show Answer

28. $f(x) = 4 - x^2,\ a = -1$

29. $f(t) = t - 2t^2,\ a = 3$

Show Answer