

Q1

Saturday, September 5, 2020 2:33 PM

A curve has equation $y = f(x)$.

(a) Write an expression for the slope of the secant line through the points $P(7, f(7))$ and $Q(x, f(x))$.

- ☐ $\frac{f(x) - x}{f(7) - 7}$
- ☐ $\frac{f(7) - 7}{f(x) - x}$
- ☒ $\frac{f(x) - f(7)}{x - 7}$
- ☐ $\frac{x - 7}{f(x) - f(7)}$



(b) Write an expression for the slope of the tangent line at P .

- ☒ $\lim_{x \rightarrow 7} \frac{f(x) - f(7)}{x - 7}$
- ☐ $\lim_{x \rightarrow 0} \frac{f(x) - x}{f(7) - 7}$
- ☐ $\lim_{x \rightarrow 0} \frac{f(x) - f(7)}{x - 7}$
- ☐ $\lim_{x \rightarrow 7} \frac{x - 7}{f(x) - f(7)}$



a) $P(7, f(7))$ $Q(x, f(x))$

$$M_{pa} = \frac{\Delta y}{\Delta x} = \frac{f(x) - f(7)}{x - 7}$$

b) If P is $(7, f(7))$
 Q is $(x, f(x))$

Then $m = \lim_{x \rightarrow 7} \frac{f(x) - f(7)}{x - 7}$

Q2

Saturday, September 5, 2020

8:10 PM

Find an equation of the tangent line to the curve at the given point.

$$y = x^3 - 2x + 1, \quad (4, 57)$$

$$y = 46x - 127$$



$$a = 4 \text{ and } f(x) = 57$$

$$m = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

$$\lim_{x \rightarrow 4} \frac{f(x) - 57}{x - 4}$$

$$= \frac{(x^3 - 2x + 1) - 57}{x - 4}$$

$$= \frac{x^3 - 2x - 56}{x - 4}$$

use rational root theorem

<https://www.youtube.com/watch?v=gs0S9LpuxmE>

$$= \frac{\cancel{(x-4)}(x^2 + 4x + 14)}{\cancel{x-4}}$$

equation of Tangent line:

$$y - f(a) = f'(a)(x - a)$$

$$\lim_{x \rightarrow 4} = x^2 + 4x + 14$$

$$= (4)^2 + 4(4) + 14$$

$$= 16 + 16 + 14$$

$$= \underline{\underline{46}} \text{ slope of tangent line}$$

$$y - 57 = 46(x - 4)$$

$$y - 57 = 46x - 184$$

$$y = 46x - 184 + 57$$

$$y = 46x - 127$$

Q3

Sunday, September 6, 2020 6:15 PM

Find an equation of the tangent line to the curve at the given point.

$$y = \sqrt{x}, (49, 7)$$

$$y = \frac{1}{14}x + \frac{7}{2}$$



$$y = \sqrt{x}, (49, 7)$$

\swarrow \searrow
 $a = 49$ $f(a) = 7$

$$m = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

$$\lim_{x \rightarrow 49} \frac{\sqrt{x} - 7}{x - 49}$$

$$= \frac{\sqrt{x} - 7}{x - 49} (\sqrt{x} + 7)$$

$$= \frac{\cancel{x - 49}}{(\cancel{x - 49})(\sqrt{x} + 7)}$$

$$\lim_{x \rightarrow 49} = \frac{1}{\sqrt{x} + 7}$$

$$= \frac{1}{\sqrt{49} + 7}$$

$$f'(49) = \frac{1}{14}$$

slope of
Tangent
line

equation of Tangent line:

$$y - f(a) = f'(a)(x - a)$$

$$y - 7 = \frac{1}{14}(x - 49)$$

$$y - 7 = \frac{1}{14}x - \frac{7}{2}$$

$$y = \frac{1}{14}x - \frac{7}{2} + 7$$

$$y = \frac{1}{14}x + \frac{7}{2}$$

Q4

Sunday, September 6, 2020 7:22 PM

(a) Find the slope m of the tangent to the curve $y = 7 + 4x^2 - 2x^3$ at the point where $x = a$.

$$m = 8a - 6a^2$$

✓

(b) Find equations of the tangent lines at the points $(1, 9)$ and $(2, 7)$.

$$y(x) = 2x + 7$$

(at the point $(1, 9)$)

✓

$$y(x) = -8x + 23$$

(at the point $(2, 7)$)

✓

$$y = 7 + 4x^2 - 2x^3, \quad x = a, \quad f(x) = y$$

$$m = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

$$\begin{aligned} \lim_{h \rightarrow 0} \frac{7 + 4(a+h)^2 - 2(a+h)^3 - (7 + 4a^2 - 2a^3)}{h} &= \frac{7 + 4(a^2 + 2ah + h^2) - 2(a^3 + 3a^2h + 3ah^2 + h^3) - 7 - 4a^2 + 2a^3}{h} \\ &= \frac{7 + 4a^2 + 8ah + 4h^2 - 2a^3 - 6a^2h - 6ah^2 - 2h^3 - 7 - 4a^2 + 2a^3}{h} \\ &= \frac{8ah + 4h^2 - 6a^2h - 6ah^2 - 2h^3}{h} \end{aligned}$$

$$= \frac{h(8a + 4h - 6a^2 - 6ah - 2h^2)}{h}$$

equation of Tangent line.

$$y - f(a) = f'(a)(x - a)$$

$$\lim_{h \rightarrow 0} 8a + 4h - 6a^2 - 6ah - 2h^2$$

$$= 8a + 4(0) - 6a^2 - 6a(0) - 2(0)^2$$

$$m = 8a - 6a^2$$

slope of tangent
to the curve
 $y = 7 + 4x^2 - 2x^3$,
 $x = a$

at point $(1, 9)$, $y(x) = ?$

$$a = 1$$

$$\begin{aligned} m &= 8a - 6a^2 \\ &= 8(1) - 6(1)^2 \\ &= 8 - 6 \\ &= 2 \end{aligned}$$

$$y - (9) = (2)(x - 1)$$

$$\begin{aligned} y - 9 &= 2x - 2 \\ &= 2x - 2 + 9 \end{aligned}$$

$$y(x) = 2x + 7$$

at point $(2, 7)$, $y(x) = ?$

$$a = 2$$

$$m = 8a - 6a^2$$

$$= 8(2) - 6(2)^2$$

$$= 16 - 24$$

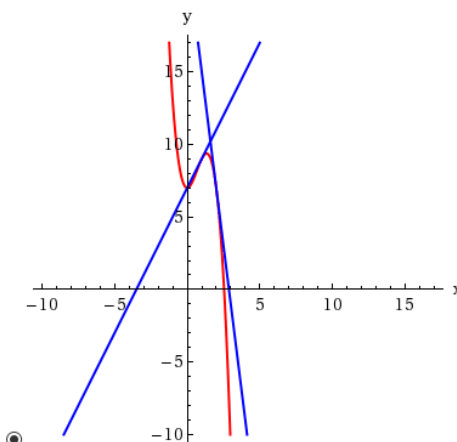
$$= -8$$

$$y - 7 = (-8)(x - 2)$$

$$y - 7 = -8x + 16$$

$$= -8x + 16 + 7$$

$$y(x) = -8x + 23$$



(a) Find the slope m of the tangent to the curve $y = 7/\sqrt{x}$ at the point where $x = a > 0$.

$$m = -\frac{7}{2}a^{-\left(\frac{3}{2}\right)}$$

(b) Find equations of the tangent lines at the points $(1, 7)$ and $(4, \frac{7}{2})$.

$$y(x) = -\frac{7}{2}x + \frac{21}{2}$$

(at the point $(1, 7)$)

$$y(x) = -\frac{7}{16}x + \frac{21}{4}$$

(at the point $(4, \frac{7}{2})$)

$$y = \frac{7}{\sqrt{x}}, \quad x = a > 0 \quad m = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

$$\begin{aligned} m &= \lim_{x \rightarrow a} \frac{\frac{7}{\sqrt{x}} - \frac{7}{\sqrt{a}}}{x - a} = \frac{\frac{7}{\sqrt{x}}(\frac{\sqrt{a}}{\sqrt{a}}) - \frac{7}{\sqrt{a}}(\frac{\sqrt{x}}{\sqrt{x}})}{x - a} = \frac{\frac{7\sqrt{a}}{\sqrt{x}\sqrt{a}} - \frac{7\sqrt{x}}{\sqrt{a}\sqrt{x}}}{x - a} \\ &= \frac{\frac{7\sqrt{a} - 7\sqrt{x}}{\sqrt{x}\sqrt{a}}}{x - a} = \frac{7\sqrt{a} - 7\sqrt{x}}{\sqrt{x}\sqrt{a}} \cdot \frac{1}{x - a} = \frac{7\sqrt{a} - 7\sqrt{x}}{\sqrt{x}\sqrt{a}(x - a)} \\ &= \frac{7\sqrt{a} - 7\sqrt{x}}{\sqrt{x}\sqrt{a}(x - a)} \cdot \frac{(\sqrt{a} + \sqrt{x})}{(\sqrt{a} + \sqrt{x})} = \frac{49a - 49x}{\sqrt{x}\sqrt{a}(x - a)(\sqrt{a} + \sqrt{x})} \\ &= \frac{49(x - a)}{\sqrt{x}\sqrt{a}(x - a)(\sqrt{a} + \sqrt{x})} = \frac{-49(x - a)}{\sqrt{x}\sqrt{a}(x - a)(\sqrt{a} + \sqrt{x})} \\ &= \frac{-7}{\sqrt{x}\sqrt{a}(\sqrt{a} + \sqrt{x})} \end{aligned}$$

$$\lim_{x \rightarrow a} \frac{-7}{\sqrt{x}\sqrt{a}(\sqrt{a} + \sqrt{x})} = \frac{-7}{\sqrt{a^2}(2\sqrt{a})}$$

$$\sqrt{a^2} = |a| = \begin{cases} a & a > 0 \\ -a & a < 0 \end{cases} \quad f(x) = \frac{1}{\sqrt{x}} \quad \text{Domain: } x > 0$$

$$= \frac{-7}{a(2\sqrt{a})} = \frac{-7}{2a^{\frac{3}{2}}} = -\frac{7}{2}a^{\frac{3}{2}}$$

$$m = \frac{-7}{2a^{\frac{3}{2}}} \quad \text{or} \quad -\frac{7}{2}a^{\frac{3}{2}}$$

equation of Tangent line.

$$y - y_0 = m(x - x_0)$$

$$(1, 7) : a = 1, f(a) = 7$$

$$m = \frac{-7}{2(1)^{\frac{3}{2}}} = \frac{-7}{2}$$

$$\begin{aligned} y - 7 &= -\frac{7}{2}(x - 1) \\ y &= -\frac{7}{2}x + \frac{7}{2} + 7 \end{aligned}$$

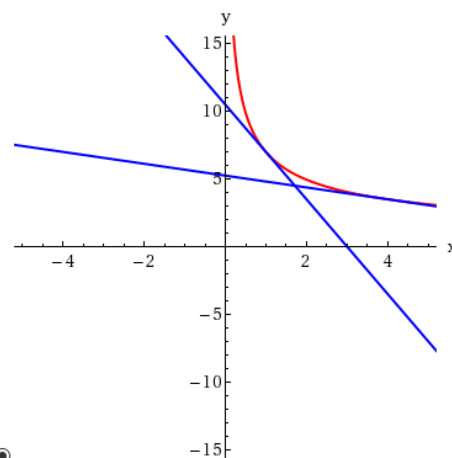
$$y = -\frac{7}{2}x + \frac{21}{2}$$

$$(4, \frac{7}{2}) : a = 4, f(a) = \frac{7}{2}$$

$$m = \frac{-7}{2(4)^{\frac{3}{2}}} = \frac{-7}{2(\sqrt{4})^3} = \frac{-7}{2(8)} = \frac{-7}{16}$$

$$\begin{aligned} y - \frac{7}{2} &= \frac{-7}{16}(x - 4) \\ y &= \frac{-7}{16}x + \frac{7}{4} + \frac{7}{2} \end{aligned}$$

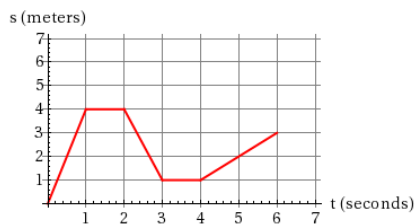
$$y = -\frac{7}{16}x + \frac{21}{4}$$



Q6

Monday, September 7, 2020 11:27 AM

(a) A particle starts by moving to the right along a horizontal line; the graph of its position function is shown in the figure.



For which of the following time intervals is the particle moving to the right? (Select all that apply.)

- ☒ (0, 1)
- ☐ (1, 2)
- ☐ (2, 3)
- ☐ (3, 4)
- ☒ (4, 6)

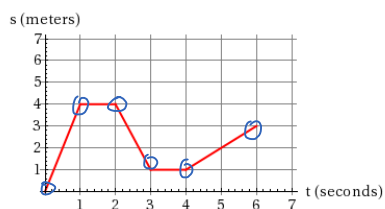
For which of the following time intervals is the particle moving to the left? (Select all that apply.)

- ☐ (0, 1)
- ☐ (1, 2)
- ☒ (2, 3)
- ☐ (3, 4)
- ☐ (4, 6)

For which of the following time intervals is the particle standing still? (Select all that apply.)

- ☐ (0, 1)
- ☒ (1, 2)
- ☐ (2, 3)
- ☒ (3, 4)
- ☐ (4, 6)

\nearrow = right \searrow = left \longrightarrow = still



$$\text{on } (0, 1), \text{ slope} = \frac{4-0}{1-0} = 4$$

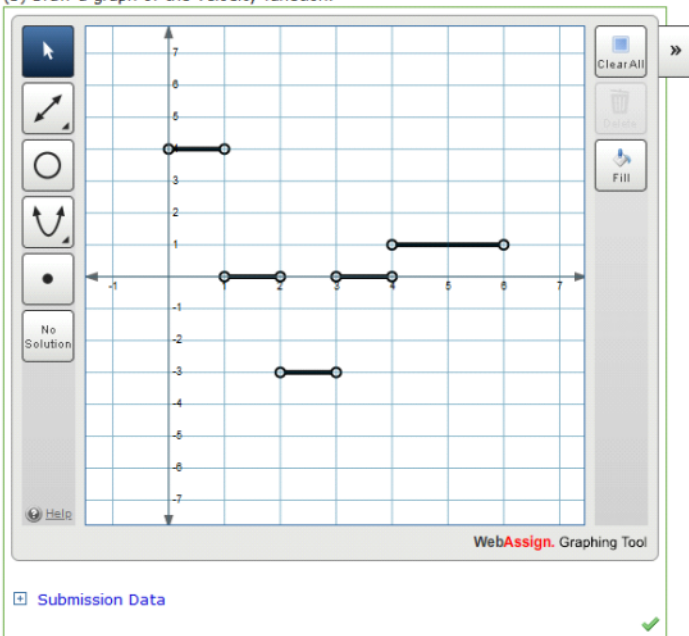
$$\text{on } (1, 2), \text{ slope} = 0$$

$$\text{on } (2, 3), \text{ slope} = \frac{1-4}{3-2} = \frac{-3}{1} = -3$$

$$\text{on } (3, 4), \text{ slope} = 0$$

$$\text{on } (4, 6), \text{ slope} = \frac{3-1}{6-4} = \frac{2}{2} = 1$$

(b) Draw a graph of the velocity function.



Q7

Monday, September 7, 2020

11:57 AM

If a ball is thrown into the air with a velocity of 39 ft/s, its height (in feet) after t seconds is given by $y = 39t - 16t^2$. Find the velocity when $t = 1$.

7 ft/s

$$a = 1, y = f(t)$$

$$f(t) = 39t - 16t^2$$

$$f(1) = 39(1) - 16(1)^2$$

$$= 39 - 16$$

$$f(1) = \underline{\underline{23}}$$

$$v(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

$$v(1) = \lim_{h \rightarrow 0} \frac{f(1+h) - f(1)}{h}$$

$$= \frac{[39(1+h) - 16(1+h)^2] - 23}{h}$$

$$= \frac{39 + 39h - 16(1 + 2h + h^2) - 23}{h}$$

$$= \frac{39 + 39h - 16 - 32h - 16h^2 - 23}{h}$$

$$= \frac{16h^2 + 7h}{h} = \frac{\cancel{h}(16h + 7)}{\cancel{h}} = 16h + 7$$

$$\lim_{h \rightarrow 0} 16(0) + 7 = \boxed{7 \text{ ft/s}}$$

Q8

Monday, September 7, 2020 12:20 PM

If a rock is thrown upward on the planet Mars with a velocity of 16 m/s, its height (in meters) after t seconds is given by $H = 16t - 1.86t^2$.

(a) Find the velocity of the rock after one second.

m/s

(b) Find the velocity of the rock when $t = a$.

m/s

(c) When will the rock hit the surface? (Round your answer to one decimal place.)

$t =$ s

(d) With what velocity will the rock hit the surface?

m/s

when $t = 1$

$$f(t) = 16t - 1.86t^2$$

$$f(1) = 16(1) - 1.86(1)^2$$

$$= 16 - 1.86$$

$$f(1) = 14.14$$

$$v(1) = \lim_{h \rightarrow 0} \frac{f(1+h) - 14.14}{h}$$

$$= \frac{16(1+h) - 1.86(1+h)^2 - 14.14}{h}$$

$$= \frac{16 + 16h - 1.86(1 + 2h + h^2) - 14.14}{h}$$

$$= \frac{16 + 16h - 1.86 - 3.72h - 1.86h^2 - 14.14}{h}$$

$$= \frac{-1.86h^2 + 12.28h}{h} = \frac{h(-1.86h + 12.28)}{h}$$

$$\lim_{h \rightarrow 0} = -1.86h + 12.28$$

$$= -1.86(0) + 12.28$$

$$= 12.28 \text{ ft/s} \quad (a)$$

$$v(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

when $t = a$

$$= \frac{16(a+h) - 1.86(a+h)^2 - (16a - 1.86a^2)}{h}$$

$$= \frac{16a + 16h - 1.86(a^2 + 2ah + h^2) - 16a + 1.86a^2}{h}$$

$$= \frac{16h - 1.86a^2 - 3.72ah + 1.86h^2 - 16h + 1.86a^2}{h}$$

$$= \frac{1.86h^2 - 3.72ah + 16h}{h} = \frac{h(1.86h - 3.72a + 16)}{h}$$

$$\lim_{h \rightarrow 0} = 1.86h - 3.72a + 16 = 1.86(0) - 3.72a + 16$$

$$= -3.72a + 16 \text{ ft/s} \quad (b)$$

$$H = 16t - 1.86t^2$$

$$(100) \quad 0 = 16t - 1.86t^2 \quad (100)$$

$$0 = 1600t - 186t^2$$

$$-186t^2 + 1600t = 0$$

quadratic formula

$$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$t = \frac{-1600 \pm \sqrt{1600^2 - 4(-186)0}}{2(-186)} = 0 \text{ s} \quad \text{Initial velocity}$$

$$t = \frac{-1600 - \sqrt{1600^2 - 4(-186)0}}{2(-186)} = \frac{800}{93} \approx 8.6 \text{ s} \quad (c)$$

final velocity

$$f(8.6) = -3.72(8.6) + 16$$

$$= -15.992 \text{ m/s} \quad (d)$$

Q9

Monday, September 7, 2020

12:41 PM

The displacement (in meters) of a particle moving in a straight line is given by the equation of motion $s = 7/t^2$, where t is measured in seconds. Find the velocity of the particle at times $t = a$, $t = 1$, $t = 2$, and $t = 3$.

$t = a$	$v = \frac{-14}{a^3}$	m/s
$t = 1$	$v = -14$	m/s
$t = 2$	$v = -7/4$	m/s
$t = 3$	$v = -14/27$	m/s

$$\begin{aligned}
 v(a) &= \lim_{h \rightarrow 0} \frac{s(a+h) - s(a)}{h} = \frac{\frac{7}{(a+h)^2} - \frac{7}{a^2}}{h} \\
 &= \frac{\frac{7}{(a+h)^2} \left(\frac{a^2}{a^2} \right) - \frac{7}{a^2} \left(\frac{(a+h)^2}{(a+h)^2} \right)}{h} = \frac{7a^2 - 7(a+h)^2}{a^2(a+h)^2} \cdot \frac{1}{h} \\
 &= \frac{7a^2 - 7(a^2 + 2ah + h^2)}{h a^2 (a+h)^2} = \frac{7a^2 - 7a^2 - 14ah - 7h^2}{h a^2 (a+h)^2} \\
 &= \frac{-\cancel{h}(14a + 7h)}{\cancel{h} a^2 (a+h)^2} = \frac{-14a - 7h}{a^2(a+h)^2} \\
 &= \lim_{h \rightarrow 0} \frac{-14a - 7h}{a^2(a+h)^2} = \frac{-14a - 7(0)}{a^2(a+0)^2} = \frac{-14\cancel{a}}{a^2 \cdot \cancel{a^2}} = \boxed{-\frac{14}{a^3} \text{ m/s}}
 \end{aligned}$$

$$v(1) = \frac{-14}{a^3} = \frac{-14}{(1)^3} = \boxed{-14 \text{ m/s}}$$

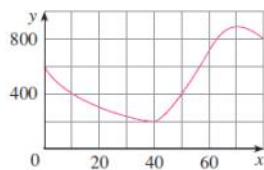
$$v(2) = \frac{-14}{a^3} = \frac{-14}{(2)^3} = \frac{-14}{8} = \boxed{-\frac{7}{4} \text{ m/s}}$$

$$v(3) = \frac{-14}{a^3} = \frac{-14}{(3)^3} = \boxed{-\frac{14}{27} \text{ m/s}}$$

Q10

Monday, September 7, 2020 4:27 PM

The graph of a function f is shown.



(a) Find the average rate of change of f on the interval $[20, 70]$. (Round your answer to the nearest integer.)

12 ✓

(b) Identify an interval on which the average rate of change of f is 0.

- ☐ $[0, 80]$
☐ $[10, 40]$
☐ $[20, 40]$
☒ $[10, 50]$
☐ $[0, 60]$

(c) Which interval gives a larger average rate of change, $[40, 50]$ or $[40, 80]$?

- ☒ $[40, 50]$
☐ $[40, 80]$

(d) Compute $\frac{f(40) - f(10)}{40 - 10}$.

-20/3 ✓

What does this value represent geometrically?

- ☐ the slope of the tangent line at $(15, f(15))$
☒ the slope of the line segment from $(10, f(10))$ to $(40, f(40))$
☐ the slope of the tangent line at $(40, f(40))$
☐ the slope of the tangent line at $(10, f(10))$

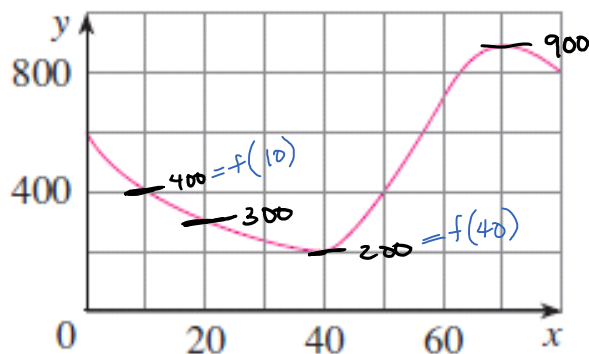
$$(a) \text{ Average rate of change} = \frac{\Delta y}{\Delta x}$$

$$\frac{900 - 300}{70 - 20} = 12$$

$$(d) \frac{f(40) - f(10)}{40 - 10}$$

$$= \frac{(200) - (400)}{40 - 10}$$

$$= \frac{-200}{30}$$



Q11

Monday, September 7, 2020 4:32 PM

Find an equation of the tangent line to the graph of $y = g(x)$ at $x = 5$ if $g(5) = -3$ and $g'(5) = 6$. (Enter your answer as an equation in terms of y and x .)

$$y = g(x), x = 5, g(5) = -3, g'(5) = 6$$

$$a = 5$$

equation of Tangent line.

$$y - f(a) = f'(a)(x - a)$$

$$y - (-3) = 6(x - 5)$$

$$y + 3 = 6x - 30$$

$$y = 6x - 30 - 3$$

$$y = 6x - 33$$

Q12

Monday, September 7, 2020 4:42 PM

If $f(x) = 7x^2 - x^3$, find $f'(1)$ and use it to find an equation of the tangent line to the curve $y = 7x^2 - x^3$ at the point $(1, 6)$.

$$y = 11x - 5$$



$$f(x) = 7x^2 - x^3$$

Derivative of a function

$$f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

$$f'(1) = \lim_{h \rightarrow 0} \frac{f(1+h) - f(1)}{h} = \frac{7(1+h)^2 - (1+h)^3 - (7(1)^2 - (1)^3)}{h}$$

$$= \frac{7(1 + 2h + h^2) - (1 + 3h + 3h^2 + h^3) - (7 - 1)}{h} = \frac{\cancel{7} + 14h + 7h^2 - \cancel{1} - 3h - 3h^2 - h^3 - \cancel{6}}{h}$$

$$= \frac{-h^3 + 4h^2 + 11h}{h} = \frac{h(-h^2 + 4h + 11)}{h}$$

$$= \lim_{h \rightarrow 0} -h^2 + 4h + 11 = -(0)^2 + 4(0) + 11 = 11$$

$$m = \frac{\Delta y}{\Delta x} = 11$$

$$= \frac{y - 6}{x - 1} = 11$$

$$= y - 6 = 11(x - 1)$$

$$= y - 6 = 11x - 11$$

$$= y = 11x - 11 + 6$$

$$= y = 11x - 5$$

Q13

Monday, September 7, 2020 5:20 PM

Find $f'(a)$.

$$f(x) = 3x^2 - 4x + 1$$

 $f'(a) =$

Derivative of a function

$$f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

$$f(x) = 3x^2 - 4x + 1$$

$$\begin{aligned} f'(a) &= \lim_{h \rightarrow 0} \frac{3(a+h)^2 - 4(a+h) + 1 - [3a^2 - 4a + 1]}{h} \\ &= \frac{3(a^2 + 2ah + h^2) - 4a - 4h + 1 - 3a^2 + 4a - 1}{h} \\ &= \frac{\cancel{3a^2} + 6ah + 3h^2 - \cancel{4a} - 4h + \cancel{1} - \cancel{3a^2} + \cancel{4a} - \cancel{1}}{h} \\ &= \frac{3h^2 + 6ah - 4h}{h} = \frac{\cancel{h}(3h + 6a - 4)}{\cancel{h}} \end{aligned}$$

$$\lim_{h \rightarrow 0} 3h + 6a - 4 = 3(0) + 6a - 4 = \underline{\underline{6a - 4}}$$

$$f'(a) = \boxed{6a - 4}$$

Q14

Monday, September 7, 2020 5:30 PM

Find $f'(a)$.

$$f(x) = \sqrt{3-4x}$$

$$f'(a) = \frac{-2}{\sqrt{3-4a}}$$



Derivative of a function

$$f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

$$f(x) = \sqrt{3-4x}$$

$$f'(a) = \lim_{h \rightarrow 0} \frac{\sqrt{3-4(a+h)} - (\sqrt{3-4(a)})}{h}$$

$$= \frac{\sqrt{3-4a-4h} - \sqrt{3-4a}}{h} \cdot \left(\frac{\sqrt{3-4a-4h} + \sqrt{3-4a}}{\sqrt{3-4a-4h} + \sqrt{3-4a}} \right)$$

$$= \frac{\sqrt{3-4a-4h}^2 - \sqrt{3-4a}^2}{h(\sqrt{3-4a-4h} + \sqrt{3-4a})} = \frac{\cancel{3-4a} - 4h - \cancel{3+4a}}{h(\sqrt{3-4a-4h} + \sqrt{3-4a})}$$

$$= \frac{-4h}{h(\sqrt{3-4a-4h} + \sqrt{3-4a})} = \frac{-4}{\sqrt{3-4a-4h} + \sqrt{3-4a}}$$

$$\lim_{h \rightarrow 0} = \frac{-4}{\sqrt{3-4a-4(0)} + \sqrt{3-4a}} = \frac{-4}{\sqrt{3-4a} + \sqrt{3-4a}}$$

$$= \frac{-4}{2\sqrt{3-4a}} = \frac{-2}{\sqrt{3-4a}}$$

$$f'(a) = \frac{-2}{\sqrt{3-4a}}$$