Name: Richard

MATH 200 – QUIZ 4N

I'm in the Thurs11 Thurs12 Thurs1 or Fri10 recitation. (Circle one)

September 19, 2012

1. Use the limit process to find slope of the graph of $f(x) = 3x^2 - 1$ at the point $(-2,\ 11)$.
   As usual, show all work carefully and carry limits as appropriate.

$$m = \lim_{h\to 0} \frac{f(a+h)-f(a)}{h} = \lim_{h\to 0} \frac{f(-2+h)-f(-2)}{h}$$

$$= \lim_{h\to 0} \frac{3(-2+h)^2-1-(3(-2)^2-1)}{h} = \lim_{h\to 0} \frac{3(4-4h+h^2)-1-11}{h}$$

$$= \lim_{h\to 0} \frac{12-12h+3h^2-12}{h} = \lim_{h\to 0} \frac{h(-12+3h)}{h} = \lim_{h\to 0} (-12+3h)$$

$$= -12 + 3\cdot 0 = \boxed{-12}$$

2. Now find the equation of the line tangent to the graph of $y = f(x)$ at the point $(-2,\ 11)$.

$$y - y_0 = m(x - x_0)$$
$$y - 11 = -12(x-(-2))$$
$$y - 11 = -12(x+2)$$
$$y - 11 = -12x - 24$$
$$\boxed{y = -12x - 13}$$

Name: Richard

MATH 200 – QUIZ 4S

I'm in the Thurs11 Thurs12 Thurs1 or Fri10 recitation. (Circle one)

September 19, 2012

1. Find the slope of the graph of $f(x) = 2x^2 - 4$ at the point $(-2,\ 4)$.
   As usual, show all work carefully and carry limits as appropriate.

$$m = \lim_{h\to 0} \frac{f(a+h)-f(a)}{h} = \lim_{h\to 0} \frac{f(-2+h)-f(-2)}{h}$$

$$= \lim_{h\to 0} \frac{2(-2+h)^2-4-(2(-2)^2-4)}{h} = \lim_{h\to 0} \frac{2(4-4h+h^2)-4-4}{h}$$

$$= \lim_{h\to 0} \frac{8-8h+2h^2-8}{h} = \lim_{h\to 0} \frac{-8h+2h^2}{h} = \lim_{h\to 0} \frac{h(-8+2h)}{h}$$

$$= \lim_{h\to 0} (-8+2h) = -8 + 2\cdot 0 = \boxed{-8}$$

2. Now find the equation of the line tangent to the graph of $y = f(x)$ at the point $(-2,\ 4)$.

Point/Slope form:

$$y - y_0 = m(x - x_0)$$
$$y - 4 = -8(x-(-2))$$
$$y - 4 = -8x - 16$$
$$\boxed{y = -8x - 12}$$

Name: Richard

MATH 200 – QUIZ 4 E

I'm in the Thurs11 Thurs12 Thurs1 or Fri10 recitation. (Circle one)

September 19, 2012

1. Use the limit process to find the slope of the graph of $f(x) = 3x^2 - 6$ at the point $(-1, -3)$. As usual, show all work carefully and carry limits as appropriate.

$$m = \lim_{h\to 0} \frac{f(a+h)-f(a)}{h} = \lim_{h\to 0} \frac{f(-1+h)-f(-1)}{h}$$

$$= \lim_{h\to 0} \frac{3(-1+h)^2 - 6 - (3(-1)^2 - 6)}{h}$$

$$= \lim_{h\to 0} \frac{3(1-2h+h^2) - 6 - (-3)}{h} = \lim_{h\to 0} \frac{3 - 6h + 3h^2 - 3}{h}$$

$$= \lim_{h\to 0} \frac{-6h + 3h^2}{h} = \lim_{h\to 0} \frac{h(-6+3h)}{h} = \lim_{h\to 0} (-6+3h)$$

$$= -6 + 3(0) = \boxed{-6}$$

2. Now find the equation of the line tangent to the graph of $y = f(x)$ at the point $(-1, -3)$.

Point / Slope form

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

$$y - (-3) = -6(x - (-1))$$

$$\rightarrow y + 3 = -6x - 6$$

$$\boxed{y = -6x - 9}$$

Name: Richard

MATH 200 – QUIZ 4 W

I'm in the Thurs11 Thurs12 Thurs1 or Fri10 recitation. (Circle one)

September 19, 2012

1. Use the limit process to find the slope of the graph of $f(x) = 2x^2 - 5$ at the point $(-3, 13)$. As usual, show all work carefully and carry limits as appropriate.

$$m = \lim_{h\to 0} \frac{f(a+h)-f(a)}{h} = \lim_{h\to 0} \frac{f(-3+h)-f(-3)}{h}$$

$$= \lim_{h\to 0} \frac{2(-3+h)^2 - 5 - (2(-3)^2 - 5)}{h}$$

$$= \lim_{h\to 0} \frac{2(9-6h+h^2) - 5 - 13}{h} = \lim_{h\to 0} \frac{18 - 12h + 2h^2 - 18}{h}$$

$$= \lim_{h\to 0} \frac{-12h + 2h^2}{h} = \lim_{h\to 0} \frac{h(-12+2h)}{h} = \lim_{h\to 0} (-12+2h) = -12 + 2 \cdot 0$$

$$= \boxed{-12}$$

2. Now find the equation of the line tangent to the graph of $y = f(x)$ at the point $(-3, 13)$.

Point / Slope form:

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

$$y - 13 = -12(x - (-3))$$

$$\rightarrow y - 13 = -12x - 36$$

$$\boxed{y = -12x - 23}$$