

Name:

Ch3 Derivatives

Math2413

10. Find the equation of the line tangent to the graph $f(x) = \frac{x^2+1}{x^2-4}$ when $x=3$.

① $f'(x)$

② $f'(c)$

③ $f(c)$

④ $y = f'(c)(x-c) + f(c)$

$u = x^2 + 1$

$v = x^2 - 4$

$u' = 2x$

$v' = 2x$

$$\frac{u'v - uv'}{v^2}$$

①
$$\Rightarrow \frac{2x(x^2-4) - (x^2+1)(2x)}{(x^2-4)^2}$$

②
$$\frac{6(3^2-4) - (3^2+1)(6)}{(9-4)^2}$$

$$f'(3) = \frac{6(5) - 60}{25} = \frac{-30}{25} = -\frac{6}{5}$$

③
$$f(3) = \frac{3^2+1}{3^2-4} = \frac{10}{5} = 2$$

④
$$y = -\frac{6}{5}(x-3) + 2$$

$$\Rightarrow -\frac{6}{5}x + \frac{18}{5} + \frac{10}{5} = -\frac{6}{5}x + \frac{28}{5}$$

Exit Ticket Upload:

Angelica Zamer

1. Using the quotient rules with function values
- $f(4)=2$
- ;
- $g(4)=5$
- ;
- $f'(4)=6$
- ;
- $g'(4)=-3$
- , Find

$h'(4)$ if $h(x) = \frac{f(x)}{g(x)}$

$$\frac{u'v - uv'}{v^2}$$

$$\frac{f'g - fg'}{g^2}$$

$$\frac{6(5) - 2(-3)}{5^2} \Rightarrow \frac{30 + 6}{25}$$

$$h'(4) = \frac{36}{25}$$

2. Find the derivative for
- $f(x) = \frac{3\sqrt{x}-4}{x^6}$

$$f(x) = 3x^{1/2} - 4(x^{-6})$$

$$\Rightarrow 3x^{1/2}(x^{-6}) - 4x^{-6}$$

$$f(x) = 3x^{-11/2} - 4x^{-6}$$

$$f'(x) = -\frac{33}{2}x^{-13/2} + 24x^{-7}$$

$$f'(x) = -\frac{33}{2\sqrt{x^{13}}} + \frac{24}{x^7}$$