Name: Mr. Konichek Quiz 2: Ch 3.1 – 3.3

Draw a box around your final answers. No partial credit will be given.

3.1 #17

1. Find the derivative of the function: $f(x) = 5x^2 - 3x + 7$

$$\boxed{f'(x) = 10x - 3}$$

3.1 #13

2. Find the derivative of the function: $f(x) = 3\sqrt{x} = 3(x^{1/2})$

$$f'(x) = \frac{3}{2}x^{-1/2} = \boxed{\frac{3}{2\sqrt{x}}}$$

3.1 #35

3. Let $f(x) = 2x^3 - 4x$. Find $f'(-2)$.

$$f'(x) = 6x^2 - 4$$

$$f'(-2) = 6(-2)^2 - 4 = 24 - 4 = \boxed{20}$$

3.1 #29

4. Find the derivative of the function: $f(t) = \frac{4}{t^4} - \frac{3}{t^3} + \frac{2}{t} = 4t^{-4} - 3t^{-3} + 2t^{-1}$

$$f'(t) = -16t^{-5} + 9t^{-4} - 2t^{-2}$$

$$\boxed{f'(t) = \frac{-16}{t^5} + \frac{9}{t^4} - \frac{2}{t^2}} = \frac{-16 + 9t - 2t^3}{t^5}$$

final answer

$$\boxed{\frac{-2t^3 + 9t - 16}{t^5}}$$

5. Find the derivative of the function: $f(x) = 2x(x^2 + 1)$ **[2 lines]**

3.2 #1

$$f'(x) = 2x(2x) + (x^2+1)(2)$$

$$= 4x^2 + 2x^2 + 2$$

$$= \boxed{6x^2 + 2}$$

6. Find the derivative of the function: $f(x)=(3x+1)(x^2-2)$ **[2 lines]**

3.2 #5

$$f'(x) = (x^2-2)(3) + (3x+1)(2x)$$
$$= 3x^2-6+6x^2+2x$$
$$= \boxed{9x^2+2x-6}$$

7. Find the derivative of the function: $f(s)=\dfrac{s^2-4}{s+1}$ **[2 lines]**

$2s^2+2s-s^2-4$

3.2 #21

$$f'(s) = \frac{(s+1)(2s)-(s^2+4)(1)}{(s+1)^2}$$

$$\boxed{f'(s) = \frac{s^2+2s-4}{(s+1)^2}}$$

8. Find the derivative of the function: $f(x)=(2x-1)^3$ **[2 lines]**

3.3 #1

$$f'(x) = 3(2x-1)^2(2)$$
$$\boxed{f'(x) = 6(2x-1)^2}$$

9. Find the derivative of the function: $f(x)=(x^2+1)^3-(x^3+1)^2$ **[2 lines]**

3.3 #23

$$f'(x) = 3(x^2+1)^2(2x) - 2(x^3+1)(3x^2)$$
$$f'(x) = \boxed{6x(x^2+1)^2 - 6x^2(x^3+1)}$$

OR $6x\left[(x^2+1)^2 - x(x^3+1)\right]$

$\cancel{x^4}+2x^2+1-\cancel{x^4}-x$

$(+2x^2-x+1)$

$\boxed{\text{final answer } f'(x) = 6x(2x^2-x+1)}$

10. Find the derivative of the function: $f(x)=\left(\dfrac{x+3}{x-2}\right)^3$ **[2 lines]**

-5

$x-2-x-3$

3.3 #33

$$f'(x) = 3\left(\frac{(x+3)}{(x-2)}\right)^2 \frac{(x-2)(1)-(x+3)(1)}{(x-2)^2}$$

$$= \boxed{-15\,\frac{(x+3)^2}{(x-2)^4}}$$