Name:
Stu#: SOLUTIONS.

(1) [3 points] Differentiate: $y = \dfrac{x^3 - 5x + 2}{\sqrt{x}}$ $= x^{5/2} - 5x^{1/2} + 2x^{-1/2}$

$$\therefore y' = \frac{5}{2}x^{3/2} - \frac{5}{2}x^{-1/2} - x^{-3/2}$$

(2) [4 points] Differentiate: $y = \dfrac{x}{\cos x}$

$$y' = \frac{\cos x - x(-\sin x)}{\cos^2 x}$$

$$= \frac{\cos x + x\sin x}{\cos^2 x}$$

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(3) [4 points] Determine $\frac{dy}{dx}$: $y = (5x-2)^4(7x^2+3)^{-2}$

$$\frac{dy}{dx} = 4(5x-2)^3(5)(7x^2+3)^{-2} + (5x-2)^4(-2)(7x^2+3)^{-3}(14x)$$

$$= 20(5x-2)^3(7x^2+3)^{-2} - 28x(5x-2)^4(7x^2+3)^{-3}$$

(4) [4 points] Find $f'(x)$: $f(x) = \tan(x^2 \sin x)$

$$f'(x) = \sec^2(x^2 \sin x) \cdot [2x \sin x + x^2 \cos x].$$