1.

Marvin B. Waro BSCS 1B

Given the function

$f(x) = 4x^4 - 3x^3 + 2x - 2$. Solve for $f(2)$, $f(-2)$, $f(1/2)$, and $(-x)$.

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

$= 4(16) - 3(8) + 4 - 2$

$= 64 - 24 + 4 - 2$

$\boxed{f(2) = 42}$

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

$= 4(-2)^4 - 3(-2)^3 - 2(2) - 2$

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

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

$= -2(-2^5 - 3(4) + 2 + 1)$

$= -2(-32 - 12 + 2 + 1)$

$= -2(-41)$

$\boxed{f(-2) = 82}$

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

$= 4(1/16) - 3(1/8) + + - 2$

$= 1/4 - 3(1/8) + 1 - 2$

$= 1/4 - 3/8 + 1 - 2$

$= 1/8 + 1 - 2$

$= 1/8 - 1$

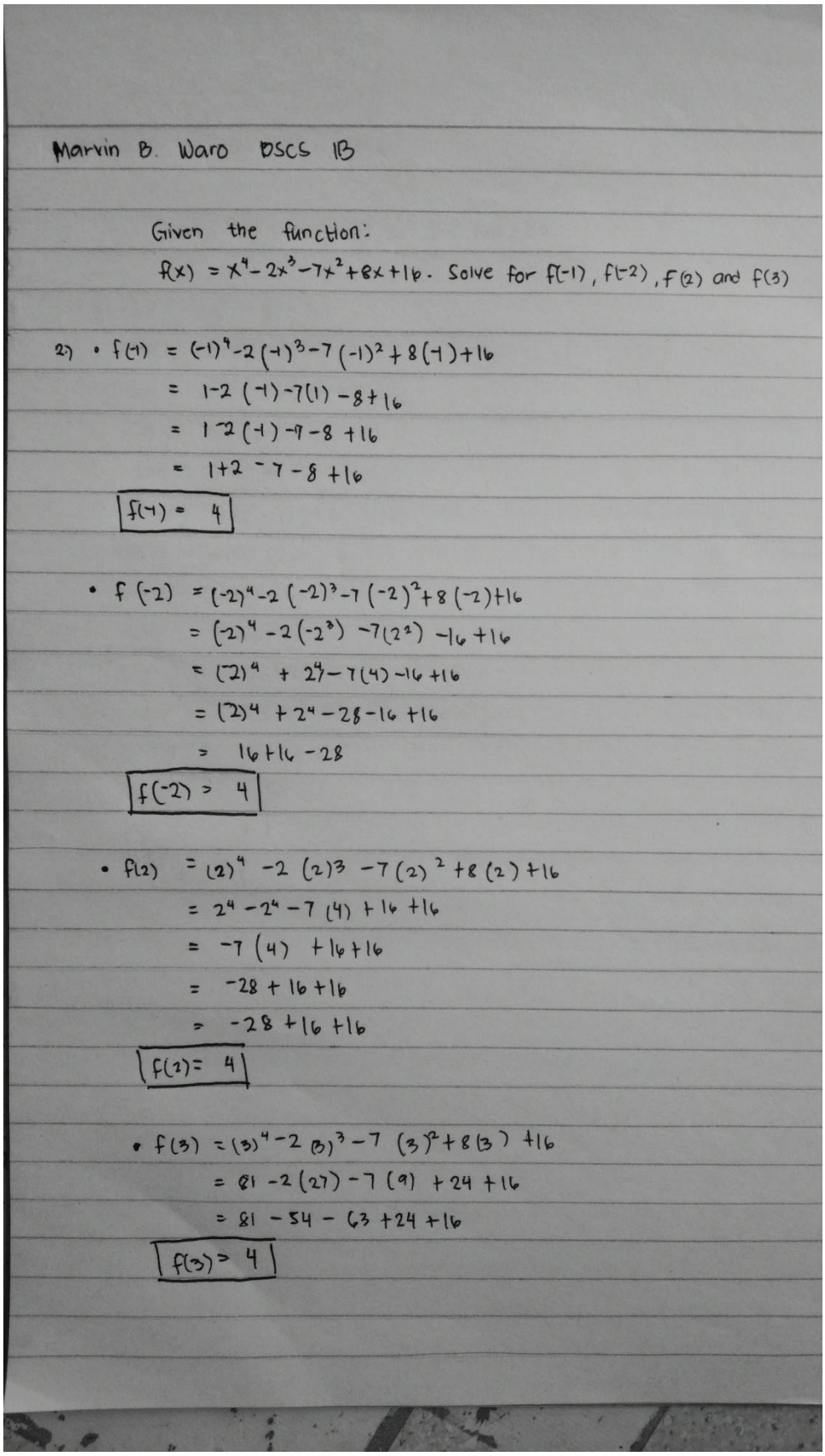
$f(1/2) = -9/8$

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

$= 4x^4 - 3(-x^3) - 2x - 2$

$\boxed{f(-x) = 4x^4 + 3x^3 - 2x - 2}$

2.



Marvin B. Waro BSCS 1B

Given the function:

$f(x) = x^4 - 2x^3 - 7x^2 + 8x + 16$. Solve for $f(-1)$, $f(-2)$, $f(2)$ and $f(3)$

2.) • $f(-1) = (-1)^4 - 2(-1)^3 - 7(-1)^2 + 8(-1) + 16$

$= 1 - 2(-1) - 7(1) - 8 + 16$

$= 1 - 2(-1) - 7 - 8 + 16$

$= 1 + 2 - 7 - 8 + 16$

$\boxed{f(-1) = 4}$

• $f(-2) = (-2)^4 - 2(-2)^3 - 7(-2)^2 + 8(-2) + 16$

$= (-2)^4 - 2(-2^3) - 7(2^2) - 16 + 16$

$= (-2)^4 + 2^4 - 7(4) - 16 + 16$

$= (-2)^4 + 2^4 - 28 - 16 + 16$

$= 16 + 16 - 28$

$\boxed{f(-2) = 4}$

• $f(2) = (2)^4 - 2(2)^3 - 7(2)^2 + 8(2) + 16$

$= 2^4 - 2^4 - 7(4) + 16 + 16$

$= -7(4) + 16 + 16$

$= -28 + 16 + 16$

$= -28 + 16 + 16$

$\boxed{f(2) = 4}$

• $f(3) = (3)^4 - 2(3)^3 - 7(3)^2 + 8(3) + 16$

$= 81 - 2(27) - 7(9) + 24 + 16$

$= 81 - 54 - 63 + 24 + 16$

$\boxed{f(3) = 4}$

3.

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Solve for the limit of the function

3. $\lim_{x \to -1} \dfrac{2x^2 - x - 3}{3x^2 + 5x + 2}$

$\lim_{x \to -1} \dfrac{2x^2 + 2x - 3x - 3}{3x^2 + 3x + 2x + 2}$

$\lim_{x \to -1} \dfrac{2x(x+1) - 3(x+1)}{3x(x+1) + 2(x+1)}$

$\lim_{x \to -1} \dfrac{(x+1)(2x-3)}{(x+1)(3x+2)}$

$\lim_{x \to -1} \dfrac{(2x-3)}{(3x+2)}$

$\lim_{x \to -1} \dfrac{2(-1)-3}{3(-1)+2}$

$\lim_{x \to -1} \dfrac{-5}{-1}$

$= 5$

4.

Marvin B. Waro BSCS 1B

Solve for the limit of the function.

$$4.)\ \lim_{x \to 2} \frac{x^3 - x^2 - x - 2}{2x^3 - 5x^2 + 5x - 6}$$

$$\lim_{x \to 2} \frac{x^3 - 2x^2 + x^2 - 2x + x - 2}{2x^3 - 4x^2 - x^2 + 2x + 3x - 6}$$

$$\lim_{x \to 2} \frac{x^2(x-2) + x(x-2) + 1(x-2)}{2x^2(x-2) - x(x-2) + 3(x-2)}$$

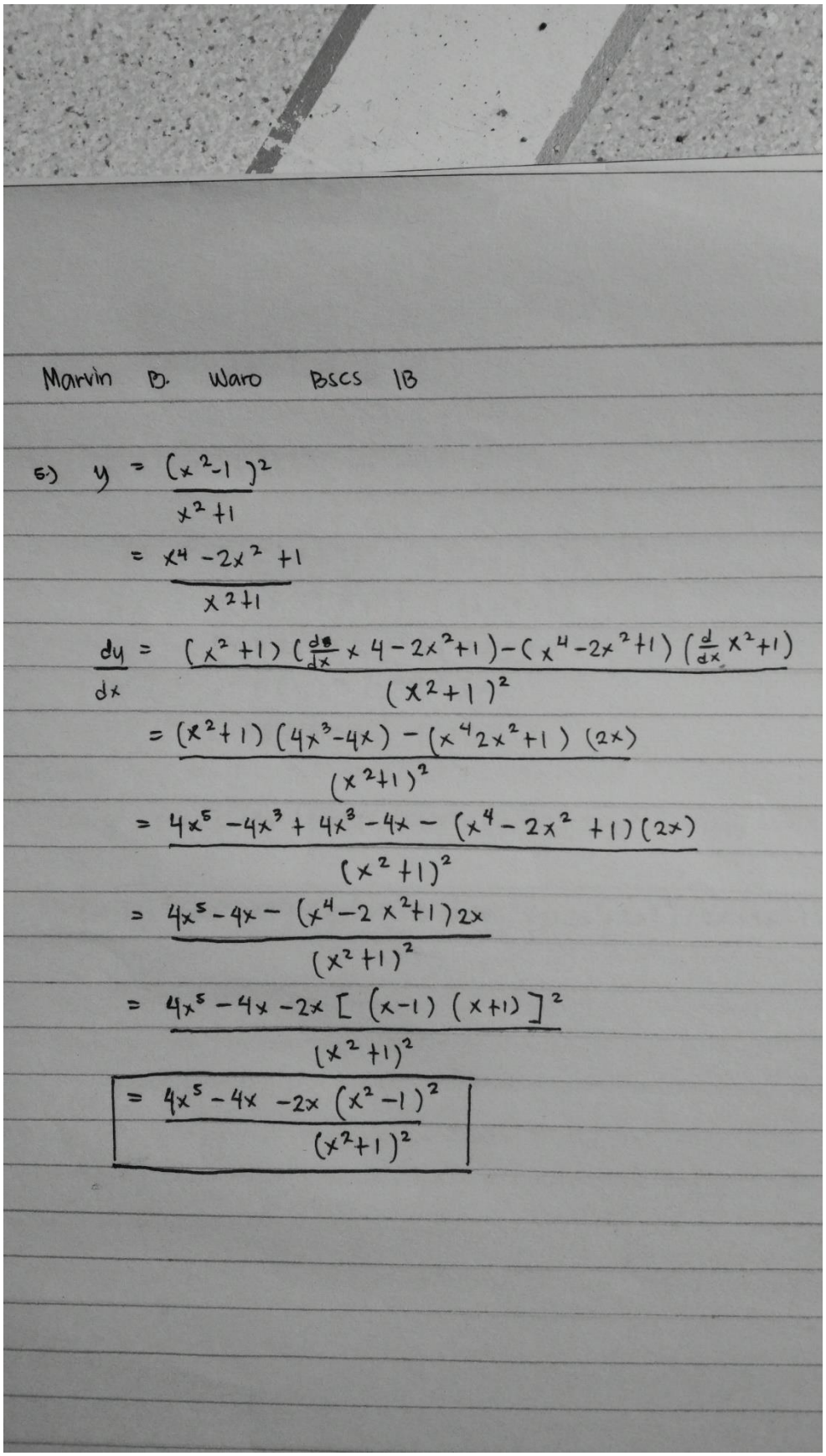
$$\lim_{x \to 2} \frac{(x-2)(x^2+x+1)}{(x-2)(2x^2-x+3)}$$

$$\lim_{x \to 2} \frac{2^2+2+1}{2(2)^2-2+3}$$

$$\lim_{x \to 2} \frac{4+2+1}{2(4)-2+3}$$

$$= \frac{7}{9}$$

5.



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5.) $y = \dfrac{(x^2-1)^2}{x^2+1}$

$= \dfrac{x^4-2x^2+1}{x^2+1}$

$\dfrac{dy}{dx} = \dfrac{(x^2+1)\left(\frac{d}{dx} \times 4-2x^2+1\right)-(x^4-2x^2+1)\left(\frac{d}{dx}x^2+1\right)}{(x^2+1)^2}$

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

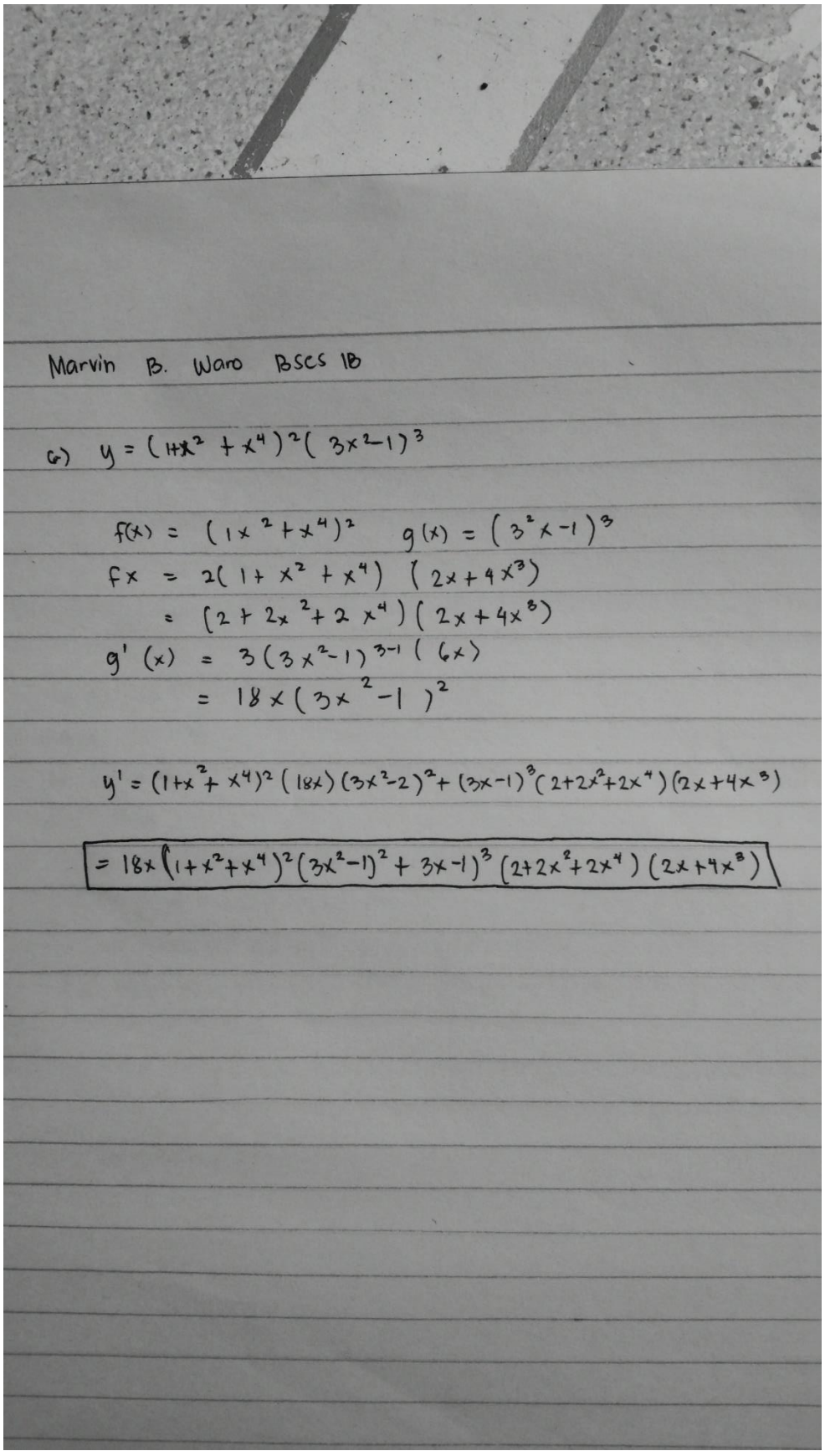
$= \dfrac{4x^5-4x^3+4x^3-4x-(x^4-2x^2+1)(2x)}{(x^2+1)^2}$

$= \dfrac{4x^5-4x-(x^4-2x^2+1)2x}{(x^2+1)^2}$

$= \dfrac{4x^5-4x-2x[(x-1)(x+1)]^2}{(x^2+1)^2}$

$\boxed{= \dfrac{4x^5-4x-2x(x^2-1)^2}{(x^2+1)^2}}$

6.



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

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

$fx = 2(1+x^2+x^4)(2x+4x^3)$

$= (2+2x^2+2x^4)(2x+4x^3)$

$g'(x) = 3(3x^2-1)^{3-1}(6x)$

$= 18x(3x^2-1)^2$

$y' = (1+x^2+x^4)^2(18x)(3x^2-2)^2+(3x-1)^3(2+2x^2+2x^4)(2x+4x^3)$

$= 18x\left[(1+x^2+x^4)^2(3x^2-1)^2+3x-1)^3(2+2x^2+2x^4)(2x+4x^3)\right]$

7.

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7.) $y = \dfrac{1}{(4x-1)^3(x^2-1)^{3/2}}$

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

$u = 4x - 1$

$z = x^2 - 1$

$y = u^{-3}$

$y = z^{-3/2}$

$dx = -3u^{-3-1}(4) - 3/2\, z^{-3/2-1}(2x)$

dy

$= -3u^{-4}(4) - 3/2\, z^{-5/2}(2x)$

$= (-12)u^{-4}(-3x)z^{-5/2}$

$= (-12)(4x-1)^{-4}(-3x)(x^2-1)^{-5/2}$

$\boxed{= -3x(4x-1)^{-3}(x^2-1)^{-5/2} - 12(4x-1)^{-4}(x^2-1)^{-3/2}}$

8.

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8) $y = \dfrac{2x^3}{\sqrt{3x^2+1}}$

$u = 2x^3 \qquad v = (3x^2+1)^{1/2}$

$$\frac{dy}{dx} = \frac{(3x^2+1)^{1/2}(2(3)x^{3-1}) - 2x3\left[\frac{1}{2}(3x^2+1)^{-1/2}\right](3(2)x^{2-1}+0)}{\sqrt{3x^2+1}^{\,2}}$$

$$= \frac{(3x^2+1)^{1/2}(6x^2) - 2x^3\left[\frac{1}{2}(3x^2+1)^{-1/2}\right](6x)}{\sqrt{3x^2+1}^{\,2}}$$

$$= \frac{(3x^2+1)^{1/2}(6x^2) - 6x^4(3x^2+1)^{-1/2}}{3x^2+1}$$

$$\boxed{= \frac{6x^2(3x^2+1)^{1/2} - 6x^4(3x^2+1)^{-1/2}}{3x^2+1}}$$