

17. 19 14 10

$$10. \quad y = x\sqrt{x^2+1}$$

$$= \underbrace{x}_f \underbrace{(x^2+1)}_g^{\frac{1}{2}}$$

$$y' = (1)(x^2+1)^{\frac{1}{2}} + x \left[ \frac{1}{2}(x^2+1)^{-\frac{1}{2}} (2x) \right]$$

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

$$= (x^2+1)^{-\frac{1}{2}} \left[ (x^2+1) + x^2 \right]$$

$$= (x^2+1)^{-\frac{1}{2}} \left[ 2x^2+1 \right]$$

$$= \frac{2x^2+1}{\sqrt{x^2+1}}$$

$$14. \quad y = \underbrace{(1-x^2)}^3 \underbrace{(6+2x)}^{-3}$$

$$y' = 3(1-x^2)^2(-2x)(6+2x)^{-3} + (1-x^2)^3(-3)(6+2x)^{-4}(2)$$

$$= -6(1-x^2)^2(6+2x)^{-4} \left[ x(6+2x) + (1-x^2) \right]$$

$$= -6(1-x^2)^2 \underbrace{(6+2x)}^{-4} \left[ x^2+6x+1 \right]$$

$$= \left( 2(3+x) \right)^{-4}$$

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

$$\begin{aligned}
 17. \quad f(x) &= \frac{-3x^4}{\sqrt{4x-8}} \quad \frac{f}{g} \\
 f'(x) &= \frac{-12x^3(4x-8)^{\frac{1}{2}} - (-3x^4)\left(\frac{1}{2}(4x-8)^{-\frac{1}{2}}(4)\right)}{4x-8} \\
 &= \frac{-6x^3(4x-8)^{-\frac{1}{2}} [2(4x-8) - x]}{4x-8} \\
 &= \frac{-6x^3(4x-8)^{-\frac{1}{2}} [7x-16]}{4x-8} \\
 &= \frac{-6x^3(7x-16)}{\underbrace{(4x-8)^{\frac{3}{2}}}_{CF=4}} \quad \checkmark \\
 &= \frac{-6x^3(7x-16)}{4^{\frac{3}{2}}(x-2)^{\frac{3}{2}}} \quad \text{OR} \\
 &= \frac{-3x^3(7x-16)}{4(x-2)^{\frac{3}{2}}} \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 19. \quad y &= \left[ \frac{1}{(4x+x^2)^3} \right]^3 \\
 &= \left[ (4x+x^2)^{-3} \right]^3 \\
 &= (4x+x^2)^{-9} \\
 y' &= -9(4x+x^2)^{-10} \underbrace{(4+2x)}_{CF=2} \\
 &= -18(4x+x^2)^{-10} (2+x) \\
 &= \frac{-18(2+x)}{(4x+x^2)^{10}}
 \end{aligned}$$