

$$2.2 \quad (u^n)' = n \cdot u^{n-1} \cdot u'$$

$$a) f(x) = (x+2)^5$$

$$f'(x) = 5(x+2)^{5-1} \cdot 1$$

$$f'(x) = 5(x+2)^4$$

$$b) f(x) = (1-x)^7$$

$$f'(x) = 7(1-x)^{7-1} \cdot (-1)$$

$$f'(x) = -7(1-x)^6$$

$$c) f(x) = (x^2+3x+2)^5$$

$$f'(x) = 5(x^2+3x+2)^4 \cdot (2x+3)$$

$$(x^2+3x+2) = (x+2)(x+1) \Rightarrow f'(x) = 5(x+2)^4 \cdot (x+1)^4 \cdot (2x+3)$$

$$d) f(x) = (x^3-1)^3$$

$$f'(x) = 3(x^3-1)^2 \cdot (3x^2-0)$$

$$f'(x) = 9x^2(x^3-1)^2$$

$$(x^3-1) = (x-1)(x^2-x+1) \Rightarrow f'(x) = 9x^2(x-1)^2(x^2-x+1)^2$$

$$e) f(x) = 3(x^2+x)^9$$

$$f'(x) = 3 \cdot [(x^2+x)^9]' = 3 \cdot 9(x^2+x)^8 \cdot (2x+1)$$

$$f'(x) = 27(x^2+x)^8(2x+1)$$

$$(x^2+x)^8 = [x(x+1)]^8 = x^8 \cdot (x+1)^8 \Leftrightarrow f'(x) = 27x^8(x+1)^8(2x+1)$$

$$f) f(x) = 5((x^2-1) \cdot 2)^7$$

$$2^7 = 128 \Rightarrow f(x) = 5 \cdot 128 \cdot (x^2-1)^7$$

$$f(x) = 640(x^2-1)^7$$

$$f'(x) = 640 \cdot [(x^2-1)^7]'$$

$$f'(x) = 640 \cdot 7(x^2-1)^6 \cdot 2x$$

$$f'(x) = 8960x(x^2-1)^6 = 8960x(x+1)^6(x-1)^6$$