2.8.8

a) $f'(x) = 1(x-3) + 1(x+1)$

$= x-3+x+1$

$= 2x-2$

$u = x+1 \quad v = x-3$

$u' = 1 \quad v' = 1$

b) $f'(x) = 1 \cdot (x^2+5) + x \cdot 2x$

$= x^2+5+2x^2$

$= 3x^2+5$

$u = x \quad v = x^2+5$

$u' = 1 \quad v' = 2x$

d) $\left((2x-1)(2-2x)(1+x)\right)'$

$u = 2x-1 \quad u' = 2$

$v = 2-2x \quad v' = -2$

$w = 1+x \quad w' = 1$

$= 2(2-2x)(1+x) + (2x-1)\cdot(-2)(1+x) + (2x-1)(2-2x)\cdot 1$

$= (4-4x)(1+x) + (-4x+2)(1+x) + \quad "$

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

$= -12x^2+4x+4$

f) $\left(\frac{x-2}{3-x}\right)'$

$u = x-2 \qquad u' = 1$

$v = 3-x \qquad v' = -1$

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

$$\left(= \frac{1}{\underbrace{x^2-6x+9}_{(x-3)^2 = (3-x)^2}}\right)$$

g) $\left(\frac{5}{2x^2-1}\right)' = 5\left(\frac{1}{2x^2-1}\right)' = 5\cdot\left(-\frac{4x}{(2x^2-1)^2}\right)$

$v = 2x^2-1$

$v' = 4x$

$$= -\frac{20x}{(2x^2-1)^2}$$

<u>ou</u>

$$= \frac{0\cdot(2x^2-1) - 5\cdot 4x}{(2x^2-1)^2} =$$

$u = 5$

$u' = 0$

h) $\dfrac{\left(1+\frac{1}{x}-\frac{2}{x^2}\right)'}{(1)'+\left(\frac{1}{x}\right)'-\left(\frac{2}{x^2}\right)'} = 0-\frac{1}{x^2}-\left(2\cdot x^{-2}\right)' = -\frac{1}{x^2}-2\cdot(-2)x^{-3}$

$$= -\frac{1}{x^2}+4\cdot\frac{1}{x^3}$$

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

l) $\left(\frac{x^3-4}{3x}+x\right)' = \left(\frac{x^3-4}{3x}\right)'+(x)'$

$u = x^3-4 \quad u' = 3x^2$

$v = 3x \quad v' = 3$

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

$$= \frac{9x^3-3x^3+12}{9x^2}+1$$

$$= \frac{6x^3+12}{9x^2}+1$$

$$= \frac{\overset{2}{\cancel{6}}(x^3+2)}{\underset{3}{\cancel{9}}x^2}+\frac{1}{1}$$

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