Skills 6 - Key

#1. a) $60x + \frac{2000}{x} = \frac{60x}{1}\cdot\frac{(x)}{(x)} + \frac{2000}{x} = \boxed{\frac{60x^2 + 2000}{x}}$

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

c) $4\pi x - \frac{2000}{x^2} = \frac{4\pi x}{1}\cdot\left(\frac{x^2}{x^2}\right) - \frac{2000}{x^2} = \boxed{\frac{4\pi x^3 - 2000}{x^2}}$

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

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

#2. a) $\boxed{2400 - 4x}$

b) $\boxed{x^4 - 1}$

c) $\boxed{10x^9 - 495x^8 + 10560x^7}$

d) $\boxed{x + \frac{1}{2}}$

e) $\boxed{3ax^2 + b}$

#3. a) $\frac{t}{4} = \frac{1}{4}t$ derivative: $\boxed{\frac{1}{4}}$

b) $\frac{4}{t} = 4t^{-1}$ derivative: $\boxed{4t^{-2}}$

c) $\frac{7}{3t^5} = \frac{7}{3}t^{-5}$ derivative: $\boxed{\frac{-35}{3}t^{-6}}$

d) $2\sqrt{t} = 2t^{1/2}$ derivative: $\boxed{t^{-1/2}}$

e) $\frac{11}{13\sqrt{t}} = \frac{11}{13}t^{-1/2}$ derivative: $\boxed{\frac{-11}{26}t^{-3/2}}$

#4. a) $\frac{(2x-1)(2x-3)}{(1-x)^2}$

Find zeros:

$2x-1=0$ $\quad$ $2x-3=0$

$x=1/2$ $\quad$ $x=3/2$

$\boxed{x=1/2,\ 3/2}$

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

Find zeros:

$1-x^2=0$

$x=\pm 1$

$\boxed{x=\pm 1}$

c) $\frac{4x^2-7x+3}{3(x^2+6x+9)}$

Find zeros:

$4x^2-7x+3=0$

$(4x-3)(x-1)=0$

$4x-3=0$ $\quad$ $x-1=0$

$x=3/4$ $\quad$ $x=1$

$\boxed{x=3/4,\ 1}$