2) c) $\dfrac{x^2}{(x^2+1)^2(x-1)} = \dfrac{a}{x-1} + \dfrac{bx+c}{x^2+1} + \dfrac{dx+e}{(x^2+1)^2} = \dfrac{a(x^2+1)^2+(bx+c)(x-1)(x^2+1)+(dx+e)(x-1)}{(x-1)(x^2+1)^2}$.

Making $x=1$ get $4a=1$ $a=\frac{1}{4}$

writing out the numerator in the fraction, get $a(x^4+2x^2+1)+(bx+c)(x^3-x^2+x-1)+dx^2+ex-dx+e=x^2$

$(a+b)x^4+(c-b)x^3+(2a-c+b+d)x^2+(c-b+e-d)x+a-c-e=x^2$

$a+b=0 \Rightarrow b=-a=-\frac{1}{4}$

$c-b=0 \Rightarrow c=b=-\frac{1}{4}$

$2a-c+b+d=1 \Rightarrow d=\frac{1}{2}$

$a-c-e=0 \Rightarrow e=\frac{1}{2}$

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

3) Midpoint rule $\simeq 1\left(\dfrac{1}{1+\frac{1}{2}} + \dfrac{1}{1+\frac{3}{2}} + \dfrac{1}{1+\frac{5}{2}} + \dfrac{1}{1+\frac{7}{2}}\right)$

Trapezoidal rule $\simeq \dfrac{1}{2}\left[\dfrac{1}{1+0} + 2\dfrac{1}{1+1} + 2\dfrac{1}{1+2} + \dfrac{2}{1+3} + \dfrac{1}{1+4}\right)$

Simpson's rule $\simeq \dfrac{1}{3}\left[\dfrac{1}{1+0} + 4\dfrac{1}{1+1} + 2\dfrac{1}{1+2} + 4\dfrac{1}{1+3} + \dfrac{1}{1+4}\right]$

Error $f'(x) = \dfrac{-1}{(1+x)^2}$ $\quad f''(x) = \dfrac{2}{(1+x)^3}$ $\quad f'''(x) = \dfrac{-6}{(1+x)^4}$ $\quad f^{IV}(x) = \dfrac{24}{(1+x)^5}$

$f''(x) \leq 2$ in the interval $(0,4)$

$f^{IV}(x) \leq 24$ " " $(0,4)$

$E_M \leq \dfrac{2 \cdot 4^3}{24 \cdot 4^2} = \dfrac{1}{3}$ $\quad E_T \leq \dfrac{2 \cdot 4^3}{12 \cdot 4^2} = \dfrac{2}{3}$ $\quad E_S \leq \dfrac{24 \cdot 4^5}{180 \cdot 4^4} = \dfrac{24}{45}$ 0.5

p. 487 34 $V = \int A\,dx$ $\quad V \simeq \dfrac{1}{3}[0.68 + 4\,0.65 + 2\,0.64 + 4\,0.61 + 2\,0.58 + 4\cdot 0.59 + 2\,0.53$
$+ 4\cdot 0.55 + 2\cdot 0.52 + 4\cdot 0.50 + 0.48]$