SVAR MVE340 25/8-17

1a $f'(1) \approx \frac{3.3-3}{1.1-1} = 3$ $\qquad g(3.1) \approx 2.5 + 4 \cdot 0.1 = 2.9$

1b $y = 1 - 6(x-1)$ $\qquad y = 0 \Rightarrow x = 7/6$

1c $f'(x) = x^2(x+2)(x-3)$ $\qquad$ $-2 \quad 0 \quad 3 \quad x$; $\; + \quad - \quad - \quad +$ $\qquad -2 < x < 3$

1d $f(-1.7) \approx 3.1 + (-0.6)0.3 = 3.1 - 0.18 = 2.92$

2a $f'(x) = 3x^2 - 12$ $\qquad x = \pm 2$ $\qquad$ $-2 \quad 2 \quad x$; $\; + \quad - \quad +$

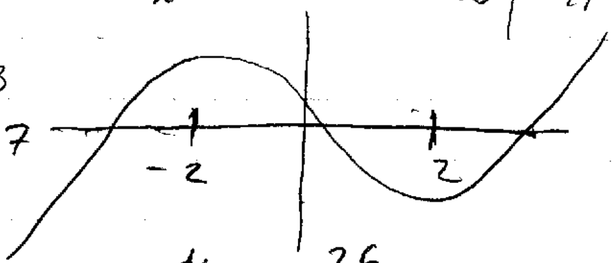
x	y
-2	21
2	-11

2b $x_0 = -3$ $\qquad x_{k+1} = x_k - (x_k^3 - 12x_k + 5)/(3x_k^2 - 12)$

$x_1 = -3.93$ $\quad f(x_1) = -8.6$

$x_2 = -3.68$ $\quad f(x_2) = -0.73$

$\boxed{x_3 = -3.656}$ $\quad f(x_3) = -0.007$



2c $x^2 + 4 = 2x + 12$ $\qquad x = 1 \pm \sqrt{1+8}$

$\int_{-2}^{4} (2x + 8 - x^2)\,dx = \left[x^2 + 8x - \frac{x^3}{3}\right]_{-2}^{4} = 36$

3a $y' = A$ $\quad y'' = 0$ $\qquad 0 - 2A + \boxed{A}x + B = \boxed{3}x - 4$ $\qquad B = 2A - 4 = 2$

3b $y' = \frac{2}{3}y$ $\quad y = Ce^{\frac{2}{3}t}$ $\qquad \underbrace{\frac{2}{3}C}_{y'(0)} = 4$ $\quad C = 6$

3c $r = \frac{-16 \pm \sqrt{16^2 - 4 \cdot 4 \cdot 25}}{2 \cdot 4} = \frac{-16 \pm \sqrt{(16-20)(16+20)}}{8} = \frac{-16 \pm i2 \cdot 6}{8}$

$= -2 \pm \frac{3}{2}i$ $\qquad y = e^{-2t}(A\cos\frac{3}{2}t + B\sin\frac{3}{2}t)$

$y(0) = A = -3$ $\qquad y'(0) = e^{-2t}(-2A\cos - 2B\sin - \frac{3}{2}A\sin + \frac{3}{2}B\cos)$

$= -2A + \frac{3}{2}B = 7$

$B = \frac{2}{3}(7 + 2A) = \frac{2}{3}$

4a $2 + t - 2(1-3t) + 2(-t) = -10$ $\qquad 5t = -10$ $\quad t = -2$

$(x, y, z) = (0, 7, 2)$

$k \cdot 1 + l = 1.6$

$k \cdot 2 + l = 2.9$

$\vdots$

4b $3x + 5y - 4z = D = 3 \cdot 0 + 5 \cdot (-1) - 4 \cdot 2 = -13$

4c $55k + 15m = 65.1$

$15k + 5m = 18.5$ $\qquad y = 0.96x + 0.82$

4d A=[1 1; 2 1; 3 1; 4 1; 5 1]

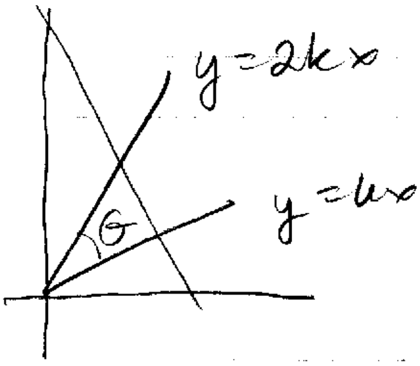
y=[1.6; 2.9; 3.7; 4.9; 5.4]

x=A\y

5i $\displaystyle\int \frac{\cos 2x \cdot \cos x}{\cos x + \sin x}\,dx = \dots$

5ii $\displaystyle\int \frac{x^2-1}{2x^2+x^4+1}\,dx = \dots$

6

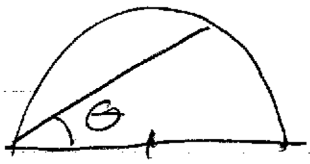


$A =$ hela $-$ delar

$\dfrac{dA}{dk} = \dots$

$\dfrac{d\cos\theta}{dk} = \dots$

7



$\dfrac{d\,\text{Tid}}{d\theta} = \dots$