

1a $\frac{2.8-3}{0.1} = -2$ 1b $-2 + (-3) \cdot (-0.2) = -1.4$

1b $f' = 2(x^3-2) \cdot 3x^2$ $f'(-1) = -18$ Tang: $y = 9 - 18(x+1)$ $x = -1/2$

1c $f'(x) = 0$ $x = -3$ $x = 1/2$ $\frac{-3}{-} \frac{1/2}{+}$ $x < -3$ $x > 1/2$

1d $3.5 + \frac{1}{-1}(-2.7 - (-3)) = 3.5 - 0.33 = 3.17$

2a $(2.3 + 0.5 - 1.3 - 2.7)/2 = -0.6$

2b $-1 \rightarrow -2$ $0 \rightarrow 4$ $x_0 = -1$, $x_1 = -0.75$ $|f(x_1)| = 0.17$, $x_2 = -0.724$ $|f(x_2)| = 0.001$

2c $f(x) = -\frac{2x^3}{3} - \frac{5x^2}{2} + 3x + C$ $-\frac{2}{3} - \frac{5}{2} + 3 + C = \frac{1}{2}$ $C = 2/3$ $\frac{-3}{-} \frac{1/2}{+}$

$x = -3$ lok min $x = 1/2$ lok max

2d $x^2 + 2 = 2 - 3x$ $x = 0$, $x = -3$ $\int_{-3}^0 -3x - x^2 = -\left[\frac{3x^2}{2} + \frac{x^3}{3}\right]_{-3}^0 = -\left[-\left(\frac{27}{2} + 9\right)\right] = \frac{9}{2}$

3a $y' = -\frac{5}{4}y$ $y = Ce^{-5t/4}$ $3C + 2 \cdot (-\frac{5}{4})C = 1$ $C = 2$

3b $y'' = 4Ae^{2x} - 9B\cos 3x$ $9Ae^{2x} - 4B\cos 3x = 6e^{2x} + \cos 3x$
 $A = 2/3$ $B = -1/4$

3c $r_{1,2} = (-2 \pm \sqrt{4 - 4 \cdot 2 \cdot 13})/4 = (-2 \pm 2\sqrt{-25})/4 = (-1 \pm 5i)/2$

$y = e^{-t/2} (C_1 \cos \frac{5t}{2} + C_2 \sin \frac{5t}{2})$ $y' = -\frac{1}{2}e^{-t/2} (C_1 \cos \frac{5t}{2} - C_2 \sin \frac{5t}{2}) + \frac{5}{2}e^{-t/2} (-C_1 \sin \frac{5t}{2} + C_2 \cos \frac{5t}{2})$

$y(0) = C_1$ $y'(0) = -\frac{1}{2}C_1 + \frac{5}{2}C_2$ $C_1 = 4$ $-\frac{1}{2}C_1 + \frac{5}{2}C_2 = -1$ $C_2 = 2/5$

4a $2 + 5t + 2 \cdot (-3t) + 3(1 + 2t) + 5 = 0$ $5t + 10 = 0$ $t = -2 \Rightarrow (-8, 6, -3)$

4b $\vec{AB} \times \vec{F} = (2, -4, 2) \times (1, -5, 6) = -2(7, 5, 3)$ $7x + 5y + 3z = 3$

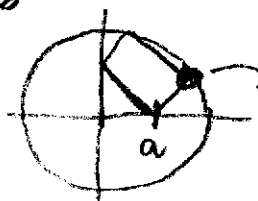
4c $k \cdot 55 + m \cdot 15 = 67$ $6 \cdot 10 = 1$ $k = 0.1$ $m = (22 - 1.5)/5 = 4.1$
 $k \cdot 15 + m \cdot 5 = 22$

4d $\begin{cases} k \cdot 1 + m = 2 \\ k \cdot 2 + m = 3 \\ k \cdot 3 + m = 5.5 \\ k \cdot 4 + m = 5 \\ k \cdot 5 + m = 6.5 \end{cases} \Rightarrow A = \begin{bmatrix} 1 & 1 \\ 2 & 1 \\ 3 & 1 \\ 4 & 1 \\ 5 & 1 \end{bmatrix}$
 $\Rightarrow y = [2; 3; 5.5; 5; 6.5]$
 $\Rightarrow A \setminus y$

5a $\frac{1 + 2\cos x + \cos^2 x}{4\cos^2 x}$ $\frac{1}{\cos x} = \frac{1 + \tan^2 x}{1 - \tan^2 x} = \frac{dt/dx}{1 - t^2}$

5b $\frac{x^6 x^5}{(x^6 + 1)^2} = \frac{t dt/dx}{(t+1)^2}$

6



$\begin{cases} y = x - a \\ x^2 + y^2 = 1 \end{cases}$

$A_{\text{ren}} = a\sqrt{2} \cdot (\dots)$
 $\frac{dA_{\text{ren}}}{da} = \dots$

7a $+1$

7b $\frac{1}{\sqrt{1+x^2}}$