

$$1a) \quad A(1,1) \quad B(4,3) \quad y-1 = \frac{2}{3}(x-1) \Leftrightarrow \underline{\underline{y = \frac{2}{3}x + \frac{1}{3}}}$$

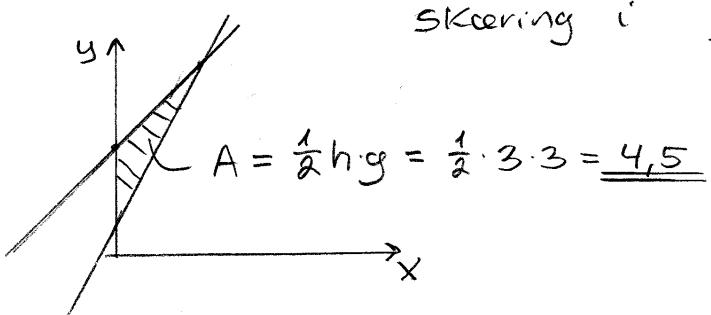
$$d = \frac{3-1}{4-1} = \frac{2}{3} \quad U_x = \tan^{-1} d = \tan^{-1} \frac{2}{3} = 33,7^\circ$$

$$b) \quad y_1 = 2x + 1 \quad y_2 = x + 4$$

$$\text{Skoring: } y_1 = y_2 : \quad 2x+1 = x+4 \Leftrightarrow x = 3$$

$$x = 3 \Rightarrow y = x + 4 = 3 + 4 = 7$$

$$\text{skoering i } \underline{(x,y) = (3,7)}$$



c) $f(x) = e^{2x+3}$ vandret tangent dvs $f'(x)=0$

$$f'(x) = -\bar{e}^x(2x+3) \cdot 2\bar{e}^x = \bar{e}^x(-2x-3+2) = \bar{e}^x(-2x-1)$$

$$f'(x) = 0 \quad \text{and} \quad e^x(-2x-1) = 0$$

$$\Leftrightarrow e^x = 0 \quad i.l. \quad \vee \quad \Leftrightarrow -2x-1 = 0$$

Vandret tangent i $(-\frac{1}{2}, 2\sqrt{2})$

$$d) \quad \left(\frac{1}{x}\right)^{\frac{1}{5}} = e^{-2x} \Leftrightarrow \frac{1}{5} \cdot \ln \frac{1}{x} = -2x \Leftrightarrow x = \frac{-1}{10} \ln \frac{1}{x}$$

$$= \frac{1}{10} \ln\left(\frac{1}{2}\right)^{-1} = \frac{\ln 2}{10}$$

2/3

$$e) \quad f(x) = ax^2 + 2bx\sqrt{x} \quad f(1) = 4 \quad f'(1) = 1$$

$$f'(x) = 2ax + 2b \cdot \frac{1}{2\sqrt{x}} = 2ax + \frac{b}{\sqrt{x}}$$

2 lign. opskrives: $f(1) : \left\{ \begin{array}{l} a+2b = 4 \\ 2a+b = 1 \end{array} \right. \Leftrightarrow \left\{ \begin{array}{l} 2a+4b = 8 \\ 2a+b = 1 \end{array} \right.$

$$f(1) - f'(1) = 4b - b = 8 - 1 \Leftrightarrow 3b = 7 \Leftrightarrow b = \frac{7}{3} \Rightarrow$$

$$a = 4 - 2b = 4 - \frac{14}{3} = -\frac{2}{3} \quad \underline{a, b = \left(-\frac{2}{3}, \frac{7}{3}\right)}$$

$$f) \quad f(x) = 2 \ln(x^2 + 3)$$

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

$$f'(x) = 1 \Leftrightarrow \frac{4x}{x^2 + 3} = 1 \Leftrightarrow x^2 - 4x + 3 = 0 \Leftrightarrow \underline{x=1 \vee x=3}$$

$$g) \quad y = (x+2) \cdot (x-2) = x^2 - 4 \quad x \geq 0 \quad Vmy = [-4, \infty]$$

$$x = \sqrt{y+4} \quad \text{dvs} \quad f^{-1}(x) = \sqrt{x+4}$$

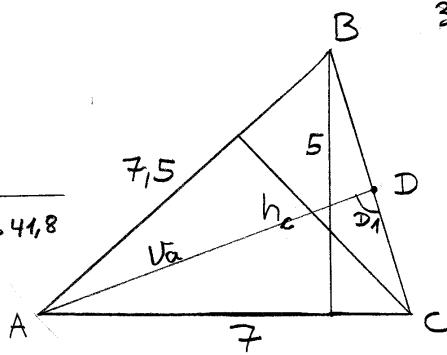
$$Dmf^{-1} = Vmy = \underline{[-4, \infty]}$$

3/3

a) $\alpha = \sin^{-1} \frac{5}{7,5} = \underline{\underline{41,8^\circ}}$

$$\alpha = \sqrt{7,5^2 + 7^2 - 2 \cdot 7,5 \cdot 7 \cdot \cos 41,8}$$

b) $\underline{\underline{\alpha = 5,19}}$



c) $B = \cos^{-1} \left(\frac{7,5^2 + 5,19^2 - 7^2}{2 \cdot 7,5 \cdot 5,19} \right) = \underline{\underline{63,9^\circ}}$

$$C = 180 - 41,8 - 63,9 = \underline{\underline{74,2^\circ}}$$

d) $h_c = b \cdot \sin A = 7 \cdot \sin 41,8 = \underline{\underline{4,67}}$

$$D_1 = 180^\circ - \frac{41,8}{2} - 74,2 = 84,8^\circ$$

e) $\frac{v_a}{\sin C} = \frac{7}{\sin D_1} \Leftrightarrow v_a = 7 \cdot \frac{\sin 74,2}{\sin 84,8} = \underline{\underline{6,75}}$

3a) $f(x) = \frac{1}{4}x^4 - 2x^3 + \frac{5}{2}x^2 = x^2 \left(\frac{1}{4}x^2 - 2x + \frac{5}{2} \right)$

a) $f(x) = 0 : \begin{array}{l} \uparrow x^2 = 0 \quad \checkmark \quad \frac{1}{4}x^2 - 2x + \frac{5}{2} = 0 \\ x = 0 \quad \checkmark \quad \uparrow \quad x = 1,55 \quad \vee \quad x = 6,45 \end{array}$

b) Monotonie $f'(x) = 0 : f'(x) = x^3 - 6x^2 + 5x = x(x^2 - 6x + 5)$

$$\begin{array}{ll} x=0 \quad \checkmark \quad x=1 \quad \checkmark \quad x=5 & \begin{array}{c|ccc} x & 0 & 1 & 5 \\ \hline f'(x) & - & + & - \\ f(x) & \searrow & \nearrow & \searrow \end{array} \end{array}$$

$f(-1) < 0$
 $f'(0) < 0$
 $f'(1) > 0$
 $f'(5) > 0$

$f(x)$ aftagende i $[-\infty, 0] \cup [1, 5]$
 $f(x)$ stigende i $[0, 1] \cup [5, \infty]$

c) Extremum i $(0,0)$; $(1, \frac{3}{4})$; $(5, \frac{125}{4})$

d) $y_t = -6x + 10$