Svar Matte intro/A BI/KI 14/1 -2011

1a $\frac{1}{x^2+y^2}$ **1b** $\frac{x-1+2x+4}{(x-1)(x+1)} = \frac{3(x+1)}{(x-1)(x+1)}$

2a $(x^3)^2 + x^3 - 2 = 0 \iff x^3 = -\frac{1}{2} \pm \sqrt{\frac{1}{4}+2}$

$x^3 = -\frac{1}{2} \pm \frac{3}{2}$ $x^3 = 1 \iff x = 1$

eller $x^3 = -2 \iff x = -\sqrt[3]{2}$

2b $x+1 = (5-x)^2 = 25 - 10x + x^2$

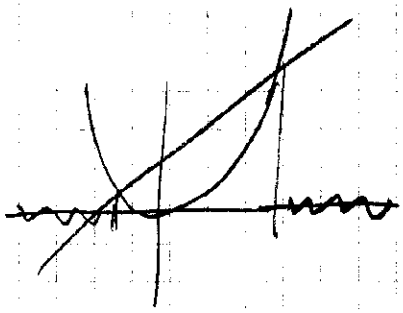
$\iff x^2 - 11x + 24 = 0 \iff x = \frac{11}{2} \pm \sqrt{\frac{121}{4} - 24}$

$\iff x = \frac{11}{2} \pm \sqrt{\frac{25}{4}} = \frac{11 \pm 5}{2}$ $x = 8$ el $x = 3$

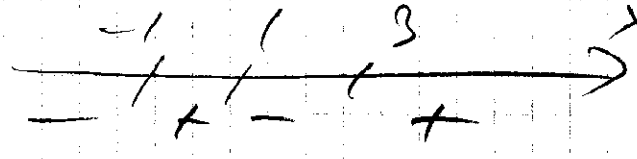
$x = 8$ ej 1034

3a $x = +\frac{1}{2} \pm \sqrt{\frac{1}{4}+\frac{3}{4}} = \frac{1}{2} \pm 1$

$x < -\frac{1}{2}$ eller $x > 3/2$



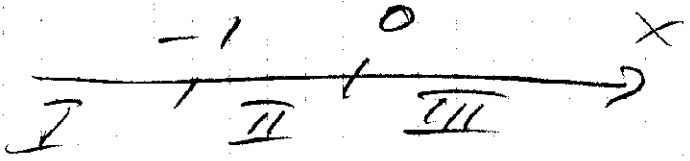
3b $\frac{x^2+x-4-(x^2-1)}{(x-1)(x+1)} < 0 \iff \frac{x-3}{(x-1)(x+1)} < 0$



$x < -1$ eller

$1 < x < 3$

(4)



I: $x\cdot(-x) = 3x-(-(x+1))$

II: $x\cdot(-x) = 3x-(x+1)$

III: $x\cdot x = 3x-(x+1)$

I: $x^2+4x+1=0$ $\quad x=-2\pm\sqrt{4-1} \notin$ I

II: $x^2+2x-1=0$ $\quad x=-1\pm\sqrt{2} \notin$ II

III: $x^2-2x+1=0$ $\quad x=1\pm\sqrt{0} \in$ III

(5) (a) $\ln\frac{3x}{(2x)^4} = \ln 12$ $\quad \frac{3}{2^4x^3}=12$ $\quad x^3 = 2^{-6}$

$x = 1/4$

(5b) $(3^x)^2 - 12\cdot 3^x + 36 = 0$ $\quad 3^x = 6\pm\sqrt{36-36}$

$3^x = 6$ $\quad x\cdot\ln 3$ $\quad 6$ $\quad x = \ln 6/\ln 3$

(6a) $2/\sqrt{7}$ (6b) $\cos\left(2v+\frac{\pi}{2}\right)=1$

$2v+\frac{\pi}{2} = n\,2\pi$

(6c) $2\sin^2 v = 2\sin v\cos v$ $\quad v = -\frac{\pi}{4}+n\pi$

$\Leftrightarrow$ $\sin v = 0$ eller $\sin v = \cos v$

$v = n\pi$ $\quad \cos\left(\frac{\pi}{2}-v\right)$ $\quad \frac{\pi}{2}-v = \pm v + n2\pi$

$v = \frac{\pi}{4} - n\pi$

(7a) $y-4=-\frac{2}{3}(x+3)$ $\quad y=-\frac{2x}{3}+2$

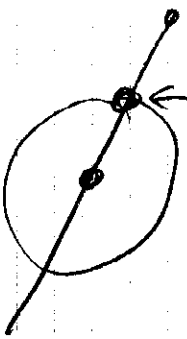
(7b) $3(x-1)^2-3+2\left(y+\frac{1}{4}\right)^2-\frac{1}{8}=0$

$3(x-1)^2+2\left(y+\frac{1}{4}\right)^2=\frac{25}{8}$

$$\frac{(x-1)^2}{\frac{25}{3\cdot 8}}+\frac{\left(y+\frac{1}{4}\right)^2}{\frac{25}{2\cdot 8}}=1$$

centr $\left(1,-\frac{1}{4}\right)$ halvaxlar: $\frac{5}{2\sqrt{6}}$, $\frac{5}{4}$

(7c) $(x-1)^2+(y+2)^2=5+1+4=10$



centr $(1,-2)$ $\Rightarrow$ $y+2=\frac{2-(-2)}{3-1}(x-1)$

$y=2x-4 \Rightarrow (x-1)^2+(2x-4+2)^2=10$

$\Leftrightarrow 5(x-1)^2=10 \Leftrightarrow x-1=\pm\sqrt{2}$

$x=1+\sqrt{2} \Rightarrow y=2(1+\sqrt{2})-4=2(\sqrt{2}-1)$

(8a) $f'(x)=-\frac{1}{x^2}+3x^2+2$ $\quad f'(1)=4$

$y-3=4(x-1)$ $\quad y=4x-1$ $\quad y=0 \Rightarrow x=\frac{1}{4}$

(8b) $3(x^2)^2+2x^2-1=0$

$x^2=-\frac{1}{3}\pm\sqrt{\frac{1}{9}+\frac{1}{3}}=\frac{-1\pm 2}{3}$ $\quad x=\pm\frac{1}{\sqrt{3}}$