

19/8 - 2009

①

$$1a) \frac{x^2 + xy + y^2}{(x+y)(x-y)(x^2+xy+y^2)} = \frac{1}{x^2-y^2}$$


$$1b) \frac{t^2-1+t-5}{(t-2)(t-5)} = \frac{(t-2)(t+3)}{(t-2)(t-5)}$$

$$2a) x^2 = t \quad t^2 - 8t - 9 = 0 \quad t = 4 \pm \sqrt{25} = 9 \text{ el. } -1$$

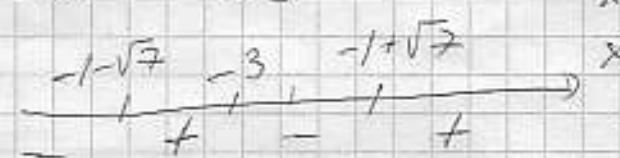
$$x^2 = -1 \text{ ej lösbar} \quad x^2 = 9 \quad x = \pm 3$$

$$2b) (2-x)^2 = 2x-1 \quad x^2 - 6x + 5 = 0 \quad x = \frac{3 \pm \sqrt{4}}{1} = 5 \text{ el. } 1$$

$$2-x < 0 \text{ om } x = 5$$

$$3a) x = \frac{3}{2} \pm \sqrt{\frac{9}{4} - 1} = \frac{3 \pm \sqrt{5}}{2}$$


$$x \leq \frac{3-\sqrt{5}}{2} \text{ el. } x \geq \frac{3+\sqrt{5}}{2}$$

$$3b) 0 \leq \frac{x + (x-2)(x+3)}{x+3} = \frac{x^2 + 2x - 6}{x+3} = \frac{(x - (-1+\sqrt{7}))(x - (-1-\sqrt{7}))}{x+3}$$


$$-1-\sqrt{7} \leq x < -3 \text{ el. } x > -1+\sqrt{7}$$

$$4a) 2 \left( \left(x + \frac{3}{4}\right)^2 - \frac{5}{2} - \left(\frac{3}{4}\right)^2 \right) = 2 \left(x + \frac{3}{4}\right)^2 - \frac{49}{8}$$

$$4b) p(x) = (x+1)(x-4)(x-r)$$

$$p(2) = 3 \Rightarrow 2 \cdot (-2) \cdot (2-r) = 3 \quad r = \frac{5}{2}$$

$$\text{eller ansätt } p(x) = x^3 + ax^2 + bx + c$$

$$5a \quad \ln \frac{x^2}{\sqrt{x}} = 3 \quad x^{3/2} = e^3 \quad x = (e^3)^{2/3} = e^2$$

(2)

$$5b \quad 2^x = t \quad t^2 - 4t + 1 = 0 \quad t = 2 \pm \sqrt{3}$$

$$x = \frac{\ln(2 \pm \sqrt{3})}{\ln 2}$$

$$6a \quad \cos\left(\frac{\pi}{2} - v\right) = \cos 2v \quad \frac{\pi}{2} - v = \pm 2v + n2\pi$$

$$v = \frac{\pi}{6} - n \cdot \frac{2\pi}{3} \quad \text{el} \quad v = -\frac{\pi}{2} + n2\pi$$

$$6b) \quad \frac{\sin 2v}{\cos 2v} = 2 \sin v \quad \frac{2 \sin v \cos v}{\cos 2v} = 2 \sin v$$

$$\sin v = 0 \quad \text{el} \quad \cos v = \cos 2v$$

$$v = n\pi$$

$$v = \pm 2v + n2\pi$$

$$v = -n2\pi \quad \text{el} \quad v = \frac{n2\pi}{3}$$

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$$7a \quad y - 2 = \frac{2}{4}(x+1) \quad \text{el} \quad y = \frac{x}{2} + \frac{5}{2} = -2x - \frac{1}{2}$$

$$\frac{5x}{2} = -3 \quad x = -\frac{6}{5} \quad y = \frac{-6+25}{10} = \frac{19}{10}$$

$$7b \quad \left. \begin{aligned} (x-1)^2 + (y-2)^2 &= 25 \\ (x-4)^2 + (y-6)^2 &= (x-5)^2 + (y-5)^2 \end{aligned} \right\} \quad \left. \begin{aligned} (x-1)^2 + (y-2)^2 &= 25 \\ -4x - 6y + 52 &= -10x - 10y + 50 \end{aligned} \right\}$$

$$y = x + 1 \quad \left. \begin{aligned} (x-1)^2 + (x-1)^2 &= 25 \\ x-1 &= \pm \frac{5}{\sqrt{2}} \quad x = 1 \pm \frac{5}{\sqrt{2}} \\ y &= 2 \pm \frac{5}{\sqrt{2}} \end{aligned} \right\}$$

$$8a \quad f'(x) = 3(\sqrt{x}-x)^2 \left(\frac{1}{2\sqrt{x}} - 1\right) \quad f'(4) = 3 \cdot 4 \cdot \left(\frac{1}{4} - 1\right) = -9$$

$$y + 8 = -9(x-4) \quad x=0 \Rightarrow y=28, \quad y=0 \Rightarrow x=4 \cdot \frac{8}{9} = \frac{28}{9}$$

$$8b) \quad \sqrt{x} = x \quad \text{el} \quad \frac{1}{2\sqrt{x}} = 1 \quad \sqrt{x} = \frac{1}{2} \quad x = \frac{1}{4}$$

$$\begin{aligned} x &= x^2 \\ x &\neq 0 \quad \text{el} \quad x = 1 \end{aligned}$$