

Svar Matte intro/del A B/Ykt 2/10

1a $2(x-y)$ 1b $-\sqrt{ab}$ -2011

2a $x = (1-2x)(2-3x)$ $6x^2 - 8x + 2 = 0$
 $x = \frac{2}{3} \pm \sqrt{\frac{4}{9} - \frac{1}{3}}$ $x_1 = 1$ $x_2 = \frac{1}{3}$

2b $4x^2 + 4x + 1 = 2x^2 - 3x + 5$ $2x^2 + 7x - 4 = 0$
 $x = -\frac{7}{4} \pm \sqrt{\frac{49}{16} + 2} = \frac{-7 \pm 9}{4}$ $x = -4$

3a $\begin{array}{c} -2 \quad 2 \\ \hline - & + \end{array} \rightarrow$ $-2 < x < 2$ eller $x > 3$

3b $\frac{2x^2 - 2 - 3x + 3 - x - 1}{(x-1)(x+1)} < 0$ $\frac{2x^2 - 4x}{(x-1)(x+1)} < 0$
 $\begin{array}{c} -1 \quad 0 \quad 1 \quad 2 \\ \hline + & - & + & - & + \end{array} \rightarrow$ $-1 < x < 0$ eller $1 < x < 2$

4 $\begin{array}{c} -1 \quad 3 \\ \hline I \quad II \quad III \end{array} \rightarrow$ I: $-(x+1) = -2x+6+3$ $x=10 \notin I$
II: $x+1 = -2x+6+3$ $x = \frac{8}{3} \in \underline{II}$
III: $x+1 = 2x-6+3$ $x=4 \in \underline{III}$

5a $\ln(3x) = \ln(6/(2x)^3)$ $3x = 6/(2x)^3$ $x=2^{-2}$

5b $\begin{cases} 5 = Ae^k \\ 3 = Ae^{2k} \end{cases} \Rightarrow e^k = \frac{3}{5}$ $k = \ln \frac{3}{5}$ $A = \frac{5}{e^k} = \frac{25}{3}$

$x=4 \Rightarrow y = Ae^{4k} = \frac{25}{3} \left(\frac{3}{5}\right)^4 = \frac{27}{25}$

$$6a \quad \begin{array}{c} \text{Diagram of a right-angled triangle with hypotenuse } 5, \text{ one leg } 3, \text{ and the other leg } 4. \end{array} \quad \cos\left(v + \frac{\pi}{4}\right) = \frac{4}{5}\frac{1}{\sqrt{2}} - \frac{3}{5}\cdot\frac{1}{\sqrt{2}} = \frac{1}{5\sqrt{2}}$$

$$6b \quad \begin{array}{c} \text{Diagram of a unit circle with an angle } v \text{ measured from the positive x-axis.} \end{array} \quad \begin{aligned} 2v - \frac{\pi}{3} &= -\frac{\pi}{4} + n2\pi \quad v = \frac{11}{24} + n2\pi \\ 2v - \frac{\pi}{3} &= -\frac{3\pi}{4} + n2\pi \quad v = -\frac{5\pi}{24} + n2\pi \end{aligned}$$

$$6c \quad 2\cos^2 v - 1 + 3\cos v = 1 \quad \cos v = x \quad x = -\frac{3}{4} + \sqrt{\frac{9}{16} + 1} \\ x = \frac{1}{2} \quad \begin{array}{c} \text{Diagram of a unit circle with an angle } v \text{ measured from the positive x-axis.} \end{array} \quad v = \pm \frac{\pi}{3} + n2\pi$$

$$7a \quad y = \frac{7}{2}x - 2$$

$$7b \quad 2((x-1)^2 - 1) + 4\left(\left(y + \frac{5}{8}\right)^2 - \frac{25}{64}\right) = -3$$

$$\begin{aligned} 2(x-1)^2 + 4\left(y + \frac{5}{8}\right)^2 &= \frac{9}{16} && \text{center } (1, -\frac{5}{8}) \\ \frac{(x-1)^2}{\frac{1}{2} \cdot \frac{9}{16}} + \frac{\left(y + \frac{5}{8}\right)^2}{\frac{1}{4} \cdot \frac{9}{16}} &= 1 && \text{halvaer} \\ \frac{1}{2} \cdot \frac{3}{4}, \frac{1}{2} \cdot \frac{3}{4} & && \end{aligned}$$

$$7c \quad \begin{array}{c} \text{Diagram of a triangle with vertices } (1, 2), (3, 1), \text{ and } (0, 0). \end{array} \quad \begin{aligned} \frac{x}{3} &= -3(x-1) + 2 \quad x = \frac{3}{2}, y = \frac{1}{2} \\ \text{höjd} &= \sqrt{\left(1 - \frac{3}{2}\right)^2 + \left(2 - \frac{1}{2}\right)^2} = \sqrt{\frac{5}{2}} \end{aligned}$$

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

$$x^2 = t \quad t = \frac{1}{2} \pm \sqrt{\frac{1}{4} + 2} \quad t = 2 \quad x = \pm \sqrt{2}$$

$$8b \quad f(1) = 8/3 \quad f'(1) = -2$$

$$\text{tgt: } y = -2(x-1) + \frac{8}{3} = -2x + \frac{14}{3}$$

$$\text{norm: } y = \frac{1}{2}(x-1) + \frac{8}{3} = \frac{x}{2} + \frac{13}{6}$$