

1. a) $|3 - \sqrt{11}| = -(3 - \sqrt{11}) = \sqrt{11} - 3$
 b) $x+2 = 3x-2$ tai $-(x+2) = 3x-2$
 $-2x = -4$ tai $-4x = 0$
 $x = 2$ tai $x = 0$

Tarkasta sivuittomalla alkuperäisen: $x=2$ ok, $x=0$ ei kelpaa! $V: x=2$

2. a) $k_p = \left(\frac{-4-5}{2}, \frac{-2+3}{2} \right) = \left(-\frac{9}{2}, \frac{1}{2} \right)$
 $k_1 = \frac{-2-3}{-6-(-5)} = 5 \rightarrow k_2 = -\frac{1}{5} \rightarrow y - \frac{1}{2} = -\frac{1}{5} \left(x + \frac{9}{2} \right) \rightarrow y = -\frac{1}{5}x - \frac{11}{10} + \frac{1}{2}$
 $\rightarrow y = -\frac{1}{5}x - \frac{1}{10}$
 b) $3x - 5y = 11 \rightarrow y = \frac{3}{5}x - \frac{11}{5} \rightarrow y - 8 = \frac{3}{5}(x - 5) \rightarrow y = \frac{3}{5}x + 5$

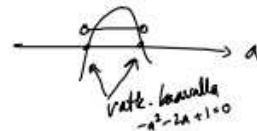
3. $\begin{cases} x - 2y + 3z = 0 \\ x - y + z = 2 \\ 3x - 4y + 2z = -2 \end{cases} \rightarrow \begin{cases} x - 2y + 3z = 0 \\ x - y + z = 2 \\ 3x - 4y + 2z = -2 \end{cases}$
 $\begin{cases} y - 2z + 2 = 0 \\ 3y - 3z + 6 - 4y + 2z = -2 \end{cases}$
 $\begin{cases} -y + 2z = -2 \\ -y - z = -8 \end{cases} \quad | \cdot (-1)$
 $\begin{cases} 3z = 6 \\ z = 2 \end{cases} \rightarrow y = 6 \rightarrow x = 6$

4. $x^2 + y^2 + 4x - 2y + 1 = 0 \rightarrow (x+2)^2 + (y-1)^2 = 4$, $k_p = (-2, 1)$, $r = 2$
 $y - 3 = k(x - 1) \rightarrow kx - y - k + 3 = 0$

k_p etäisyyden suoransta ottava $= 2$

tai $\begin{cases} x^2 + y^2 + 4x - 2y + 1 = 0 \\ y - 1 = k(x - (-2)) \end{cases} \rightarrow \frac{|-2k - 1 - k + 3|}{\sqrt{k^2 + 1}} = 2 \rightarrow 5k^2 - 12k = 0$
 $\rightarrow k = 0$ tai $k = \frac{12}{5}$
 $\rightarrow$ suorat $y = 3$ tai $12x - 5y + 3 = 0$
 $\rightarrow$ siirtäminen $\rightarrow$ väädetään diskriminantti $D = 0$
 $\rightarrow k = 0$ tai $k = \frac{12}{5}$

6. $x^2 + y^2 - 2x - 4ay + 5a^2 + 2a = 0$
 $x^2 - 2x + 1 + y^2 - 4ay + (-2a)^2 = -5a^2 - 2a + 1 + (-2a)^2$
 $(x-1)^2 + (y-2a)^2 = -a^2 - 2a + 1$
 ymp. jos $-a^2 - 2a + 1 > 0$



5. Janan alkup. $(1, 1)$ ja pituus $\sqrt{10}$. Määritä loppupiste kun
 jona $y = 3x$ suunt.
 Janan loppupiste (x, y) . $\begin{cases} \sqrt{(x-1)^2 + (y-1)^2} = \sqrt{10} & | \cdot 2 \\ \frac{y-1}{x-1} = 3 & | \cdot 3 \end{cases}$
 $\begin{cases} (x-1)^2 + (y-1)^2 = 10 \\ y = 3x - 2 \end{cases}$
 $\vdots$