3. a) $x = \frac{-77 \pm \sqrt{11^2 - 4 \cdot 2 \cdot -6}}{2 \cdot 2}$

$x = \frac{-11 \pm \sqrt{121 + 48}}{4}$

$x = \frac{-11 \pm \sqrt{169}}{4}$

$x \approx \frac{-11 \pm 13}{4}$

$x \approx 0{,}5 \quad \vee \quad x = -6$

b) $4{,}2x^2 - 1{,}2x^2 + 74{,}4x = 0$

$3x^2 + 74{,}4x = 0$

$x(3x + 74{,}4) = 0$

$x = 0 \vee 3x + 74{,}4 = 0$

$x = 0 \vee x = -4{,}8$

c) $6x^2 - 3{,}5x^2 + x - x = 1$

$2{,}5x^2 = 1 \quad | : 2{,}5$

$x^2 = 0{,}4$

$x \approx \pm 0{,}632$

d) $8x^2 - 720x = -450$

$8x^2 - 720x + 450 = 0$

$\Longleftrightarrow$

$x = \frac{-(-720) \pm \sqrt{720^2 - 4 \cdot 8 \cdot 450}}{2 \cdot 8}$

$x = \frac{720 \pm \sqrt{74400 - 74400}}{16}$

$x = \frac{720}{16}$

$x = 7{,}5$

---

4. a) $5{,}7x^2 - 11{,}4 = 4{,}8x^2 + 14{,}4$

$5{,}7x^2 - 4{,}8x^2 = 14{,}4 + 11{,}4$

$0{,}9x^2 = 25{,}8 \quad | : 0{,}9$

$x^2 = \frac{86}{3}$

$x = \sqrt{\frac{86}{3}} \approx \pm 5{,}4$

b) $x = \frac{-\left(-\frac{1}{2}\right) \pm \sqrt{\left(-\frac{1}{2}\right)^2 - 4 \cdot \frac{3}{4} \cdot \frac{1}{12}}}{2 \cdot \frac{3}{4}}$

$= \frac{\frac{1}{2} \pm \sqrt{\frac{1}{4} - \frac{1}{4}}}{\frac{3}{2}}$

$= \frac{\frac{1}{2}}{\frac{3}{2}}$

$x = \frac{1}{3}$

c) $\frac{a-1}{5} = \frac{3}{a+1} \quad | \cdot a+1$

$\frac{a^2 - 1}{5} = 3 \quad | \cdot 5$

$a^2 - 1 = 15$

$a^2 = 15 + 1$

$a^2 = 16$

$a = \pm 4$

---

6. a) $F = m\frac{4\pi r}{T^2} \quad | \cdot T^2 \quad (T = ?)$

$FT^2 = m(4\pi r) \quad | : F$

$T^2 = \frac{4\pi mr}{F}$

$T = \sqrt{\frac{4\pi mr}{F}}$

b) $ky - 4y^2 = 0 \quad (y = ?)$

$y(k - 4y) = 0$

$y = 0 \vee k - 4y = 0$

$y = 0 \vee y = \frac{k}{4}$

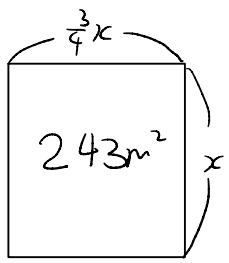
c) $\pi R^2 - \pi r^2 = A \quad (R = ?)$

$\pi R^2 = A + \pi r^2 \quad | : \pi$

$R^2 = \frac{A + \pi r^2}{\pi}$

$R = \sqrt{\frac{A + \pi r^2}{\pi}}$

7.



$\frac{3}{4}x \cdot x = 243\,\text{m}^2$

$\frac{3}{4}x^2 = 243\,\text{m}^2 \quad | : \frac{3}{4}$

$x^2 = 324$

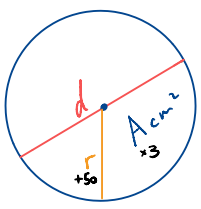
p. $x = 18\,\text{m}$

l. $\frac{3}{4}x = \frac{3}{4} \cdot 18 = 13{,}5\,\text{m}$

pituus : 18 m

leveys : 13,5 m

9.



$A = \pi r^2 \quad d = r \cdot 2$

$3A = \pi \cdot (r+50)^2 \quad | : 3$

$A = \frac{\pi(r+50)^2}{3}$

$\pi r^2 = \frac{\pi(r+50)^2}{3}$

$\pi r^2 = \frac{\pi(r+50)(r+50)}{3}$

$\pi r^2 = \frac{\pi(r^2 + 100r + 2500)}{3}$

$\pi r^2 = \frac{\pi r^2 + 100\pi r + 2500\pi}{3} \quad | \cdot 3$

$3\pi r^2 = \pi r^2 + 100\pi r + 2500\pi$

$3\pi r^2 - \pi r^2 - 100\pi r - 2500\pi = 0$

$2\pi r^2 - 100\pi r - 2500\pi = 0$

$r = \frac{-(-100\pi) \pm \sqrt{(-100\pi)^2 - 4 \cdot 2\pi \cdot -2500\pi}}{2 \cdot 2\pi}$

$r \approx 68{,}3\,\text{cm}$

halkaisija $= 2r$

$\approx 137\,\text{cm}$