POLYNOMIOPIN KERTAUSTA

Esim 1 $3x^2$ — eksponentti

kerroin: 3

muuttujaosa: x^2

3 vakio $\quad x^1$ 1. asteen $\quad x^2$ 2. asteen

$5x^2 - 4x^1 + 3$ trinomi

$x^0 = 1$

$3 = 3 \cdot x^0 = 3 \cdot 1$

Esim 2 $2x^2 - 5x + 3 \qquad x^2 - 2$

erotus

$2x^2 - 5x + 3 - (x^2 - 2)$

$= 2x^2 - 5x + 3 - x^2 + 2$

$= x^2 - 5x + 5$

Esim. 3. $-3(2x^2 - 5x + 3)$

$= -3 \cdot 2x^2 - 3 \cdot (-5x) - 3 \cdot 3$

$= -6x^2 + 15x - 9$

$x^1 \cdot x^1 = x^{1+1} = x^2$

$x + x = 2x$

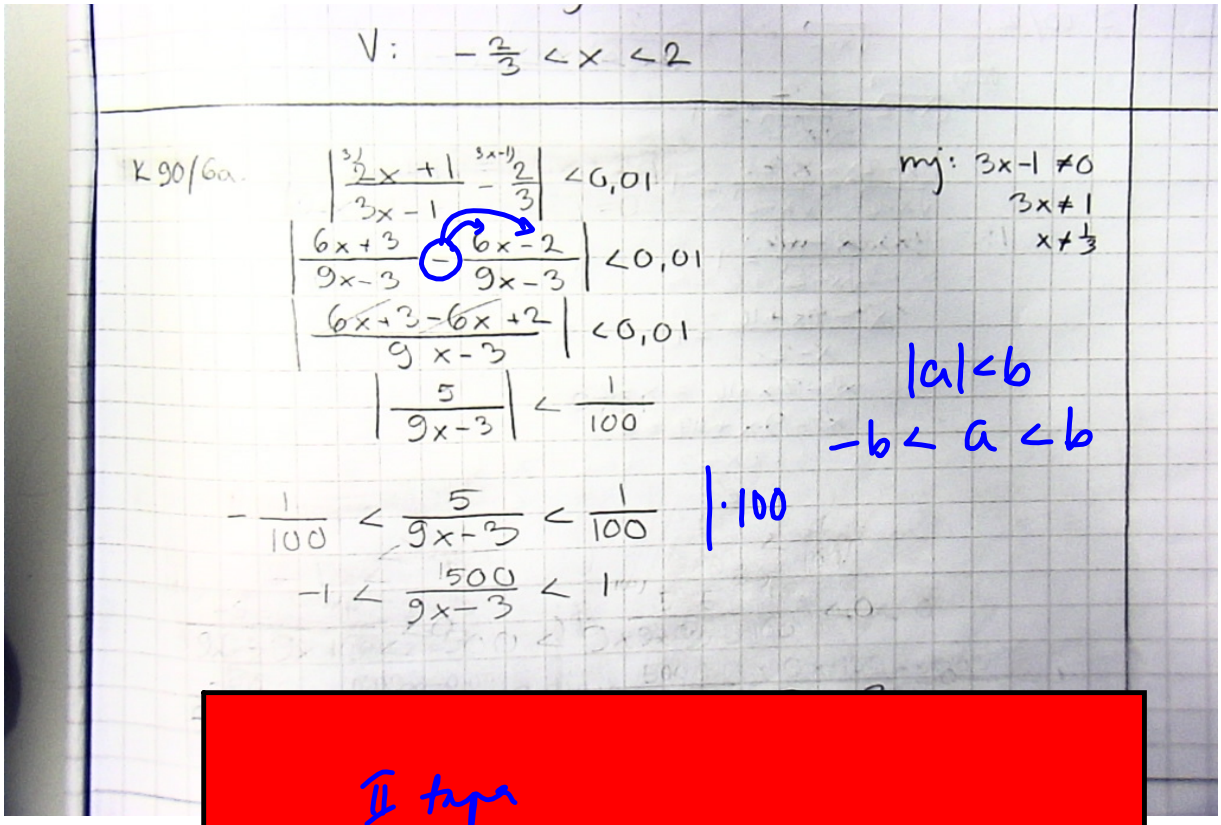
Esim. 4. $(x - 3)(2x + 4)$

$= x \cdot 2x + 4 \cdot x - 3 \cdot 2x - 3 \cdot 4$

$= 2x^2 + 4x - 6x - 12$

$= 2x^2 - 2x - 12$

$4x - 6x = -2x$



V: $-\frac{3}{3} < x < 2$

K90/6a

$$\left|\frac{3(2x+1)}{3x-1} - \frac{2(3x-1)}{3}\right| < 0{,}01$$

$$\left|\frac{6x+3}{9x-3} - \frac{6x-2}{9x-3}\right| < 0{,}01$$

$$\left|\frac{6x+3-6x+2}{9x-3}\right| < 0{,}01$$

$$\left|\frac{5}{9x-3}\right| < \frac{1}{100}$$

mj: $3x-1 \neq 0$

$3x \neq 1$

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

$|a| < b$

$-b < a < b$

$$-\frac{1}{100} < \frac{5}{9x-3} < \frac{1}{100} \quad |\cdot 100$$

$$-1 < \frac{500}{9x-3} < 1$$

II tapa

$$\frac{|5|}{|9x-3|} < \frac{1}{100}$$

$$\frac{5}{3|3x-1|} < \frac{1}{100}$$

$$\frac{3|3x-1|}{5} > 100 \quad |\cdot 5$$

$$3|3x-1| > 500 \quad |:3$$

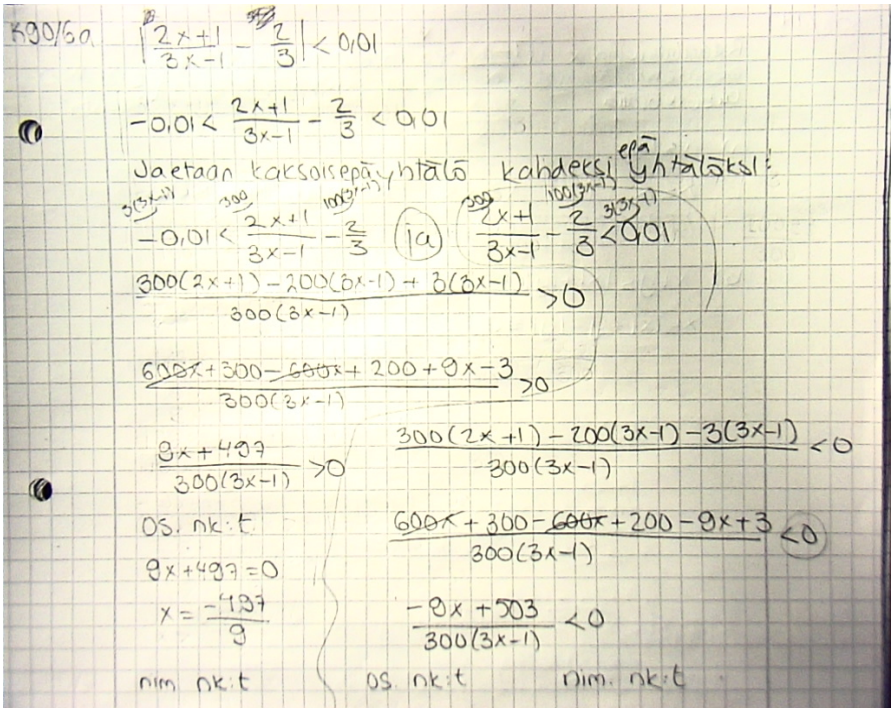
$$|3x-1| > \frac{500}{3}$$

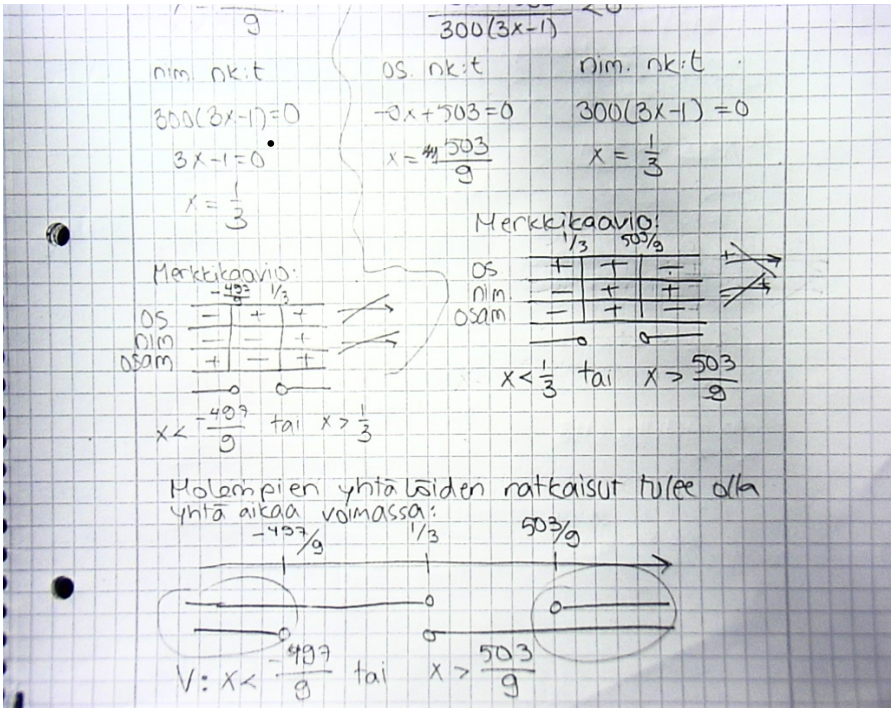
$3x-1 < -\frac{500}{3}$ tai $3x-1 > \frac{500}{3}$

$\vdots$ tai $\vdots$

tai

$\sqrt{}$: $x < -\frac{497}{9}$ tai $x > \frac{503}{9}$


K90/6a.
$\left|\frac{2x+1}{3x-1}-\frac{2}{3}\right|<0{,}01$
$-0{,}01<\frac{2x+1}{3x-1}-\frac{2}{3}<0{,}01$
Jaetaan kaksoisepäyhtälö kahdeksi epäyhtälöksi:
$-0{,}01<\frac{2x+1}{3x-1}-\frac{2}{3}$ (1a) $\frac{2x+1}{3x-1}-\frac{2}{3}<0{,}01$
$\frac{300(2x+1)-200(3x-1)+3(3x-1)}{300(3x-1)}>0$
$\frac{600x+300-600x+200+9x-3}{300(3x-1)}>0$
$\frac{9x+497}{300(3x-1)}>0$
$\frac{300(2x+1)-200(3x-1)-3(3x-1)}{300(3x-1)}<0$
Os. nk:t
$9x+497=0$
$x=-\frac{497}{9}$
$\frac{600x+300-600x+200-9x+3}{300(3x-1)}<0$
$\frac{-9x+503}{300(3x-1)}<0$
nim. nk:t
Os. nk:t
nim. nk:t


300(3x-1)
nim. nk:t
300(3x-1)=0
3x-1=0
x=1/3
os. nk:t
-9x+503=0
x=503/9
nim. nk:t
300(3x-1)=0
x=1/3
Merkkikaavio:
-497/9
1/3
os
nim
osam
x<-497/9 tai x>1/3
Merkkikaavio:
1/3
503/9
os
nim
osam
x<1/3 tai x>503/9
Molempien yhtälöiden ratkaisut tulee olla yhtä aikaa voimassa:
-497/9
1/3
503/9
V: x<-497/9 tai x>503/9

$+ \quad -$

$\cdot \quad :$

$$-2(x-1) = 3(2-x)$$

$$-2x + 2 = 6 - 3x \quad \| +3x$$

$$-2x + 2 + 3x = 6 - 3x + 3x$$

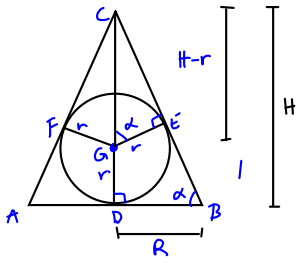
$$2 + x = 6 \quad \| -2$$

$$2 - 2 + x = 6 - 2$$

$$x = 4$$

K89/6a

$\frac{H}{r} = 2$



$\frac{V_p}{V_k} = ?$

Muodostuu 2 yhdenmuotoista kolmiota

$\triangle COB \sim \triangle CEG$

kk-lause

1) $\sphericalangle COB = \sphericalangle CEG$
2) $\sphericalangle DBC = \sphericalangle EGC$

$\tan\alpha = \frac{H}{R} = 2 \Rightarrow R = \frac{H}{2}$

Sisäänpiirretyn pallon säde r

$\cos\alpha = \frac{r}{H-r}$

$\frac{H-r}{r} = \frac{1}{\cos\alpha} \quad |(\ )^2$

$\frac{(H-r)^2}{r^2} = \frac{1}{\cos^2\alpha} = 1 + \tan^2\alpha = 1 + 2^2 = 5$

$\left(\frac{H-r}{r}\right)^2 = 5 \quad |\sqrt{\ }$

$\frac{H-r}{r} = \pm\sqrt{5}$

$\frac{H}{r} - \frac{r}{r} = \sqrt{5}$

$\frac{H}{r} - 1 = \sqrt{5}$

$\frac{H}{r} = \sqrt{5} + 1$

pallon ja kartion tilavuuksien suhde

$V_p = \frac{4}{3}\pi r^3$

$V_k = \frac{1}{3}\pi r^2 \cdot h$

$\frac{V_p}{V_k} = \frac{\frac{4}{3}\pi r^3}{\frac{1}{3}\pi R^2 \cdot H} =$

$= 4 \cdot \frac{r^3}{\left(\frac{H}{2}\right)^2 \cdot H}$

Sij. $R = \frac{H}{2}$

$\frac{\frac{4}{3}}{\frac{1}{3}} = \frac{4}{3} \cdot \frac{3}{1}$

$= 4 \cdot \frac{r^3}{\frac{H^3}{4}}$

$\frac{V_p}{V_k} = 16\left(\frac{r}{H}\right)^3$

Sij. $\frac{H}{r} = \sqrt{5} + 1$

$= 16 \cdot \left(\frac{1}{\sqrt{5}+1}\right)^3 = \frac{16}{(\sqrt{5}+1)^3} = 2\sqrt{5} - 4 \approx 0{,}4721.. \approx 0{,}47$

SMART Document Camera

K01/5

$d = 6\,cm$

$h = 16\,cm$

Pohjan kehä P

$r^2 = \left(\frac{d}{2}\right)^2 + h^2$

$r = \sqrt{\left(\frac{6}{2}\right)^2 + 16^2}$

$r = \sqrt{9 + 256}$

$r = \sqrt{265} \approx 16{,}27\,cm \approx 16{,}3\,cm$

$P = b$

$\pi d = \frac{\alpha}{360} \cdot 2\pi r$

$\alpha = \frac{\pi d \cdot 360°}{2\pi r}$

$\alpha = \frac{d \cdot 360°}{2r}$

$\alpha = \frac{6\,cm \cdot 360°}{2 \cdot \sqrt{265}} \approx 66°$

Vaipaksi ympyrän sektorin muotoinen suojapaperi.

Vastaus: Suojapaperi ympyrän sektorin säde on 16,3 cm ja keskikulma 66°