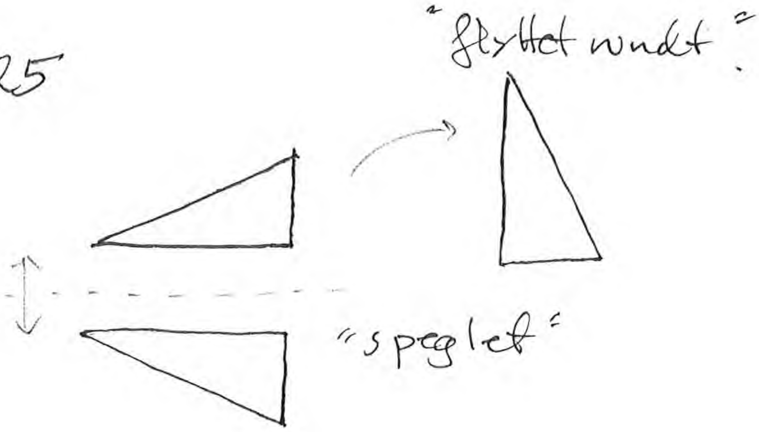
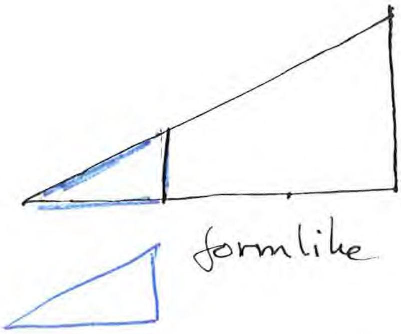
7 jan. 2025

Likhet



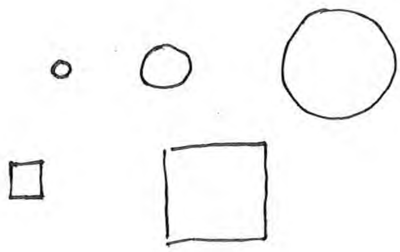
Formlikhet

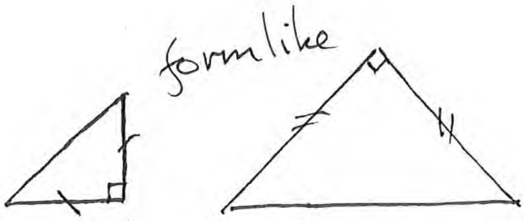


1/3 av den "store trekanten".

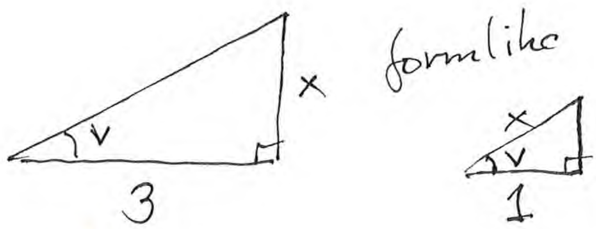
Alle sirkler er formlike

kvadrater





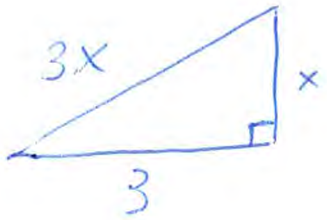
Eksempel



Hva er x?

3 ganger så stor som den lille Δ.

så



Pytagoras

$$x^2 + 3^2 = (3x)^2$$

$$x^2 + 9 = 9x^2$$

$$9 = 9x^2 - x^2$$

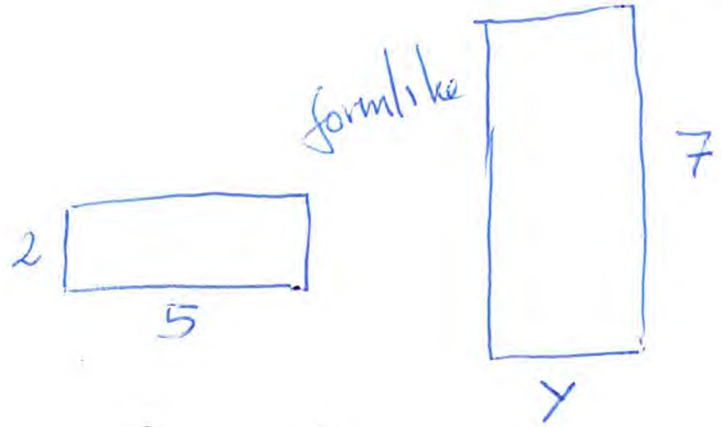
$$= (9-1)x^2$$

$$9 = 8x^2$$

$$x^2 = \frac{9}{8}$$

$(x > 0)$ så løsningen er $x = \sqrt{\frac{9}{8}}$

$$= \frac{\sqrt{9}}{\sqrt{8}} = \underline{\frac{3}{2\sqrt{2}}}$$



Hva er y?

$$\frac{2}{5} = \frac{y}{7}$$

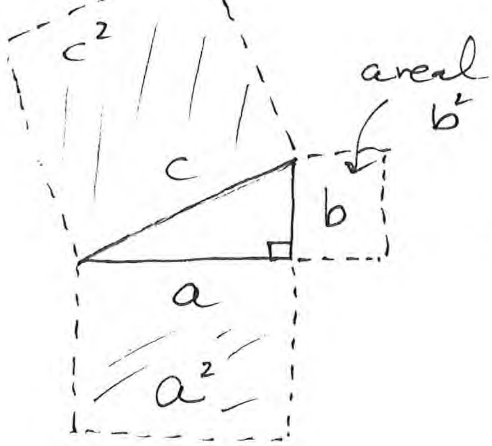
$$\frac{2 \cdot 7}{5} = y$$

$$y = \frac{14 \cdot 2}{5 \cdot 2} = \frac{28}{10}$$

$$= \underline{\underline{2.8}}$$

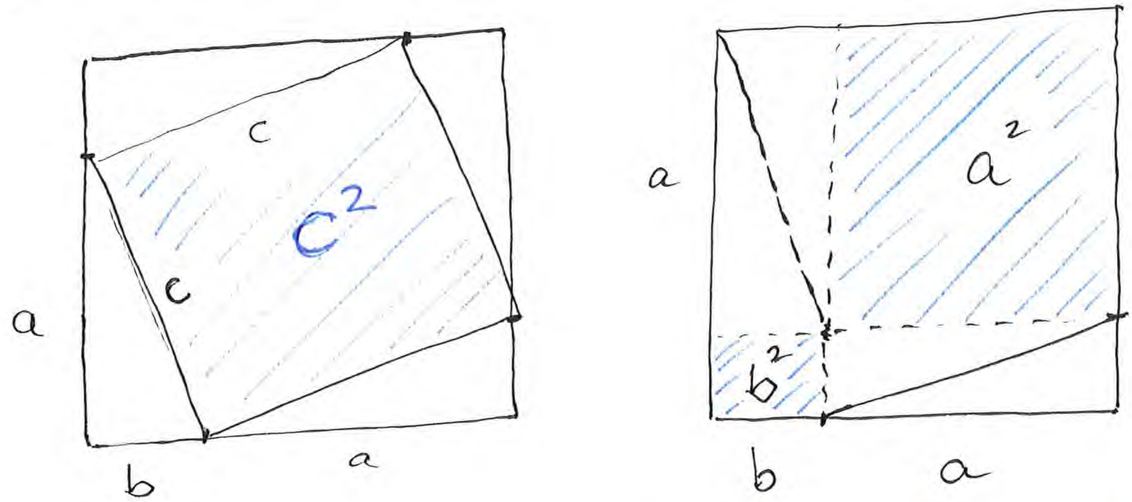
9C

Pytagoras

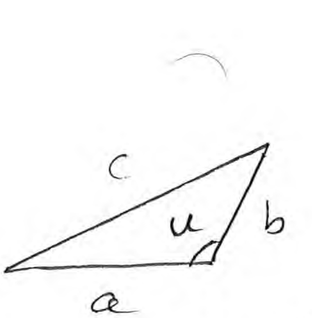


$a^2 + b^2 = c^2$

(geometrisk) bevis



arealet i det store kvadratet
utenom trekantene må være likt,
så $c^2 = a^2 + b^2$



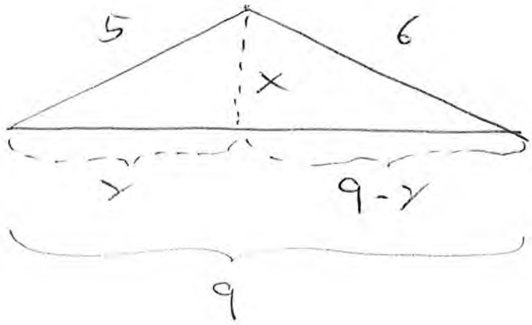
$c^2 > a^2 + b^2$

$\Leftrightarrow \quad u > 90^\circ$

$c^2 < a^2 + b^2$

$u < 90^\circ$

oppg



$5^2+6^2 = 25+36 = 61 < 9^2 = 81.$

Pytagoras: $x^2 + y^2 = 5^2 = 25$

$$x^2 + (9-y)^2 = 6^2 = 36$$

Dette gir
$$x^2 = 25 - y^2$$
$$= 36 - (9-y)^2$$
$$= 36 - 81 + 18y - y^2$$

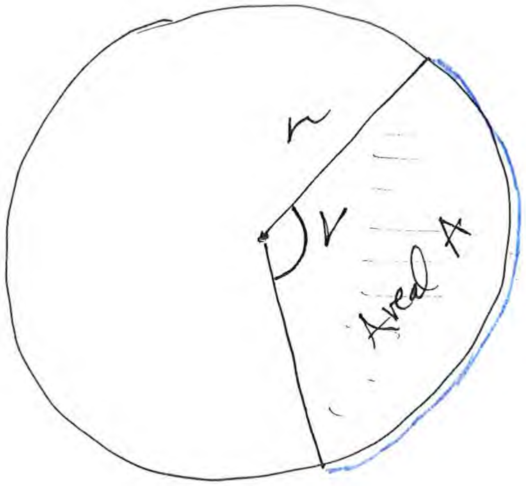
så
$$81 + 25 - 36 = y^2 - y^2 + 18y = 18y$$
$$70 = 18y$$
$$35 = 9y$$
$$y = \frac{35}{9} \sim 3{,}888\ldots$$

Pytagoras gir nå
$$x = \sqrt{5^2 - \left(\frac{35}{9}\right)^2} = \sqrt{\frac{(45)^2 - (35)^2}{9^2}}$$
$$= \sqrt{\frac{(45+35)(45-35)}{9^2}} = \frac{1}{9}\sqrt{80 \cdot 10}$$
$$x = \frac{10}{9} \cdot \sqrt{8} = \underline{\underline{\frac{20\sqrt{2}}{9}}}$$

Alternativt: $\sqrt{5^2 - x^2} + \sqrt{36 - x^2} = 9$ irrasjonal likning.

omkrets $\underline{2\pi r}$

areal $\underline{\pi r^2}$



$V = 360°$: $A = \pi r^2$ $b = 2\pi r$

$V = 180°$ (halvsirkel) $A = \frac{\pi}{2} r^2$ $b = \pi r$

$V = \frac{360°}{2^n}$ $A = \frac{\pi r^2}{2^n}$ $b = \frac{2\pi r}{2^n}$

V $A = \pi r^2 \frac{V}{360°}$ $b = 2\pi r \frac{V}{360°}$

$= \pi r \frac{V}{180°}$

$$A = \frac{1}{2} r \left(\overbrace{2\pi r \frac{V}{360°}}^{b} \right) \left(= r \underbrace{\left(\pi r \frac{V}{360°} \right)}_{b/2} = r \cdot \frac{b}{2} = \frac{1}{2} r b \right)$$

$$\underline{A = \frac{1}{2} r \cdot b}$$

10F Radianer (alternativt vinkelmål)

Buelengden $b = \left(2\pi \cdot \frac{v}{360°}\right) \cdot r$

Ønsker et vinkelmål slik at

$\frac{2\pi}{360°} \cdot \underset{\uparrow}{v}$ er vinkelen.

i grader

Da blir $b = \underset{\uparrow}{v} \cdot r$

vinkel i radianer.

$v = \frac{b}{r}$

Vinkel i <u>radianer</u> er $\frac{\text{buelengde}}{\text{radius}}$.

Vinkel i radianer $= \frac{2\pi}{360°} \cdot$ vinkel i grader

$= \frac{\pi}{180°}$ —— " ——

$360° = 2\pi$ rad

$180° = \pi$ rad

$90° = \frac{\pi}{2}$ rad

$45° = \frac{\pi}{4}$ rad

$30° = \frac{\pi}{6}$ rad

$60° = \frac{\pi}{3}$ rad

400° gon $= 360^\circ$

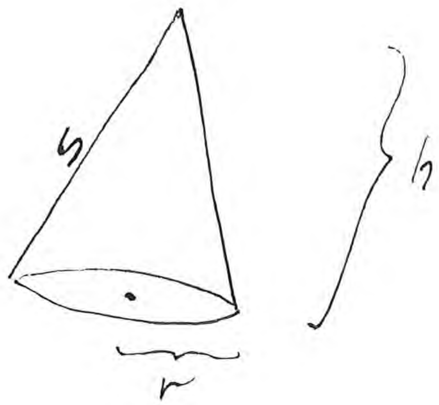
Rett vinkel 100° gon $= 90^\circ$

Kalkulatoren deg = grader

rad = radianer

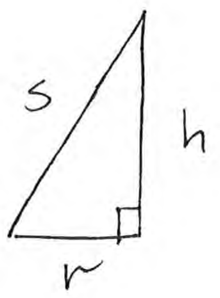
gra = gradianer (gon)

Kjegler



Volum

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

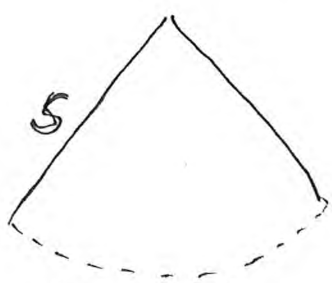


Pytagoras

$$s^2 = r^2 + h^2$$

$$s = \sqrt{r^2 + h^2}.$$

"Klipper opp kjeglen"

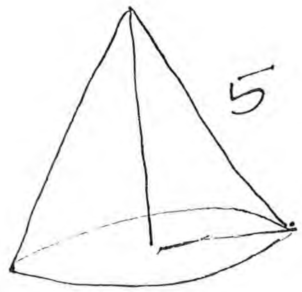


buelengde $2\pi r$

Overflatearealet

$$A = \frac{s \cdot 2\pi \cdot r}{2} = \underline{\pi r \cdot s}$$

$$\underline{A = \pi r \sqrt{r^2 + h^2}}$$



$r = 3.$

1. Finn Volumet
2. Finn overflaten til den lukka kjeglen (bunnen er med).

høyden $h = \sqrt{5^2 - 3^2} = 4$

$$V = \frac{\pi r^2 \cdot h}{3} = \frac{\pi \cdot 3^2 \cdot 4}{3} = 3 \cdot 4 \cdot \pi$$

$$V = \underline{\underline{12\pi}}$$

Overflate:

$$O = \pi r^2 + \pi r \cdot s$$

$$= \pi r(r+s)$$

$$O = \pi \cdot 3(5+3) = \underline{\underline{24\pi}}$$