Lösningar till diagnosprov i Geometri (M22b, kap 5)

1) Likformighet: $\frac{x}{3,5} = \frac{11}{2,6}$ $\quad | \cdot 3,5$

$$x = \frac{11 \cdot 3,5}{2,6} = \underline{\underline{14,8}}$$

2) Skala: $\frac{14,8}{3,5} = \frac{11}{2,6} = 4,2$ dvs $\underline{\underline{4,2:1}}$

3) Yttre vinkelsatsen: $125 = x + 70 \quad | -70$

$125 - 70 = x$

$\underline{\underline{x = 55^\circ}}$

4) Ja, därför att $125 + y = 180 \quad | -125$

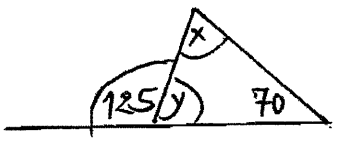
$y = 180 - 125$

$y = 55^\circ$

$\Rightarrow x = y$

$\Downarrow$

Likbent



5) $x + y = 180 \Rightarrow y + 50 + y = 180$

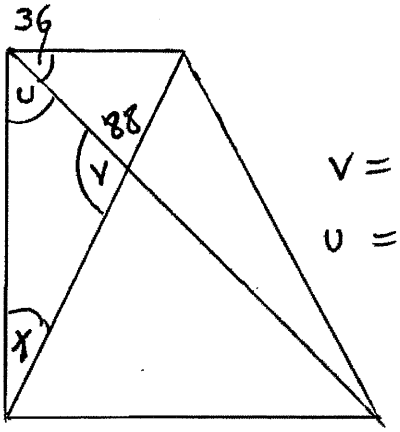
$x = y + 50$

$2y + 50 = 180 \quad | -50$

$2y = 130 \quad | /2$

$\underline{\underline{y = 65^\circ}}$

6)



$v = 180 - 88 = 92$

$u = 90 - 36 = 54$

$x + u + v = 180$

$x + 54 + 92 = 180$

$x + 146 = 180$

$x = 180 - 146$

$\underline{\underline{x = 34^\circ}}$

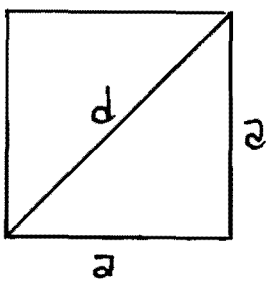
7) $\frac{18}{x} = \frac{12}{6} = 2$

$\frac{18}{x} = 2 \quad | \cdot x$

$18 = 2 \cdot x \quad | :2$

$9 = x$

$x = 9$

8) 

$a \cdot a = 1\ cm^2$

$a^2 = 1 \quad | \sqrt{}$

$a = \sqrt{1} = 1$

$d^2 = a^2 + a^2$

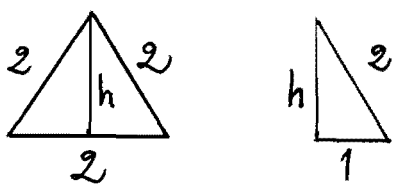
$d^2 = 2a^2$ ⟶ $d^2 = 2 \cdot 1^2 = 2 \cdot 1 = 2 \quad | \sqrt{}$

$d = \sqrt{2}$

9) Randvinklar över samma båge är lika stora

$y = 2x \Rightarrow y = 88^\circ$

$x = 44^\circ$

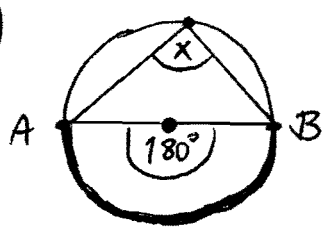
10) 

$h^2 + 1^2 = 2^2$: Pythagoras

$h^2 + 1 = 4$

$h^2 = 4 - 1 = 3 \quad | \sqrt{}$

$h = \sqrt{3}$

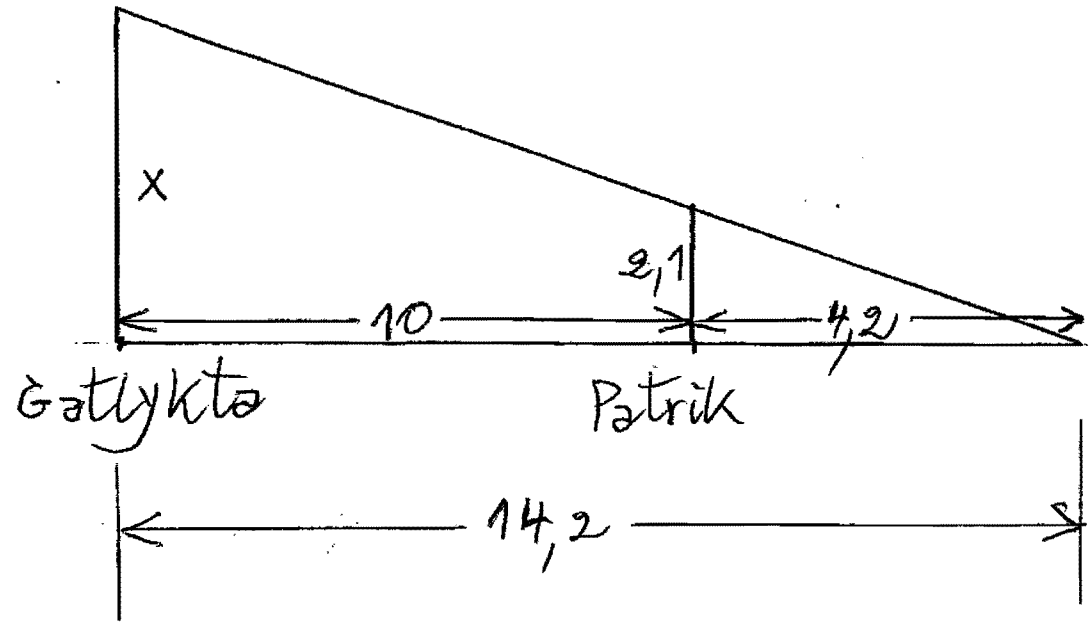
11) 

x = Randvinkel

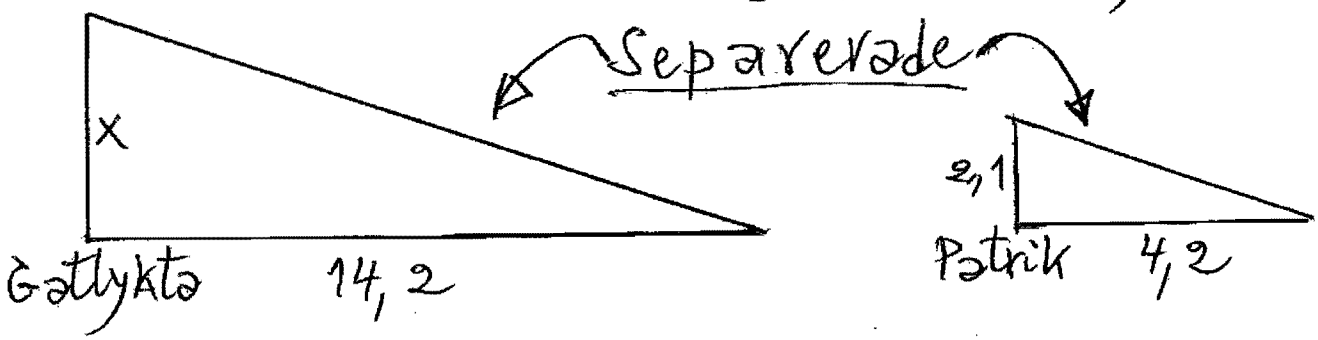
180° = Medelpunktsvinkel } över bågen $\overset{\frown}{AB}$ $\Rightarrow$ $2x = 180^\circ$

$x = 90^\circ$

12)



Två likformiga trianglar:
(i varandra)



$$\frac{x}{2,1} = \frac{14,2}{4,2}$$: {Kvoten av motsvarande sidor

$$x = \frac{14,2 \cdot 2,1}{4,2} = \underline{\underline{7,1 \text{ m}}}$$

Gatlyktan är 7,1 m hög.

13) Toppvinkelsatsen:

$$\frac{4,5}{11+4,5} = \frac{2,8}{x}$$

$$\frac{4,5}{15,5} = \frac{2,8}{x} \quad | \cdot x \; | \cdot 15,5$$

$$4,5x = 2,8 \cdot 15,5 \quad | \; /4,5$$

$$x = \frac{2,8 \cdot 15,5}{4,5}$$

$$\underline{\underline{x = 9,6 \text{ m}}}$$

14) Väg a: $250 + 100 = 350$

$350 / 0,75 = 467$ steg

$467 - 359 = 108$

Väg b: $100^2 + 250^2 = \overline{AB}^2$

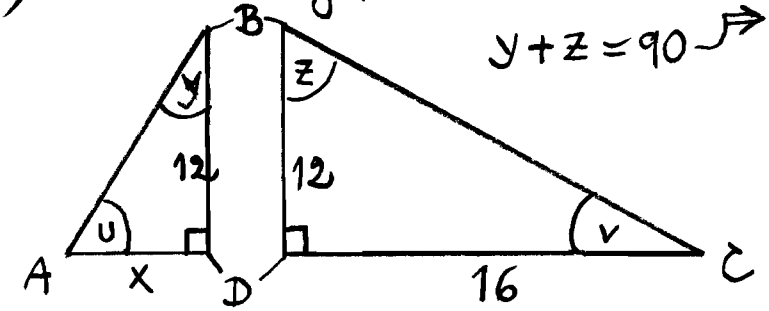
$72500 = \overline{AB}^2 \quad | \sqrt{}$

$269 = AB$

$269 / 0,75 = 359$ steg

Svar: $\underline{\underline{108 \text{ steg}}}$

15) Likformighet:



$y + z = 90 \rightarrow u + v = 90$

$u + y = 90$

$\Rightarrow y = v$

$\Downarrow$

$u = z$

Alla vinklar lika stora

$\Downarrow$

Trianglarna likformiga

$$\frac{x}{12} = \frac{12}{16}$$

$$x = \frac{12 \cdot 12}{16}$$

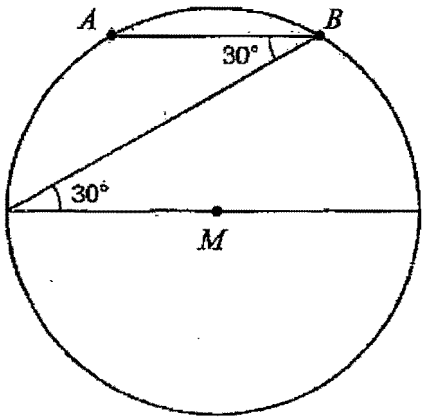
$$x = 9$$

$$\text{Arean} = \frac{12 \cdot 16}{2} + \frac{9 \cdot 12}{2} = 6 \cdot 16 + 9 \cdot 6 =$$

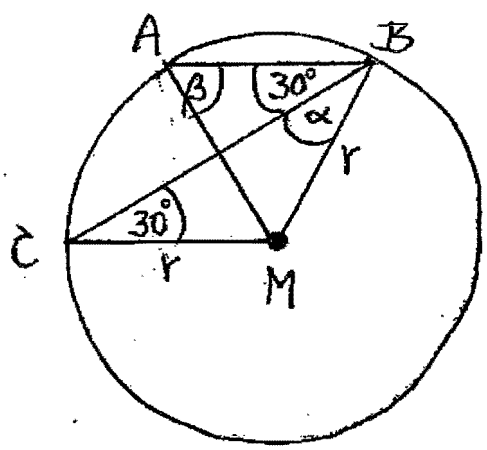
$$= 6 \cdot (16 + 9) = 6 \cdot 25 = \underline{\underline{150}}$$

16)

Punkterna A och B ligger på randen av en cirkel med medelpunkten M.



Visa att sträckan AB är lika lång som cirkelns radie. (0/2/□)



r = cirkelns radie

1) $MB = MC = r$

$\Downarrow$

ΔCBM likbent

$\Downarrow$

$\alpha = 30^\circ$

2) $MA = MB = r$

$\Downarrow$

ΔABM likbent $\Rightarrow \beta = 30^\circ + \alpha = 60^\circ$

1) och 2) $\Rightarrow \Delta ABM$ liksidig

$\Downarrow$

$\underline{AB = r}$