Diagnostische toets

bladzijde 66

1 a In $\triangle ABC$: $\tan \angle BAC = \dfrac{BC}{AB}$ geeft

tan 35°	BC
1	4,6

, dus $BC = 4{,}6 \cdot \tan 35° \approx 3{,}2$.

b In $\triangle ABE$: $\cos \angle BAE = \dfrac{AE}{AB}$ geeft

cos 35°	AE
1	4,6

, dus $AE = 4{,}6 \cdot \cos 35° \approx 3{,}768$.

In $\triangle ADE$: $\tan \angle DAE = \dfrac{DE}{AE}$ geeft

tan 40°	DE
1	3,768

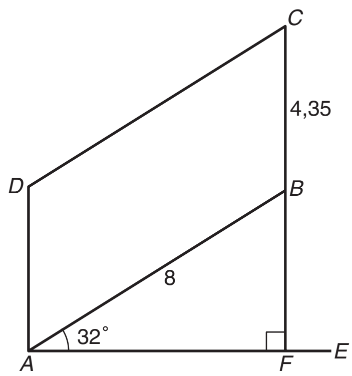
, dus $DE = 3{,}768 \cdot \tan 40° \approx 3{,}2$.

2 De stelling van Pythagoras in $\triangle SQR$:
$QS^2 = QR^2 - RS^2 = 4{,}7^2 - 1{,}1^2 = 20{,}88$, dus $QS = \sqrt{20{,}88} \approx 4{,}57$.
In $\triangle SPQ$: $\tan \angle P = \dfrac{QS}{PS} = \dfrac{4{,}57}{3{,}2}$, dus $\angle P = \tan^{-1}\left(\dfrac{4{,}57}{3{,}2}\right) \approx 55{,}0°$.

3 a In $\triangle AFB$: $\sin \angle BAF = \dfrac{BF}{AB}$ geeft

sin 32°	BF
1	8

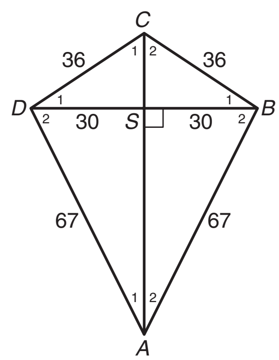
dus $BF = 8 \cdot \sin 32° \approx 4{,}24$
De hoogte van punt C is $4{,}24 + 4{,}35 = 8{,}59$ meter.



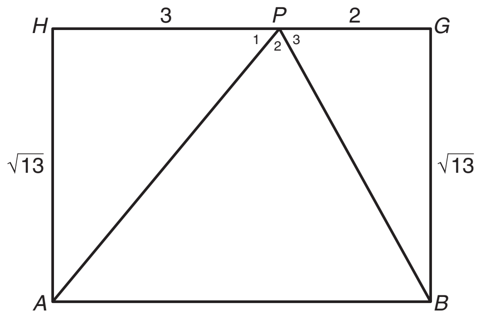
b In het geval C op hoogte 11,45 m is, is $BF = 11{,}45 - 4{,}35 = 7{,}1$ m.
In $\triangle AFB$: $\sin \angle BAF = \dfrac{BF}{AB} = \dfrac{7{,}1}{8}$, dus $\angle BAF = \sin^{-1}\left(\dfrac{7{,}1}{8}\right) \approx 62{,}6°$.

De ophaalhoek is 62,6°.

4 In $\triangle BCS$: $\cos \angle B_1 = \frac{30}{36}$, dus $\angle B_1 = \cos^{-1}\left(\frac{30}{36}\right) \approx 33{,}56°$
$\angle C_2 = 180° - 90° - \angle B_1 \approx 56{,}44°$
In $\triangle ABS$: $\cos \angle B_2 = \frac{30}{67}$, dus $\angle B_2 = \cos^{-1}\left(\frac{30}{67}\right) \approx 63{,}40°$
$\angle A_2 = 180° - 90° - \angle B_2 \approx 26{,}60°$
$\angle B_{12} = \angle D_{12} = \angle B_1 + \angle B_2 \approx 97{,}0°$
$\angle C_{12} = 2 \cdot \angle C_2 \approx 112{,}9°$
$\angle A_{12} = 2 \cdot \angle A_2 \approx 53{,}2°$



5 De stelling van Pythagoras in $\triangle BCG$:
$BG^2 = BC^2 + CG^2 = 3^2 + 2^2 = 13$, dus $BG = \sqrt{13}$



In $\triangle APH$: $\tan \angle P_1 = \dfrac{AH}{HP} = \dfrac{\sqrt{13}}{3}$, dus

$$\angle P_1 = \tan^{-1}\left(\frac{\sqrt{13}}{3}\right) \approx 50{,}24^\circ$$

In $\triangle BPG$: $\tan \angle P_3 = \dfrac{BG}{GP} = \dfrac{\sqrt{13}}{2}$, dus

$$\angle P_3 = \tan^{-1}\left(\frac{\sqrt{13}}{2}\right) \approx 60{,}98^\circ$$

$$\angle APB = \angle P_2 = 180^\circ - \angle P_1 - \angle P_3$$
$$= 180^\circ - 50{,}24^\circ - 60{,}98 \approx 68{,}8^\circ$$

6 a De stelling van Pythagoras in $\triangle ABC$:
$AC^2 = AB^2 + BC^2 = 5^2 + 5^2 = 50$, dus $AC = \sqrt{50}$
$AS = \frac{1}{2}AC = \frac{1}{2}\sqrt{50}$

In $\triangle ASH$: $\cos \angle HAS = \dfrac{AS}{AH}$ geeft

$\cos 60^\circ$	$\frac{1}{2}\sqrt{50}$
1	AH

$$AH = \frac{\frac{1}{2}\sqrt{50}}{\cos 60^\circ} \approx 7{,}071 \text{ m}$$

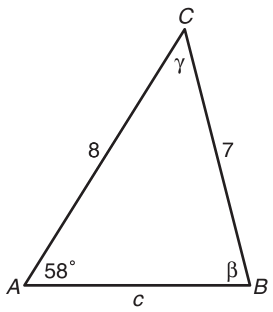
De totale lengte van de kabels is $4 \cdot AH \approx 4 \cdot 7{,}071 \approx 28{,}3$ meter.

b $AH = \dfrac{35}{4} = 8{,}75$ m

In $\triangle ASH$: $\cos \angle HAS = \dfrac{AS}{AH} = \dfrac{\frac{1}{2}\sqrt{50}}{8{,}75}$ geeft $\angle HAS = \cos^{-1}\left(\dfrac{\frac{1}{2}\sqrt{50}}{8{,}75}\right) \approx 66{,}2^\circ$.

7 a Sinusregel:

a	b	c
$\sin\alpha$	$\sin\beta$	$\sin\gamma$



geeft

7	8
$\sin 58^\circ$	$\sin\beta$

dus $\sin\beta = \dfrac{8 \cdot \sin 58^\circ}{7} \approx 0{,}969$

$\beta \approx \sin^{-1}(0{,}969) \approx 75{,}7^\circ$

b $\gamma = 180^\circ - \alpha - \beta \approx 180^\circ - 58^\circ - 75{,}7^\circ \approx 46{,}3^\circ$

a	c
$\sin\alpha$	$\sin\gamma$

geeft

7	c
$\sin 58^\circ$	$\sin 46{,}3^\circ$

, dus $c \approx \dfrac{7 \cdot \sin 46{,}3^\circ}{\sin 58^\circ} \approx 6{,}0$

8 a Sinusregel in $\triangle PQS$

QS	PS	PQ
$\sin\angle P$	$\sin\angle PQS$	$\sin\angle PSQ$

geeft

QS	PS	4,1
$\sin 72°$	$\sin 48°$	$\sin 60°$

↖ $180° - 72° - 48°$

dus $QS = \dfrac{4{,}1 \cdot \sin 72°}{\sin 60°} \approx 4{,}50$

b Sinusregel in $\triangle QRS$:

RS	QS	QR
$\sin\angle SQR$	$\sin\angle R$	$\sin\angle QSR$

geeft

RS	4,50	QR
$\sin 57°$	$\sin 53°$	$\sin 70°$

↖ $180° - 57° - 53°$

dus $QR = \dfrac{4{,}50 \cdot \sin 70°}{\sin 53°} \approx 5{,}3$

9 a De stelling van Pythagoras in $\triangle ABD$:
$BD^2 = AB^2 - AD^2 = 10^2 - 6^2 = 64$, dus $BD = \sqrt{64} = 8$

b Stel $BS = x$, dan is $DS = 8 - x$.
Zandloperfiguur ($\triangle ABS \backsim \triangle CDS$)

AB	BS
CD	DS

geeft

10	x
5	$8 - x$

Kruiselings vermenigvuldigen geeft $5 \cdot x = 10 \cdot (8 - x)$
$5x = 80 - 10x$
$15x = 80$
$x = \frac{80}{15} = 5\frac{1}{3}$

Dus $BS = 5\frac{1}{3}$

c Zijde × hoogte-methode in $\triangle ABD$:
zijde × hoogte = zijde × hoogte
$AB \times DE = AD \times BD$
$10 \cdot DE = 6 \cdot 8$
$DE = \frac{48}{10} = 4{,}8$

d De stelling van Pythagoras in $\triangle AED$:
$AE^2 = AD^2 - DE^2 = 6^2 - 4{,}8^2 = 12{,}96$, dus $AE = \sqrt{12{,}96} = 3{,}6$

e Teken loodlijn CF loodrecht op AB.
De stelling van Pythagoras in $\triangle AFC$:
$AC^2 = AF^2 + CF^2 = (3{,}6 + 5)^2 + 4{,}8^2 = 8{,}6^2 + 4{,}8^2 = 97$, dus $AC = \sqrt{97} \approx 9{,}85$.