JAWAPAN

BAB 9 PENYELESAIAN SEGI TIGA

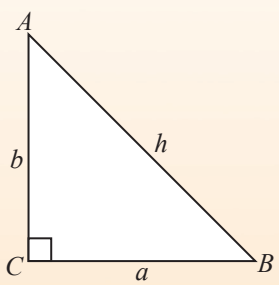
Inkuiri 1 **(Halaman 242)**

	$\frac{a}{\sin A}$	$\frac{b}{\sin B}$	$\frac{c}{\sin C}$
(a)	11.3	11.3	11.3
(b)	11.76	11.76	11.76

Konjektur:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Cabar Minda **(Halaman 243)**

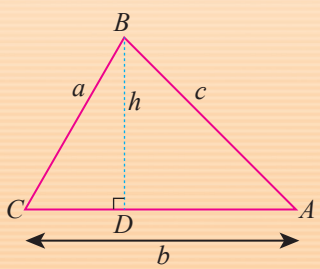


$$\frac{h}{\sin 90°} = \frac{a}{\sin A} \Rightarrow \sin A = \frac{a}{h}$$

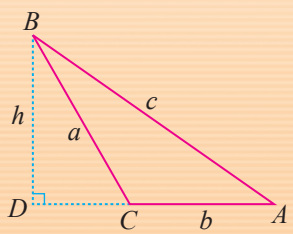
$$\frac{h}{\sin 90°} = \frac{b}{\sin B} \Rightarrow \sin B = \frac{b}{h}$$

Cabar Minda **(Halaman 244)**

Rajah (a) dan Rajah (b) masing-masing ialah segi tiga bersudut tirus dan segi tiga bersudut cakah. CD adalah berserenjang dengan AB dan diwakili dengan h.



Rajah (a) Segi tiga bersudut tirus



Rajah (b) Segi tiga bersudut cakah

Pertimbangkan segi tiga BCD,

$$\frac{h}{a} = \sin C$$

Maka, $h = a \sin C$…❶

Pertimbangkan segi tiga ABD,

$$\frac{h}{c} = \sin A$$

Maka, $h = c \sin A$…❷

❶ = ❷, $a \sin C = c \sin A$

$$\frac{a}{\sin A} = \frac{c}{\sin C}$$

atau $$\frac{\sin A}{a} = \frac{\sin C}{c}$$

Latih Diri 9.1 (Halaman 244)

1. (a) $\frac{p}{\sin P} = \frac{q}{\sin Q} = \frac{r}{\sin R}$

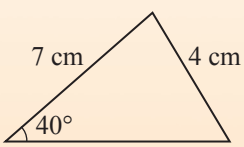
(b) $\frac{k}{\sin K} = \frac{l}{\sin L} = \frac{m}{\sin M}$

(c) $\frac{6}{\sin 40°} = \frac{8}{\sin 120°}$

Cabar Minda (Halaman 245)

Sudut bukan kandung ialah sudut yang bertentangan dengan salah satu daripada dua panjang sisi yang diberi.

Contoh:



Latih Diri 9.2 (Halaman 246)

1. (a) $\frac{m}{\sin 55°} = \frac{6.7}{\sin 78°}$

$$m = \frac{6.7}{\sin 78°} \times \sin 55°$$

$$= 5.611 \text{ cm}$$

(b) $\frac{\sin m}{8} = \frac{\sin 40°}{6.5}$

$$\sin m = \frac{\sin 40°}{6.5} \times 8$$

$$m = 52.29°$$

(c) $\frac{m}{\sin 43°} = \frac{12.4}{\sin 115°}$

$$m = \frac{12.4}{\sin 115°} \times \sin 43°$$

$$= 9.331 \text{ cm}$$

2. (a) $\frac{XY}{\sin 30.5°} = \frac{100}{\sin 66.5°}$

$$XY = \frac{100}{\sin 66.5°} \times \sin 30.5°$$
$$= 55.34 \text{ m}$$

Inkuiri 2 (Halaman 247)

Syarat	Bilangan Segi Tiga	Kes Berambiguiti
(i) $a < h$	Tiada	Bukan
(ii) $a = h$	Satu	Bukan
(iii) $a > h$	Dua jika $h < a < 10$	Ya
	Satu jika $a > 10$	Bukan
(iv) $a < c$	Dua jika $h < a < 10$	Ya
	Tiada jika $a < h$	Bukan
(v) $a = c$	Satu	Bukan
(vi) $a > c$	Satu	Bukan

Latih Diri 9.3 (Halaman 249)

1. (a) Wujud kes berambiguiti dengan sudut bukan kandung $\angle B = 62.5°$ dan sisi AC lebih pendek daripada sisi BC tetapi lebih panjang daripada tinggi.

(b) Tidak wujud kes berambiguiti kerana sisi PQ lebih panjang daripada sisi QR.

2. (a) $\frac{\sin \angle QRP}{15.5} = \frac{\sin 35°}{10.5}$

$$\sin \angle QRP = \frac{\sin 35°}{10.5} \times 15.5$$
$$\angle QRP = 57.86° \text{ atau } 180° - 57.86°$$
$$= 57.86° \text{ atau } 122.14°$$

(b) Apabila $\angle R = 57.86°$

$$\angle Q = 180° - 35° - 57.86°$$
$$= 87.14°$$
$$\frac{PR}{\sin 87.14°} = \frac{10.5}{\sin 35°}$$
$$PR = \frac{10.5}{\sin 35°} \times \sin 87.14°$$
$$= 18.283 \text{ cm}$$

Apabila $\angle R = 122.14°$

$$\angle Q = 180° - 35° - 122.14°$$
$$= 22.86°$$
$$\frac{PR}{\sin 22.86°} = \frac{10.5}{\sin 35°}$$
$$PR = \frac{10.5}{\sin 35°} \times \sin 22.86°$$
$$= 7.112 \text{ cm}$$

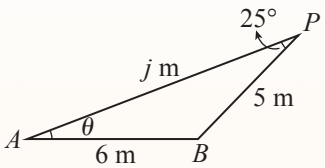
Latih Diri 9.4 (Halaman 250)

1. Andaikan penyiram air ialah A dan B, pili air ialah P, sudut antara penyiram air dan pili air ialah θ dan jarak antara pili dengan penyiram air paling jauh ialah j.

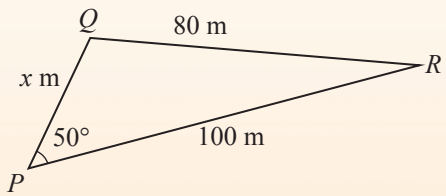
$$\frac{\sin\theta}{5} = \frac{\sin 25°}{6}$$
$$\sin\theta = \frac{\sin 25°}{6} \times 5$$
$$\theta = 20.62°$$
$$\angle ABP = 180° - 25° - 20.62°$$
$$= 134.38°$$

$$\frac{j}{\sin 134.38°} = \frac{6}{\sin 25°}$$
$$j = \frac{6}{\sin 25°} \times \sin 134.38°$$
$$= 10.147 \text{ m}$$

Maka, jarak antara pili dengan pancutan air paling jauh ialah ialah 10.147 m



2.
$$\frac{\sin Q}{100} = \frac{\sin 50°}{80}$$
$$\sin Q = \frac{\sin 50°}{80} \times 100$$
$$Q = 180° - 73.25°$$
$$= 106.75°$$
$$\angle R = 180° - 50° - 106.75°$$
$$= 23.25°$$
$$\frac{x}{\sin 23.25°} = \frac{80}{\sin 50°}$$
$$x = \frac{80}{\sin 50°} \times \sin 23.25°$$
$$= 41.224 \text{ m}$$



Latihan Intensif 9.1 (Halaman 250-251)

1.
$$\angle A = 180° - 77° - 39°$$
$$= 64°$$
$$\frac{a}{\sin 64°} = \frac{40.5}{\sin 77°}$$
$$a = \frac{40.5}{\sin 77°} \times \sin 64°$$
$$= 37.359 \text{ cm}$$
$$\frac{c}{\sin 39°} = \frac{40.5}{\sin 77°}$$
$$c = \frac{40.5}{\sin 77°} \times \sin 39°$$
$$= 26.158 \text{ cm}$$

2. (a)
$$BE = \sqrt{10^2 - 6^2}$$
$$= 8 \text{ cm}$$
$$CE = \sqrt{10^2 - 8^2}$$
$$= 6 \text{ cm}$$
$$DE = \sqrt{17^2 - 8^2}$$
$$= 15 \text{ cm}$$

(b) kos $\angle EAB = \frac{6}{10}$

$\angle EAB = 53.13°$

$\angle BCE = 53.13°$

$\angle BCD = 180° - 53.13°$

$= 126.87°$

$\frac{\sin \angle ABD}{21} = \frac{\sin 53.13°}{17}$

$\angle ABD = 81.20°$

$\frac{\sin \angle CBD}{9} = \frac{\sin 126.87°}{17}$

$\angle CBD = 25.06°$

(c) Segi tiga BDC dan segi tiga BDA mempunyai sudut dan dua panjang sisi yang sama saiz.

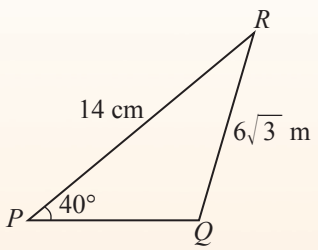
3. (a) $\angle PQR$

$\frac{\sin Q}{14} = \frac{\sin 40°}{6\sqrt{3}}$

$\sin Q = \frac{14 \sin 40°}{6\sqrt{3}}$

$Q = 60°$ atau $120°$

$\angle PQR$ adalah cakah, maka $\angle PQR = 120°$



(b) $\angle PRQ = 180° - 120° - 40°$

$= 20°$

$\frac{PQ}{\sin 20°} = \frac{14}{\sin 120°}$

$PQ = \frac{14 \sin 20°}{\sin 120°}$

$= 5.529$ cm

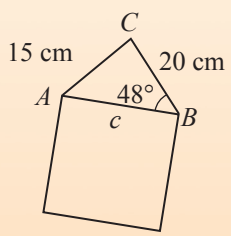
4. $\frac{\sin A}{20} = \frac{\sin 48°}{15}$

$\sin A = \frac{\sin 48°}{15} \times 20$

$A = 82.25°$

$C = 180° - 48° - 82.25°$

$= 49.75°$



$\frac{c}{\sin 49.75°} = \frac{15}{\sin 48°}$

$c = 15.405$ cm

Perimeter bingkai $= 4(15.405)$ cm

$= 61.62$ cm

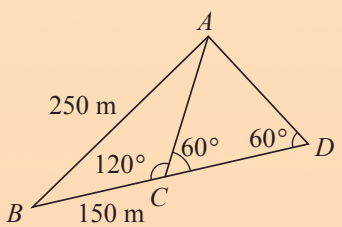
5. $\frac{\sin A}{150} = \frac{\sin 120°}{250}$

$\sin A = \frac{\sin 120°}{250} \times 150$

$A = 31.31°$

$B = 180° - 120° - 31.31°$

$= 28.69°$



$$\frac{b}{\sin 28.69°} = \frac{250}{\sin 120°}$$

$$b = 138.58 \text{ m}$$

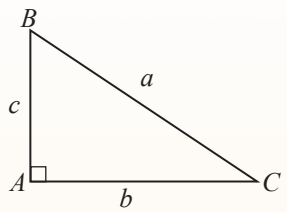
Oleh sebab jarak dari rumah Aida dan rumah Anita ke rumah Puan Azizah adalah sama, maka segi tiga *ACD* adalah sama. Maka, jarak di antara rumah Anita dan rumah Aida ialah 138.58 m.

Cabar Minda (Halaman 252)

Petua Kosinus boleh digunakan untuk segi tiga bersudut tegak

$a^2 = b^2 + c^2 - 2bc \text{ kos } 90°$

$a^2 = b^2 + c^2$ (teorem pythagoras)



Latih Diri 9.5 (Halaman 253 – 254)

1. (a) $x^2 = 3^2 + 5^2 - 2(3)(5) \text{ kos } 45°$

$x = 3.576 \text{ cm}$

(b) $180° - 55° 13' = 124° 47'$

$x^2 = 9^2 + 12^2 - 2(9)(12) \text{ kos } 124° 47'$

$x = 18.661 \text{ cm}$

(c) $x^2 = 75^2 + 100^2 - 2(75)(100) \text{ kos } 32°$

$x = 53.891 \text{ m}$

2. (a) $\text{kos } \theta = \dfrac{20^2 + 14^2 - 15.7^2}{2(20)(14)}$

$\theta = 51.38°$

(b) $\text{kos } \theta = \dfrac{10.8^2 + 12^2 - 7^2}{2(10.8)(12)}$

$\theta = 35.26°$

(c) $\text{kos } (180° - \theta) = \dfrac{9^2 + 6^2 - 10^2}{2(9)(6)}$

$(180° - \theta) = 80.94°$

$\theta = 99.06°$

3. $PR^2 = 9^2 + 12.5^2 - 2(9)(12.5) \text{ kos } 42.3°$

$PR = 8.4162 \text{ cm}$

$\text{kos } \angle PQR = \dfrac{5^2 + 8.7^2 - 8.4162^2}{2(5)(8.7)}$

$\angle PQR = 69.93°$

Latih Diri 9.6 (Halaman 255)

1. Andaikan jarak di antara papan ialah x.

$x^2 = 25^2 + 45^2 - 2(25)(45) \text{ kos } 38°$

$x = 29.614 \text{ m}$

Maka, jarak di antara papan ialah 29.614 m.

2. $\text{kos } D = \dfrac{10^2 + 5^2 - 8^2}{2(10)(5)}$

$D = 52.41°$

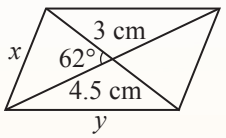
$AD^2 = 10^2 + 10^2 - 2(10)(10) \text{ kos } 52.41°$

$AD = 8.8317 \text{ m}$

Panjang dawai = 8.8317 + 10 + 10 + 5 + 8
= 41.832 m

3. $x^2 = 9^2 + 9.5^2 - 2(9)(9.5) \cos 120°$
$x = 16.023$ m
Jumlah jarak perjalan Amin = 2(8 + 16.023)
= 48.046 km

Latihan Intensif 9.2 (Halaman 255-256)



1. $x^2 = 3^2 + 4.5^2 - 2(3)(4.5) \cos 62°$
$x = 4.071$ cm
$y^2 = 3^2 + 4.5^2 - 2(3)(4.5) \cos (180 - 62)°$
$y = 6.475$ cm
Maka, panjang sisi-sisi bagi kad itu ialah 4.071 cm dan 6.475 cm.

2. $KL^2 = 15^2 + 20^2 - 2(15)(20) \cos 35°$
$KL = 11.555$ km
Jarak antara bandar K dan L ialah 11.555 km

3. $\cos \theta = \dfrac{28^2 + 49^2 - 36^2}{2(28)(49)}$
$\theta = 46.50°$
Maka, sudut antara laluan kapal Bunga Raya dan kapal Bunga Orkid ialah 46.50°.

4. $MQ = \sqrt{5^2 - 4^2}$
= 3 m
$\cos \angle MQP = \dfrac{3^2 + 7^2 - 8^2}{2(3)(7)}$
$\angle MQP = 98.21°$
$\angle PQN = 360° - 90° - 98.21°$
= 171.79°
$PN^2 = 7^2 + 4^2 - 2(7)(4) \cos 171.79°$
$PN = 10.974$ km
Panjang batu = 8 + 5 + 10.974
= 23.974 m

Inkuiri 3 (Halaman 257)

Segi tiga	Tapak	Tinggi	Luas
I	b	$a \sin C$	$\frac{1}{2}ab \sin C$
II	p	$q \sin R$	$\frac{1}{2}pq \sin R$
III	z	$x \sin Y$	$\frac{1}{2}xz \sin Y$

Latih Diri 9.7 (Halaman 258)

1. (a) Luas = $\frac{1}{2}(16.2)(18.4) \sin 49°$
= 112. 48 cm^2

(b) Luas $= \frac{1}{2}(7)(10)\sin 125°$

$= 28.67 \text{ cm}^2$

(c) $\angle Z = 180° - 60° - 35°$

$= 85°$

$\frac{XY}{\sin 85°} = \frac{10}{\sin 35°}$

$XY = 17.3681 \text{ cm}$

Luas $= \frac{1}{2}(10)(17.3681)\sin 60°$

$= 75.21 \text{ cm}^2$

2. $\frac{1}{2}(17)(LM)\sin 20° = 78.72$

$LM = \frac{78.72 \times 2}{17 \sin 20°}$

$= 27.08 \text{ cm}$

3. $\angle DBC = 180° - 2(55)°$

$= 70°$

Luas segi tiga BDC

$= \frac{1}{2}(10)(10)\sin 70°$

$= 46.985 \text{ cm}^2$

$\angle ABC = 180° - 24.18° - 55°$

$= 100.82°$

Luas segi tiga ABC

$= \frac{1}{2}(20)(10)\sin 100.82°$

$= 98.222 \text{ cm}^2$

Luas segi tiga ABD = Luas segi tiga ABC – Luas segi tiga BCD

$= 98.222 - 46.985$

$= 51.24 \text{ cm}^2$

4. Luas $XYZ = \frac{1}{2}(5.5)(7)\sin 70°30'$

$= 18.15 \text{ m}^2$

Latih Diri 9.8 (Halaman 260-261)

1. $s = \frac{5.4 + 6.1 + 7.3}{2}$

$= 9.4$

Luas $= \sqrt{9.4(9.4 - 7.3)(9.4 - 5.4)(9.4 - 6.1)}$

$= 16.142 \text{ cm}^2$

2. $s = \frac{11 + 12 + 5}{2}$

$= 14$

Luas segi tiga EGH

$= \sqrt{14(14 - 11)(14 - 12)(14 - 5)}$

$= 27.496 \text{ cm}^2$

$s = \frac{5 + 5 + 9}{2}$

$= 9.5$

Luas segi tiga EFJ

$= \sqrt{9.5(9.5 - 5)(9.5 - 5)(9.5 - 9)}$

$= 9.808 \text{ cm}^2$

Luas kawasan berlorek $= 27.496 - 9.808$

$= 17.69 \text{ cm}^2$

3. $s = \dfrac{3x + 4x + 2x}{2}$

$= \dfrac{9}{2}x$

$\sqrt{\dfrac{9x}{2}\left(\dfrac{9x}{2} - 4x\right)\left(\dfrac{9x}{2} - 3x\right)\left(\dfrac{9x}{2} - 2x\right)} = \sqrt{135}$

$\dfrac{135}{16}x^4 = 135$

$x^4 = 16$

$x = 2$

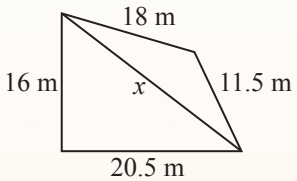
Latih Diri 9.9 (Halaman 262)

1. $x = \sqrt{16^2 + 20.5^2}$

$= 26$ m

$s = \dfrac{18 + 11.5 + 26}{2}$

$= 27.75$



Luas permaidani

$= \dfrac{1}{2}(16)(20.5) + \sqrt{27.75(27.75 - 18)(27.75 - 11.5)\ (27.75 - 26)}$

$= 164 + 87.716$

$= 251.72$ m^2

2. $VQ = \sqrt{10^2 + 4^2}$

$= \sqrt{116}$

$\dfrac{\sin R}{\sqrt{116}} = \dfrac{\sin 80°}{15}$

$R = 45°$

$\angle QVR = 180° - 80° - 45°$

$= 55°$

Luas permukaan condong

$= \dfrac{1}{2}(\sqrt{116})(15) \sin 55°$

$= 66.17$ cm^2

Latihan Intensif 9.3 (Halaman 262)

1. (a) $\dfrac{1}{2}(9)(AC) \sin \theta = 18$

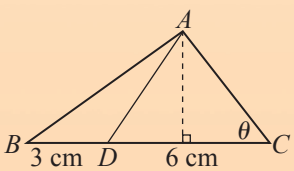
$\dfrac{1}{2}(9)(AC)\left(\dfrac{2}{3}\right) = 18$

$AC = 6$ cm

(b) $\dfrac{1}{2} \times$ tapak $\times$ tinggi $= 18$

$\dfrac{1}{2} \times 9 \times$ tinggi $= 18$

tinggi $= 4$ cm



Luas segi tiga ABD

$= \dfrac{1}{2}(3)(4)$

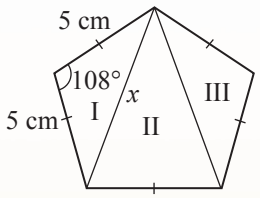
$= 6$ cm^2

2. Luas I $= \frac{1}{2}(5)(5) \sin 108°$

$= 11.8882 \text{ cm}^2$

$x^2 = 5^2 + 5^2 - 2(5)(5) \text{ kos } 108°$

$x = 8.0902 \text{ cm}$



Luas II $= \frac{1}{2}(8.0902)(8.0902) \sin 36°$

$= 19.2357 \text{ cm}^2$

Luas pentagon sekata

$= 2(11.8882) + 19.2357$

$= 43.012 \text{ cm}^2$

3. $\frac{1}{2}(8)(11) \sin \theta = 30$

$\sin \theta = 0.6818$

$\theta = 42.99°$ atau $137.01°$

Panjang sisi ketiga yang mungkin

$x^2 = 8^2 + 11^2 - 2(8)(11) \text{ kos } 42.99°$

$x = 7.501 \text{ cm}$

atau

$x^2 = 8^2 + 11^2 - 2(8)(11) \text{ kos } 137.01°$

$x = 17.71 \text{ cm}$

4. $3x + (x - 1) + (3x + 1) = 63$

$7x = 63$

$x = 9$

Maka, sisi bagi segi tiga ialah 27 cm, 8 cm dan 28 cm.

$s = \frac{27 + 8 + 28}{2}$

$= 31.5$

Luas segi tiga

$= \sqrt{31.5(31.5 - 27)(31.5 - 8)(31.5 - 28)}$

$= 107.98 \text{ cm}^2$

5. $\text{kos } \theta = \frac{5^2 + 8^2 - 7^2}{2(5)(8)}$

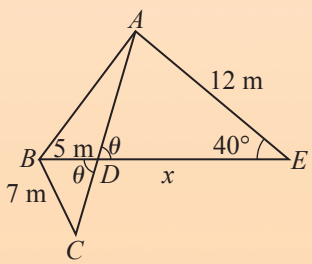
$\theta = 60°$

$\angle DAE = 180° - 60° - 40°$

$= 80°$

$\frac{x}{\sin 80°} = \frac{12}{\sin 60°}$

$x = 13.6459 \text{ m}$



Luas segi tiga BDC

$= \frac{1}{2}(5)(8) \sin 60°$

$= 17.3205 \text{ m}^2$

Luas segi tiga ABE

$= \frac{1}{2}(5 + 13.6459)(12) \sin 40°$

$= 71.9121 \text{ m}^2$

Luas tanah $= 17.3205 + 71.9121$

$= 89.23 \text{ m}^2$

6. $s = \dfrac{17 + 15 + 16}{2}$

$= 24$

Luas rak $= \sqrt{24(24 - 17)(24 - 15)(24 - 16)}$

$= 109.9818 \text{ cm}^2$

$\frac{1}{2}(15)(\text{Tinggi rak}) = 109.9818$

Tinggi rak $= 14.66$ cm

Latih Diri 9.10 (Halaman 265)

1. $\text{kos } A = \dfrac{10^2 + 4.027^2 - 6.575^2}{2(10)(4.027)}$

$A = 25.01°$

$\text{kos } B = \dfrac{4.027^2 + 6.575^2 - 10^2}{2(4.027)(6.575)}$

$B = 139.98°$

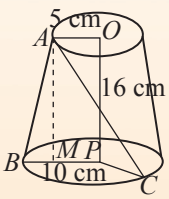
$\text{kos } C = \dfrac{6.575^2 + 10^2 - 4.027^2}{2(6.575)(10)}$

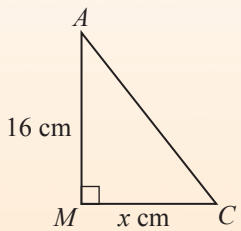
$C = 15.01°$

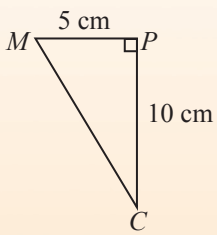
Jumlah sudut pedalaman $= 25.01° + 139.98° + 15.01°$

$= 180°$ (Terbukti)

2. (a)







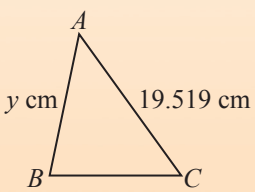
$x = \sqrt{5^2 + 10^2}$

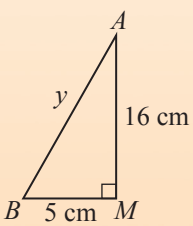
$= \sqrt{125}$ cm

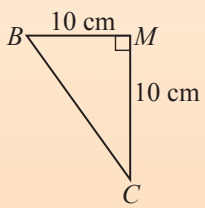
$AC = \sqrt{16^2 + 125}$

$= 19.52$ cm

(b)







$y = \sqrt{16^2 + 5^2}$

$= 16.7631$ cm

$BC = \sqrt{10^2 + 10^2}$

$= 14.1421$ cm

$s = \dfrac{19.519 + 16.7631 + 14.1421}{2}$

$= 25.2121$

Luas satah ABC

$= \sqrt{25.2121(25.2121 - 19.5192)(25.2121 - 16.7631)(25.2121 - 14.1421)}$

$= 115.87 \text{ cm}^2$

3. $\overrightarrow{OA} = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$

$\left|\overrightarrow{OA}\right| = \sqrt{(-4)^2 + 3^2}$

$= 5$

$\overrightarrow{OB} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

$\left|\overrightarrow{OB}\right| = \sqrt{1^2 + 1^2}$

$= \sqrt{2}$

$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$

$= \begin{pmatrix} 4 \\ -3 \end{pmatrix} + \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

$= \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

$\left|\overrightarrow{AB}\right| = \sqrt{5^2 + (-2)^2}$

$= \sqrt{29}$

$\text{kos } \angle AOB = \dfrac{5^2 + 2 - 29}{2(5)(\sqrt{2})}$

$\angle AOB = 98.13°$

Luas segi tiga AOB

$= \frac{1}{2}(5)(\sqrt{2}) \sin 98.13°$

$= 3.5 \text{ unit}^2$

Latihan Intensif 9.4 (Halaman 265)

1. (a) $\text{kos } P = \frac{4}{5}$

$P = 36.87°$

Luas segi tiga PRS

$= \frac{1}{2}(11)(14) \sin 36.87°$

$= 46.20 \text{ cm}^2$

Luas segi tiga PQT

$= \frac{1}{2}(4)(3)$

$= 6 \text{ cm}^2$

Luas $QRST = 46.20 - 6$

$= 40.20 \text{ cm}^2$

(b) $SR^2 = 11^2 + 14^2 - 2(11)(14) \text{ kos } 36.87°$

$SR = 8.4024 \text{ cm}$

$\dfrac{\sin S}{14} = \dfrac{\sin 36.87°}{8.402}$

$S = 88.76°$

$R = 180° - 88.76° - 36.87°$

$= 54.37°$

$\angle SUP = 180° - 54.37°$

$= 125.63°$

2. $\frac{\sin P}{13} = \frac{\sin 50°}{10}$

$P = 84.78°$

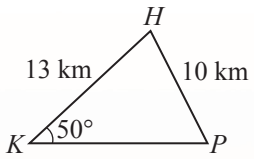
$H = 180° - 84.78° - 50°$

$= 45.22°$

$KP^2 = 13^2 + 10^2 - 2(13)(10) \text{ kos } 45.22°$

$KP = 9.266$

Jarak antara pelantar minyak dengan kapal tangki ialah 9.266 km.



3. (a) $AC = \sqrt{8^2 + 4^2} = 8.9443$

$CQ = \sqrt{8^2 + 6^2} = 10$

$AQ = \sqrt{4^2 + 6^2} = 7.2111$

$s = \frac{8.9443 + 10 + 7.2111}{2}$

$= 13.0777$

Luas satah ACQ

$= \sqrt{13.0777(13.0777 - 8.9443)(13.0777 - 10)(13.0777 - 7.2111)}$

$= 31.24 \text{ cm}^2$

(b) Satah yang mempunyai luas yang sama dengan satah ACQ ialah satah DBR.

4. $\angle ABC = 360° - 60° - 225°$

$= 75°$

$AC^2 = 20^2 + 30^2 - 2(20)(30) \text{ kos } 75°$

$AC = 31.46 \text{ km}$

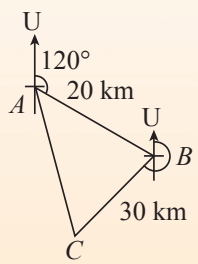
$\frac{\sin \angle BAC}{30} = \frac{\sin 75°}{31.455}$

$\angle BAC = 67.11°$

Bearing Pelabuhan Cindai dari Pelabuhan Astaka

$= 120° + 67.11°$

$= 187.11°$



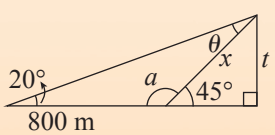
5. $\frac{x}{\sin 20°} = \frac{800}{\sin 25°}$

$x = 647.4309 \text{ m}$

$\frac{t}{647.4309} = \sin 45°$

$t = 457.80 \text{ m}$

Maka, tinggi gunung dari aras Arman berada ialah 457.80 m.



Latihan Pengukuhan (Halaman 267 – 269)

1. (a) $\angle C = 180° - 72° - 50°$

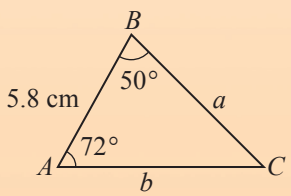
$= 58°$

$\frac{a}{\sin 72°} = \frac{5.8}{\sin 58°}$

$a = 6.504 \text{ cm}$

$\frac{b}{\sin 50°} = \frac{5.8}{\sin 58°}$

$b = 5.239 \text{ cm}$



(b) $\text{kos } P = \dfrac{3.63^2 + 6.56^2 - 8.28^2}{2(3.63)(6.56)}$

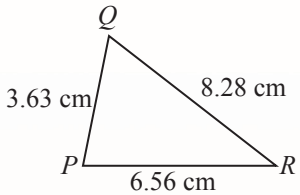
$\angle P = 105.03°$

$\text{kos } Q = \dfrac{3.63^2 + 8.28^2 - 6.56^2}{2(3.63)(8.28)}$

$\angle Q = 49.92°$

$\angle R = 180° - 105.03° - 49.92°$

$= 25.05°$



2. (a) $Y = 180° - 55°\ 13'$

$= 124°\ 47'$

$X = 180° - 124°\ 47' - 31°\ 52'$

$= 23°\ 21'$

$\dfrac{x}{\sin 23°\ 21'} = \dfrac{14}{\sin 124°\ 47'}$

$x = 6.756 \text{ cm}$

(b) $\angle P = 180° - 77°$

$= 103°$

$x^2 = 3^2 + 6^2 - 2(3)(6) \text{ kos } 103°$

$x = 7.287 \text{ cm}$

3. (a) $\text{kos } \angle ADC = -0.3$

$AC^2 = 7^2 + 10^2 - 2(7)(10)\ (-0.3)$

$AC = 13.82 \text{ cm}$

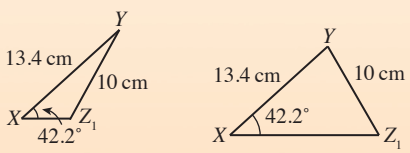
(b) $\text{kos } \angle ADC = -0.3$

$\angle ADC = 107.46°$

Luas segi tiga $ADC = \dfrac{1}{2}(7)(10) \sin 107.46°$

$= 33.39 \text{ cm}^2$

4. (a)



(b) $\dfrac{\sin Z}{13.4} = \dfrac{\sin 42.2°}{10}$

$Z_1 = 64.17°$

$Z_2 = 180° - 64.17°$

$= 115.83°$

(c) $\angle Y = 180° - 42.2° - 115.83°$

$= 21.97°$

Luas segi tiga XYZ

$= \dfrac{1}{2}(13.4)(10) \sin 21.97°$

$= 25.07 \text{ cm}^2$

5. (a) $\frac{\sin \angle ACB}{9} = \frac{\sin 30°}{5}$

$\angle ACD = 64.16°$

$AD^2 = 5^2 + 6^2 - 2(5)(6) \text{ kos } 64.16°$

$AD = 5.903 \text{ cm}$

(b) $\frac{1}{2}(5.903)(10) \sin \angle DAE = 20$

$\sin \angle DAE = \frac{20 \times 2}{(5.903)(10)}$

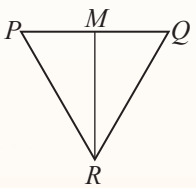
$\angle DAE = 42.66°$

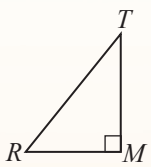
6. (a) $RM = \sqrt{6^2 - 3^2}$

$= 5.1962 \text{ cm}$

$\tan \angle TRM = \frac{4}{5.1962}$

$\angle TRM = 37.59°$





(b) $TR = \sqrt{4^2 + 5.1962}$

$= 6.5575 \text{ cm}$

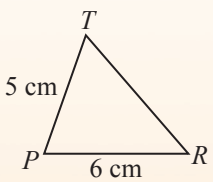
$\text{kos } P = \frac{5^2 + 6^2 - 6.5575^2}{2(5)(6)}$

$P = 72.54°$

Luas satah TPR

$= \frac{1}{2}(5)(6) \sin 72.54°$

$= 14.31 \text{ cm}^2$



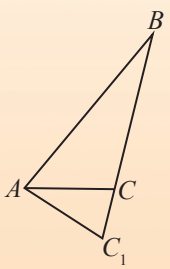
7. (a) $\frac{\sin C}{8} = \frac{\sin 50°}{7}$

$C = 61.1°$

Sudut cakah bagi $ACB = 180° - 61.1°$

$= 118.9°$

(b)

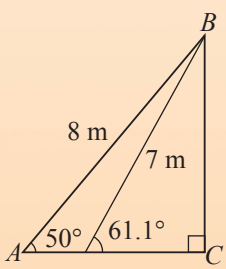


(c) $\frac{BC}{7} = \sin 61.1°$

$BC = 6.1283 \text{ m}$

$AC^2 = 8^2 - 6.1283^2$

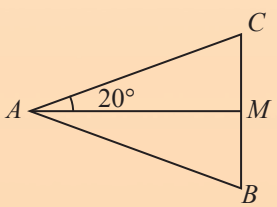
$AC = 5.142 \text{ m}$



8. (a) $\frac{1}{2}(5.2)(5.2) \sin \angle BAC = 8.69$

$\sin \angle BAC = \frac{8.69 \times 2}{5.2^2}$

$\angle BAC = 40°$



(b) $\frac{AM}{5.2} = \text{kos } 20°$

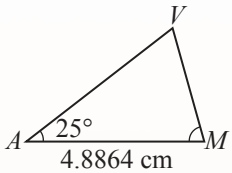
$AM = 4.8864$ m

$\angle AVM = 180° - 25° - 50°$

$= 105°$

$\frac{AV}{\sin 50°} = \frac{4.8864}{\sin 105°}$

$AV = 3.875$ cm



(c) $s = \frac{3.875 + 3 + 5.2}{2}$

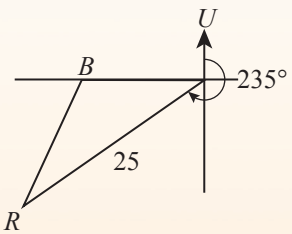
$= 6.0375$

Luas permukaan VAB

$= \sqrt{6.0375(6.0375 - 3.875)(6.0375 - 3)(6.0375 - 5.2)}$

$= 5.763 \text{ cm}^2$

9. (a)



(b) $\frac{\sin B}{25} = \frac{\sin 35°}{16}$

$B = 180° - 63.66°$

$= 116.34°$

$R = 180° - 116.34° - 35°$

$= 28.66°$

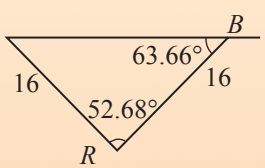
$\frac{x}{\sin 28.66°} = \frac{16}{\sin 35°}$

$x = 13.38$ km

Bot itu telah bergerak sejauh 13.38 km.

(c) (i) $\frac{y}{\sin 52.68°} = \frac{16}{\sin 63.66°}$

$y = 14.20$ km



(ii) Bearing rumah api dari kedudukan kedua $= 90^o + 63.36^o$

$= 153.36^o$

10. (a) (i) $JL^2 = 40^2 + 80^2 - 2(40)(80) \text{ kos } 44°$

$JL = 58.28$ km

(ii) $\frac{\sin M}{80} = \frac{\sin 44°}{65}$

$M = 58.76°$

(iii) $\angle L = 180° - 44° - 58.76°$

$= 77.24°$

Luas $KLM = \frac{1}{2}(80)(65) \sin 77.24°$

$= 2535.79 \text{ km}^2$

(b) Stesen minyak yang paling jauh dari stesen minyak K ialah stesen minyak M kerana jarak di antara stesen minyak K dan M berhadapan dengan sudut yang paling besar.

(c) $\frac{1}{2}(80)$(Jarak terdekat) = 2535.79

$$\text{Jarak terdekat} = \frac{2535.79}{40}$$
$$= 63.40 \text{ km}$$

11. (a) (i) $\frac{\sin E}{7} = \frac{\sin 50.05°}{6.5}$

$$= 55.65°$$
$$\angle CED = 180° - 55.65°$$
$$= 124.35°$$

(ii) $AB^2 = 5^2 + 9^2 - 2(5)(9) \text{ kos } 50.05°$

$$AB = 6.943 \text{ cm}$$

(iii) $\angle CDE = 180° - 50.05° - 124.35°$

$$= 5.6°$$

Luas segi tiga $CED = \frac{1}{2}(7)(6.5) \sin 5.6°$

$$= 2.22 \text{ cm}^2$$
$$\angle ACD = 180° - 50.05°$$
$$= 129.95°$$

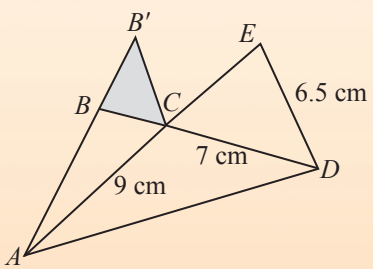
Luas segi tiga $ACD = \frac{1}{2}(9)(7) \sin 129.95°$

$$= 24.148 \text{ cm}^2$$

Luas segi tiga AED

$$= 2.22 + 24.148$$
$$= 26.37 \text{ cm}^2$$

(b)



12. (a) $\frac{\sin \angle YXZ}{4} = \frac{\sin \angle XYZ}{12}$

$$\sin \angle YXZ = \frac{\left(\frac{10}{11}\right)}{12} \times 4$$
$$= \frac{10}{33}$$

(b) $\angle YXZ = 17.64°$

$\angle XYW = 65.38°$

$\angle XYZ = 180° - 65.38°$

$$= 114.62°$$

$\angle XZY = 180° - 114.62° - 17.64°$

$$= 47.74°$$

Luas segi tiga XYZ

$= \frac{1}{2}(4)(12) \sin 47.74°$

$= 17.762 \text{ cm}^2$

Maka, $\frac{1}{2}(4)(XW) = 17.762$

$XW = 8.881 \text{ cm}$

Maka, luas segi tiga XYZ ialah 17.76 cm^2 dan panjang XW ialah 8.881 cm.

(c) Segi tiga ZXY' dengan keadaan XZ kekal, $XY' = XY$, $\angle XZY' = \angle XZY$ (Rajah I)
Segi tiga ZXY' dengan keadaan XZ kekal, $ZY' = ZY$, $\angle ZXY' = \angle ZXY$ (Rajah II)