

Jawapan

Praktis 1

Praktis Formatif

$$1 \text{ (a) } 60^\circ = 60^\circ \times \frac{\pi \text{ rad}}{180^\circ} \\ = \frac{\pi}{3} \text{ rad}$$

$$(b) 70^\circ 30' = 70^\circ 30' \times \frac{\pi \text{ rad}}{180^\circ} \\ = \frac{47}{120} \pi \text{ rad}$$

$$(c) 210.6^\circ = 210.6^\circ \times \frac{\pi \text{ rad}}{180^\circ} \\ = 1.17\pi \text{ rad}$$

$$2 \text{ (a) } 300^\circ = 300^\circ \times \frac{\pi \text{ rad}}{180^\circ} \\ = 5.237 \text{ rad}$$

$$(b) 45^\circ 48' = 45^\circ 48' \times \frac{\pi \text{ rad}}{180^\circ} \\ = 0.7995 \text{ rad}$$

$$(c) 135.3^\circ = 135.3^\circ \times \frac{\pi \text{ rad}}{180^\circ} \\ = 2.362 \text{ rad}$$

$$3 \text{ (a) } 3.05 \text{ rad} = 3.05 \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}} \\ = 174.73^\circ$$

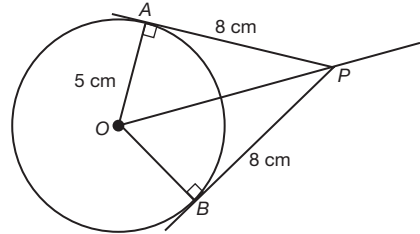
$$(b) 1.3\pi \text{ rad} = 1.3\pi \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}} \\ = 234^\circ$$

$$(c) \frac{3}{5}\pi \text{ rad} = \frac{3}{5}\pi \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}} \\ = 108^\circ$$

$$(d) \frac{\pi}{2} \text{ rad} = \frac{\pi}{2} \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}} \\ = 90^\circ$$

$$4 \quad \angle AOB_{\text{major}} = 2 \times 110^\circ \\ = 220^\circ \\ \theta = 360^\circ - 220^\circ \\ = 140^\circ \\ = 140^\circ \times \frac{\pi \text{ rad}}{180^\circ} \\ = \frac{7\pi}{9} \text{ rad}$$

$$5 \quad \tan \angle AOP = \frac{8}{5} \\ \angle AOP = 58^\circ \\ \therefore \angle AOB = 2 \times 58^\circ \\ = 116^\circ \\ = 116^\circ \times \frac{\pi \text{ rad}}{180^\circ} \\ = 2.025 \text{ rad}$$



$$6 \text{ (a) } \text{Panjang lengkok/Arc length, } s = r\theta \\ = 14 \left(\frac{\pi}{2} \right) \text{ rad} \\ = 21.99 \text{ cm}$$

$$(b) \text{Panjang lengkok/Arc length, } s = r\theta \\ = 10 \left(35^\circ \times \frac{\pi}{180^\circ} \right) \\ = 6.109 \text{ cm}$$

$$(c) \text{Panjang lengkok/Arc length, } s = r\theta \\ = 15.4(1) \\ = 15.4 \text{ cm}$$

$$7 \text{ (a) } \text{Jejari/Radius, } r = \frac{s}{\theta} \\ = \frac{6.3}{0.9} \\ = 7 \text{ cm}$$

$$(b) 270^\circ \times \frac{\pi \text{ rad}}{180^\circ} = 4.713 \text{ rad} \\ \text{Jejari/Radius, } r = \frac{52.37}{270^\circ} \\ = \frac{52.37}{4.713} \\ = 11.11 \text{ cm}$$

$$(c) \text{Jejari/Radius, } r = \frac{s}{\theta} \\ = \frac{37.8}{0.7} \\ = 54 \text{ mm}$$

$$8 \text{ (a) } \text{Sudut/Angle, } \theta = \frac{s}{r} \\ = \frac{30}{15} \\ = 2 \text{ rad}$$

$$(b) \angle AOB_{\text{major}} = \frac{s}{r} \\ = \frac{87.68}{20} \\ = 4.384 \text{ rad} \\ \theta = 2\pi - 4.384 \text{ rad} \\ = 1.9 \text{ rad}$$

$$\begin{aligned} \text{(c) Sudut/Angle, } \theta &= \frac{s}{r} \\ &= \frac{2r}{r} \\ &= 2 \text{ rad} \end{aligned}$$

$$9 \text{ Perentas/Chord } AB = 2r \sin \frac{\theta}{2}$$

atau/or $AB = \sqrt{r^2 + r^2 - 2r^2 \cos/\cos \theta}$

$$\text{(a) Perentas/Chord } AB = 2(4.5) \sin \left(\frac{1.7 \text{ rad}}{2} \right) = 6.762 \text{ cm}$$

$$\begin{aligned} \text{(b) } s &= r\theta \\ \theta &= \frac{18.9}{15} \text{ rad} \\ &= 1.26 \text{ rad} \end{aligned}$$

$$\text{Perentas/Chord } AB = 2(15) \sin \left(\frac{1.26 \text{ rad}}{2} \right) = 17.67 \text{ cm}$$

$$\begin{aligned} 10 \quad s_{AB} &= r\theta \\ \theta &= \frac{5}{5} \text{ rad} \\ &= 1 \text{ rad} \end{aligned}$$

$$\text{Perentas/Chord } AB = 2(5) \sin \left(\frac{1 \text{ rad}}{2} \right) = 4.794 \text{ cm}$$

$$\begin{aligned} s_{AB} : s_{CD} &= 2 : 1 \\ &= 5 : 2.5 \end{aligned}$$

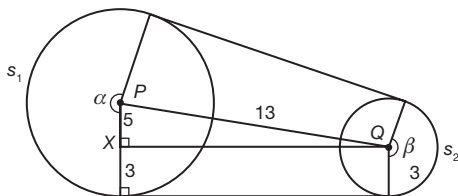
$$\begin{aligned} \text{Perimeter} &= AB + s_{AB} + OC + OD + s_{CD} \\ &= 4.794 + 5 + 10 + 10 + 2.5 \\ &= 32.294 \text{ cm} \end{aligned}$$

$$\begin{aligned} 11 \quad \frac{s_{AB}}{s_{BC}} &= \frac{\angle AOB}{\angle BOC} & \text{atau/or} & \quad \frac{s_{AB}}{s_{BC}} = \frac{1}{3} \\ \frac{1}{3} &= \frac{\angle AOB}{x} & & \quad \frac{x}{s_{BC}} = \frac{1}{3} \\ \angle AOB &= \frac{x}{15} & & \quad \frac{x}{s_{BC}} = 3x \\ s_{AB} &= r\theta & & \quad r \left(\frac{x}{s} \right) = 3x \\ x &= r \left(\frac{x}{15} \right) & & \quad r = 15 \text{ cm} \\ r &= 15 \text{ cm} & & \end{aligned}$$

$$12 \text{ (a) } s_{BC} = (2r) \left(\frac{5}{r} \right) = 10 \text{ cm}$$

$$\begin{aligned} \text{(b) Perimeter} &= s_{AD} + AB + s_{BC} + CD \\ &= 5 + r + 10 + r \\ &= (15 + 2r) \text{ cm} \end{aligned}$$

13



$$\begin{aligned} \cos \angle QPX &= \frac{5}{13} \\ \cos \angle QPX &= \frac{5}{13} \end{aligned}$$

$$\begin{aligned} \angle QPX &= 67.38^\circ \\ \alpha &= 360^\circ - 2(67.38^\circ) & \beta &= 2(67.38^\circ) \\ &= 225.24^\circ & &= 134.76^\circ \\ &= 3.931 \text{ rad} & &= 2.352 \text{ rad} \end{aligned}$$

$$\begin{aligned} XQ &= \sqrt{13^2 - 5^2} \\ &= 12 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= s_1 + s_2 + 2(12) \\ &= 8(3.931) + 3(2.352) + 24 \\ &= 62.504 \text{ cm} \end{aligned}$$

$$14 \text{ (a) } A = \frac{1}{2}(9)^2(2.5) = 101.25 \text{ cm}^2$$

$$\text{(b) } A = \frac{1}{2}(20)^2 \left(275^\circ \times \frac{\pi}{180^\circ} \right) = 959.93 \text{ cm}^2$$

$$\text{(c) } A = \frac{1}{2}(6.3)^2 \left(50^\circ \times \frac{\pi}{180^\circ} \right) = 17.32 \text{ cm}^2$$

$$15 \text{ (a) } \frac{1}{2}r^2(1.6) = 80$$

$$\begin{aligned} r^2 &= \frac{2(80)}{1.6} \\ r &= 10 \text{ cm} \end{aligned}$$

$$\text{(b) } \frac{1}{2}r^2 \left(30^\circ \times \frac{\pi}{180^\circ} \right) = 37.7$$

$$\begin{aligned} r^2 &= \frac{2(37.7)}{0.5236} \\ r &= 12 \text{ mm} \end{aligned}$$

$$16 \text{ (a) } \frac{1}{2}(4)^2(\theta) = 36$$

$$\begin{aligned} \theta &= \frac{2(36)}{100} \\ &= 4.5 \text{ rad} \end{aligned}$$

$$\text{(b) } \frac{1}{2}(10)^2(2\pi - \theta) = 132$$

$$\begin{aligned} 2\pi - \theta &= \frac{2(132)}{100} \\ &= 2.64 \text{ rad} \\ \theta &= 3.643 \text{ rad} \end{aligned}$$

$$\text{(c) } \frac{1}{2} \left(\frac{15}{\theta} \right)^2 (\theta) = 225 \text{ cm}^2$$

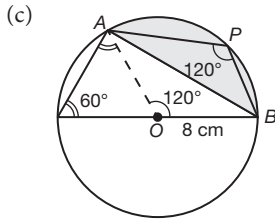
$$\begin{aligned} \frac{225}{\theta} &= 2(225) \\ \theta &= 0.5 \text{ rad} \end{aligned}$$

$$17 \text{ (a) } \frac{1}{2}(5)^2(1.2) - \frac{1}{2}(5)^2(\sin 1.2') = 3.35 \text{ cm}^2$$

$$\text{(b) } \angle QOR = \pi - \frac{\pi}{4}$$

$$= \frac{3\pi}{4}$$

$$\frac{1}{2}(11)^2 \left(\frac{3\pi}{4} \right) - \frac{1}{2}(11)^2 \left(\sin \frac{3\pi}{4} \right) = 99.77 \text{ cm}^2$$



$$\angle AOB = 120^\circ \times \frac{\pi}{180^\circ} = 2.094 \text{ rad}$$

$$\frac{1}{2}(8)^2(2.094) - \frac{1}{2}(8)^2(\sin 120^\circ) = 39.30 \text{ cm}^2$$

18 (a) $2r + r\theta = 64$

$$r\theta = 64 - 2r$$

$$\theta = \frac{64}{r} - 2$$

(b) $A = \frac{1}{2}(r)^2 \left(\frac{64 - 2r}{r} \right)$

$$= 32r - r^2 \text{ (tertunjuk/shown)}$$

19 (a) $A_{AOB} = \frac{1}{2}(12)^2(\theta) = 72\theta \text{ cm}^2$

(b) $A_{ABCD} = \frac{1}{2}(18)^2(\theta) - 72\theta = 90\theta \text{ cm}^2$

(c) $90\theta = 36$

$$\theta = 0.4 \text{ rad}$$

(d) Luas sektor major AOB

The area of the major sector AOB

$$= \frac{1}{2}(12)^2(2\pi - 0.4)$$

$$= 423.6 \text{ cm}^2$$

20 $\angle BAD = \tan^{-1} \left(\frac{8}{10} \right)$

$$= 38.66^\circ$$

$$= 0.6747 \text{ rad}$$

$$\angle BCE = \frac{\pi}{2} - 0.6747$$

$$= 0.8961 \text{ rad}$$

$$L_1 = A_{\triangle ABC} - A_{S_{BCE}}$$

$$= \frac{1}{2}(10)(8) - \frac{1}{2}(8)^2(0.8961)$$

$$= 11.3248$$

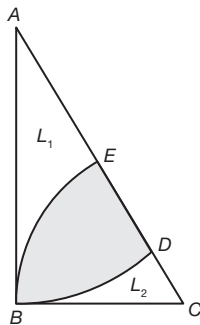
$$L_2 = A_{\triangle ABC} - A_{S_{BAD}}$$

$$= \frac{1}{2}(10)(8) - \frac{1}{2}(10)^2(0.6747)$$

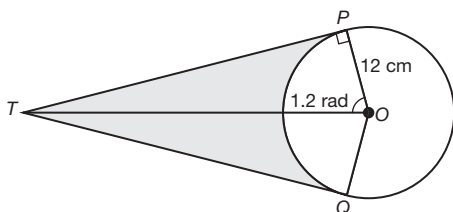
$$= 6.265$$

$$A = \frac{1}{2}(10)(8) - 11.3248 - 6.265$$

$$= 22.41 \text{ cm}^2$$



21



(a) $PT = 12 \tan 1.2'$

$$= 30.87 \text{ cm}$$

(b) $s_{PQ} = 12(2 \times 1.2)$

$$= 28.8 \text{ cm}$$

$$\text{Perimeter} = 2(30.87) + 28.8$$

$$= 90.54 \text{ cm}$$

(c) $\text{Luas/Area} = 2 \times \frac{1}{2}(30.87)(12) - \frac{1}{2}(12)^2(2 \times 1.2)$

$$= 197.64 \text{ cm}^2$$

22 $AC = 2 \times r \sin \left(\frac{2\theta}{2} \right)$

$$= 2r \sin \theta \text{ (tertunjuk/shown)}$$

(a) $A_{OADC} = \frac{1}{2}r^2(2\theta) = r^2\theta$

(b) $A_{ADC} = r^2\theta - \frac{1}{2}r^2 \sin(2\theta) = r^2(\theta - \frac{1}{2}\sin 2\theta)$

(c) $A = \frac{1}{2}\pi R^2 - A_{ADC}$

$$= \frac{1}{2}\pi \left(\frac{1}{2} \times 2r \sin \theta \right)^2 - \left[r^2\theta - \frac{1}{2}r^2 \sin(2\theta) \right]$$

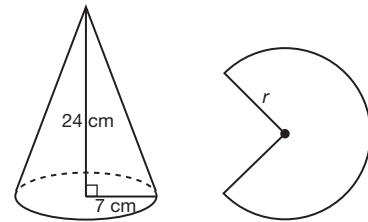
$$= \frac{1}{2}\pi r^2 \sin^2 \theta - r^2\theta + \frac{1}{2}r^2 \sin(2\theta)$$

$$= \frac{1}{2}r^2(\pi \sin^2 \theta - 2\theta + \sin 2\theta)$$

23 Jejari/Radius, $r = \sqrt{7^2 + 24^2} = 25 \text{ cm}$

Panjang lengkok/Arc length = $2\pi(7)$

$$= 14\pi \text{ cm}$$

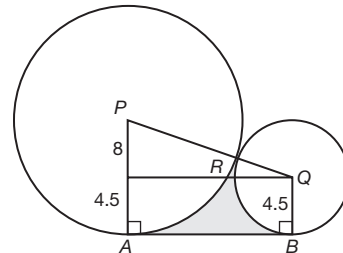


(a) Sudut sektor/The angle of the sector = $\frac{14\pi}{25} \text{ rad}$

(b) $\text{Luas/Area} = \frac{1}{2}(25)^2 \left(\frac{14\pi}{25} \right)$

$$= 175\pi \text{ cm}^2$$

24 (a)



$$PQ = 12.5 + 4.5$$

$$= 17 \text{ cm}$$

$$AB = \sqrt{17^2 + 8^2}$$

$$= 15 \text{ cm}$$

$$\angle APR = \cos^{-1} \frac{8}{17} / \cos^{-1} \frac{8}{17}$$

$$= 61.93^\circ$$

$$= 61.93^\circ \times \frac{\pi}{180}$$

$$\approx 1.08 \text{ rad (tertunjuk/shown)}$$

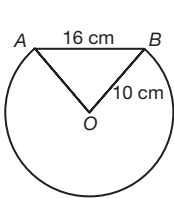
$$\begin{aligned}\angle BQR &= \pi - 1.08 \\ &= 2.06 \text{ rad}\end{aligned}$$

$$\begin{aligned}\text{Perimeter} &= s_{AR} + s_{BR} + AB \\ &= 12.5(1.08) + 4.5(2.06) + 15 \\ &= 37.77 \text{ cm}\end{aligned}$$

(b) Luas rantau berlorek/*The area of the shaded region*

$$\begin{aligned}&= A_{\text{trapezium}} - A_{APR} - A_{BQR} \\ &= \frac{1}{2}(12.5 + 4.5)(15) - \frac{1}{2}(12.5)^2(1.08) \\ &\quad - \frac{1}{2}(4.5)^2(2.06) \\ &= 22.27 \text{ cm}^2\end{aligned}$$

25



$$\begin{aligned}AB &= 2r \sin \frac{\angle AOB}{2} \\ \sin \frac{\angle AOB}{2} &= \frac{16}{20} \\ \frac{\angle AOB}{2} &= \sin^{-1}\left(\frac{16}{20}\right) \\ \angle AOB &= 106.26^\circ / 1.855 \text{ rad}\end{aligned}$$

(a) Perimeter = 16 + 10(2π - 1.855) = 60.28 cm

(b) Luas tembereng/*The area of the segment*

$$\begin{aligned}&= A_{AOB(\text{major})} + A_{\Delta AOB} \\ &= \frac{1}{2}(10)^2(2\pi - 1.855) + \frac{1}{2}(10)^2 \sin 106.26^\circ \\ &= 269.41 \text{ cm}^2\end{aligned}$$

Praktis Sumatif

Kertas 1

1

$$\begin{aligned}s_{AB} &= 2r \\ 2r + r + r &= 48 \\ 4r &= 48 \\ r &= 12 \\ \theta &= 2 \text{ rad}\end{aligned}$$

(a) $A_{AOB} = \frac{1}{2}(12)^2(2) = 144 \text{ cm}^2$

(b) $AB = 2(12) \sin\left(\frac{2^\circ}{2}\right) = 20.195 \text{ cm}$

2 (a) $OQ = \sqrt{8^2 + 4^2} = \sqrt{80}$

$$2\sqrt{80} \sin \frac{\angle POQ}{2} = 8$$

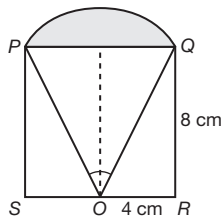
$$\sin \frac{\angle POQ}{2} = 0.4472$$

$$\frac{\angle POQ}{2} = \sin^{-1} 0.4472$$

$$\begin{aligned}\angle POQ &= 2(26.57^\circ) \\ &= 53.14^\circ \times \frac{3.142}{180} \\ &= 0.9276 \\ &\approx 0.93 \text{ rad}\end{aligned}$$

(b) Luas tembereng berlorek/*The area of shaded segment*

$$\begin{aligned}&= \frac{1}{2}(\sqrt{80})^2(0.93) - \frac{1}{2}(8)^2 \\ &= 5.2 \text{ cm}^2\end{aligned}$$



3 $\angle QRS = \frac{\pi}{4} \text{ rad}$

$$\begin{aligned}QR &= \sqrt{14^2 + 14^2} \\ &= 14\sqrt{2}\end{aligned}$$

(a) $s_{QS} = (14\sqrt{2})\left(\frac{\pi}{4}\right) = 15.55 \text{ cm}$

(b) Luas rantau berlorek/*The area of the shaded region*

$$\begin{aligned}&= A_{QRS} - A_{\Delta QRS} \\ &= \frac{1}{2}(14\sqrt{2})^2\left(\frac{\pi}{4}\right) - \frac{1}{2}(14)(14) \\ &= 55.94 \text{ cm}^2\end{aligned}$$

4 $PR = \frac{S_{PO}}{\angle PRQ}$

$$\begin{aligned}&= \frac{22}{35} \div \frac{2}{7} \\ &= 2.2 \text{ cm}\end{aligned}$$

Lilitan/*Circumference* = 2π(2.2) = 4.4π cm

Kertas 2

1 $\frac{AP}{9} = \tan 0.4^\circ$

$$\begin{aligned}AP &= 9(\tan 0.4^\circ) \\ &= 3.805 \text{ cm}\end{aligned}$$

Perimeter kawasan berlorek

The perimeter of the shaded region

$$\begin{aligned}&= 2(3.805) + 9(0.8) \\ &= 14.81 \text{ cm}\end{aligned}$$

Luas bagi kawasan yang berlorek

The area of the shaded region

$$\begin{aligned}&= 2 \times \frac{1}{2}(9)(3.805) - \frac{1}{2}(9)^2(0.8) \\ &= 1.845 \text{ cm}^2\end{aligned}$$

2 (a) $AB = 2(6) \sin(1^\circ) = 2(10) \sin \frac{\angle ACB}{2}$

$$\sin \frac{\angle ACB}{2} = \frac{2(6) \sin 1^\circ}{2(10)}$$

$$\frac{\angle ACB}{2} = \sin^{-1}(0.5049)$$

$$\angle ACB = 2(30.32^\circ)$$

$$\begin{aligned}&= 60.64^\circ \times \frac{\pi}{180} \\ &= 1.058 \text{ rad}\end{aligned}$$

Perimeter rantau berlorek

The perimeter of the shaded region

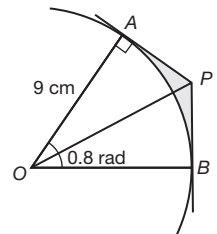
$$\begin{aligned}&= s_{AYB} + s_{AXB} \\ &= 10(1.058) + 6(2) \\ &= 22.58 \text{ cm}\end{aligned}$$

(b) Luas rantau berlorek

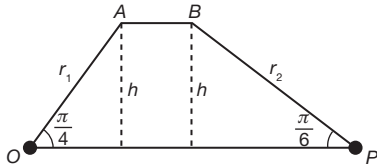
The area of the shaded region

= luas tembereng AXB - luas tembereng AYB
the area of chord AXB - the area of chord AYB

$$\begin{aligned}&= \frac{1}{2}(6)^2(2) - \frac{1}{2}(6)^2(\sin 2^\circ) - \left[\frac{1}{2}(10)^2(1.058) \right. \\ &\quad \left. - \frac{1}{2}(10)^2(\sin 60.64^\circ) \right] \\ &= 10.31 \text{ cm}^2\end{aligned}$$



3



$$(a) \quad \sin\left(\frac{\pi}{4}\right) = \frac{h}{r_1} \qquad \sin\left(\frac{\pi}{6}\right) = \frac{h}{r_2}$$

$$\frac{1}{\sqrt{2}} = \frac{h}{r_1} \qquad \frac{1}{2} = \frac{h}{r_2}$$

$$h = \frac{r_1}{\sqrt{2}} \dots \textcircled{1} \qquad h = \frac{r_2}{2} \dots \textcircled{2}$$

① = ②:

$$\frac{r_1}{\sqrt{2}} = \frac{r_2}{2}$$

$$\frac{r_1}{r_2} = \frac{\sqrt{2}}{2} \text{ (tertunjuk/shown)}$$

$$(b) \quad \frac{A_{\Delta AOC}}{A_{\Delta BPC}} = \frac{\frac{1}{2}(r_1)^2\left(\frac{\pi}{4}\right)}{\frac{1}{2}(r_2)^2\left(\frac{\pi}{6}\right)}$$

$$= \left(\frac{r_1}{r_2}\right)^2\left(\frac{6}{4}\right)$$

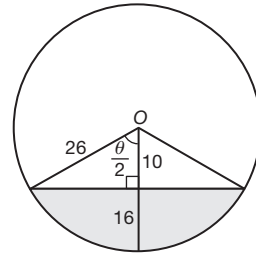
$$= \left(\frac{\sqrt{2}}{2}\right)^2\left(\frac{3}{2}\right)$$

$$= \left(\frac{2}{4}\right)\left(\frac{3}{2}\right)$$

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

$$\therefore A_{\Delta AOC} : A_{\Delta BPC} = 3 : 4$$

4



$$\frac{\theta}{2} = \cos^{-1}\left(\frac{10}{26}\right)$$

$$\cos^{-1}\left(\frac{10}{26}\right)$$

$$= 67.38^\circ$$

$$\theta = 134.76^\circ / 2.352 \text{ rad}$$

(a) Luas keratan rentas minyak

The cross-sectional area of oil

$$= \frac{1}{2}(26)^2(2.352) - \frac{1}{2}(2 \times \sqrt{26^2 - 10^2})(10)$$

$$= 554.98 \text{ cm}^2$$

(b) Peratus isi padu baki minyak

Percentage of volume of remaining oil

$$= \frac{554.98 h}{\pi(26)^2 h} \times 100\%$$

$$= 26.13\%$$

Peratus isi padu minyak tertumpah

Percentage of volume of spilled oil

$$= 100\% - 26.13\%$$

$$= 73.87\%$$

$$\approx 74\% \text{ (tertunjuk/shown)}$$