

Penyelesaian Lengkap

Praktis 1

Praktis Formatif

1 (a) $\pi \text{ rad} = 180^\circ$

(b) $\frac{\pi}{6} = \frac{180^\circ}{6}$
 $= 30^\circ$

(c) $\frac{\pi}{4} = \frac{180^\circ}{4}$
 $= 45^\circ$

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

2 (a) $80^\circ = 80^\circ \times \frac{\pi \text{ rad}}{180^\circ}$
 $= 1.396 \text{ rad} = 1.40 \text{ (3 sf)}$

(b) $100.5^\circ = 100.5^\circ \times \frac{\pi \text{ rad}}{180^\circ}$
 $= 1.754 \text{ rad} = 1.75 \text{ (3 sf)}$

(c) $235^\circ 18' = 235.3^\circ \times \frac{\pi \text{ rad}}{180^\circ}$
 $= 4.107 \text{ rad} = 4.11 \text{ (3 sf)}$

3 (a) $1.25 \text{ rad} = 1.25 \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}}$
 $= 71.61^\circ$

(b) $0.384 \text{ rad} = 0.384 \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}}$
 $= 22^\circ$

(c) $2.6\pi \text{ rad} = 2.6\pi \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}}$
 $= 468^\circ$

4 $\angle AOB = 2 \times 70^\circ$
 $= 140^\circ$
 $\theta = 360^\circ - 140^\circ$
 $= 220^\circ$
 $= 220^\circ \times \frac{\pi \text{ rad}}{180^\circ}$
 $= \frac{11\pi}{9} \text{ rad}$

5 Biar/Let $\theta = \angle AOB$
 Perentas/Chord $AB = 8$

$$2r \sin \frac{\theta}{2} = 8$$

$$10 \sin \frac{\theta}{2} = 8$$

$$\sin \frac{\theta}{2} = 0.8$$

$$\frac{\theta}{2} = \sin^{-1} 0.8$$

$$= 53.13^\circ$$

$$\theta = 106.26^\circ$$

$$= 106.26^\circ \times \frac{\pi \text{ rad}}{180^\circ}$$

$$= 1.855 \text{ rad}$$

6 (a) Panjang lengkok/Arc length, $s = r\theta$
 $= 21 \left(\frac{\pi}{2} \right) \text{ rad}$
 $= 21.99 \text{ cm}$

(b) Panjang lengkok/Arc length, $s = r\theta$
 $= 5.6 \left(40^\circ \times \frac{\pi}{180^\circ} \right)$
 $= 3.91 \text{ mm}$

(c) Panjang lengkok/Arc length, $s = r\theta$
 $= 12(1) \leftarrow r = \frac{d}{2}$
 $= 12 \text{ cm}$

7 (a) Jejari/Radius, $r = \frac{s}{\theta}$
 $= \frac{15.4}{2.2}$
 $= 7 \text{ cm}$

(b) Jejari/Radius, $r = \frac{s}{\theta}$
 $= \frac{94.26}{0.9426} \leftarrow 54^\circ \times \frac{\pi \text{ rad}}{180^\circ}$
 $= 100 \text{ mm}$
 $= 0.9426 \text{ rad}$

8 (a) Sudut/Angle, $\theta = \frac{s}{r}$
 $= \frac{22.08}{11}$
 $= 2.007 \text{ rad}$

(b) $\angle AOB_{\text{major}} = \frac{s}{r}$
 $= \frac{5r}{r}$
 $= 5 \text{ rad}$
 $\therefore \theta = 2\pi - 5 \text{ rad}$
 $= 1.284 \text{ rad}$

9 Perentas/Chord $AB = 2r \sin \frac{\theta}{2}$
 atau/or $AB = \sqrt{r^2 + r^2 - 2r^2 \cos \theta}$

(a) Perentas/Chord $AB = 2(5) \sin \frac{1.2 \text{ rad}}{2}$
 $= 5.646 \text{ cm}$

(b) $s = r\theta$
 $\theta = \frac{22.7}{10} \text{ rad}$
 $= 2.27 \text{ rad}$

Perentas/Chord $AB = 2(10) \sin \frac{2.27 \text{ rad}}{2}$
 $= 18.13 \text{ cm}$

$$10 \text{ (a)} \quad s_{AB} = r\theta$$

$$\theta = \frac{x^2 + 3x - 10}{x + 5}$$

$$= \frac{(x + 5)(x + 2)}{x + 5}$$

$$\angle AOB = (x - 2) \text{ rad}$$

$$(b) \text{ Perimeter} = 2(x + 5) + x^2 + 3x - 10$$

$$= (x^2 + 5x) \text{ cm}$$

$$11 \quad \frac{s}{r} = \frac{5}{2}$$

$$2r + s = 36$$

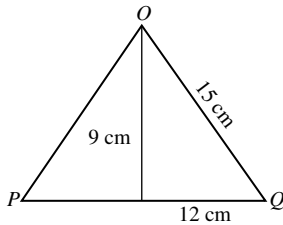
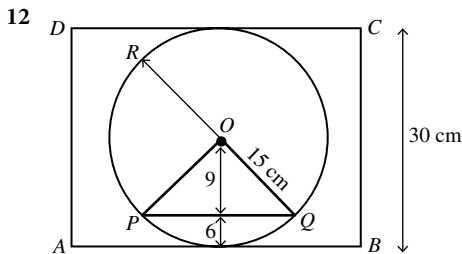
$$2r + r\left(\frac{5}{2}\right) = 36$$

$$\frac{9}{2}r = 36$$

$$r = 8 \text{ cm}$$

$$s = 8\left(\frac{5}{2}\right)$$

$$= 20 \text{ cm}$$



$$2(15) \sin \frac{\angle POQ}{2} = 24$$

$$\frac{\angle POQ}{2} = \sin^{-1} 0.8$$

$$\angle POQ = 2(53.13^\circ)$$

$$= 106.26^\circ$$

$$\angle POR = 180^\circ - 106.26^\circ$$

$$= 73.74^\circ$$

$$\angle POQ \text{ major} = 360^\circ - 106.26^\circ$$

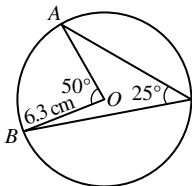
$$= 253.74^\circ$$

$$\frac{R}{145 \text{ psi}} = \frac{73.74^\circ}{253.74^\circ}$$

$$R = 42.14 \text{ psi}$$

$$13 \text{ (a)} \quad A = \frac{1}{2}(9)^2(2.5) = 101.25 \text{ cm}^2$$

(b)



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

$$= 17.32 \text{ cm}^2$$

$$14 \text{ (a)} \quad \frac{1}{2}r^2(1.6) = 80$$

$$r^2 = \frac{2(80)}{1.6}$$

$$r = 10 \text{ cm}$$

$$(b) \quad \frac{1}{2}r^2(0.57) = 58$$

$$r^2 = \frac{2(58)}{0.5236}$$

$$r = 14.27 \text{ cm}$$

$$15 \text{ (a)} \quad \frac{1}{2}(4)^2(\theta) = 36$$

$$\theta = \frac{2(36)}{100}$$

$$= 4.5 \text{ rad}$$

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

$$2\pi - \theta = \frac{2(132)}{16}$$

$$2(3.142) - \theta = 2.64 \text{ rad}$$

$$\theta = 3.644 \text{ rad}$$

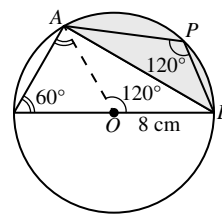
$$16 \text{ (a)} \quad \frac{1}{2}(5)^2(1.2) - \frac{1}{2}(5)^2(\sin 1.2^\circ) = 3.35 \text{ cm}^2$$

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

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

$$\frac{1}{2}(11)^2 \left(\frac{3\pi}{4} \right) - \frac{1}{2}(11)^2 \left(\sin \frac{3\pi}{4} \right) = 99.79 \text{ cm}^2$$

(c)



$$\angle AOB = 120^\circ \times \frac{\pi}{180^\circ} = 2.095 \text{ rad}$$

$$\frac{1}{2}(8)^2(2.095) - \frac{1}{2}(8)^2(\sin 120^\circ) = 39.33 \text{ cm}^2$$

$$17 \text{ (a)} \quad 2(2r) + 2r(4\theta) = 72$$

$$4r + 8r\theta = 72$$

$$r + 2r\theta = 18$$

$$\theta = \frac{18 - r}{2r}$$

$$(b) \quad A = \frac{1}{2}(2r)^2 \left(\frac{18 - r}{2r} \right)$$

$$= \frac{1}{2}(4r^2) \left(\frac{18 - r}{2r} \right)$$

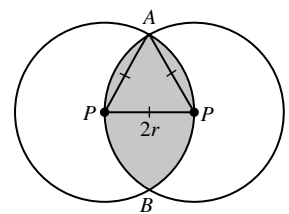
$$= 18r - r^2 \text{ (Tertunjuk/Shown)}$$

$$18 \quad \angle APB = 2(60^\circ)$$

$$= \frac{2\pi}{3} \text{ rad}$$

$$A_{S_{APB}} = \frac{1}{2}(2r)^2 \left(\frac{2\pi}{3} \right)$$

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



Luas tembereng AP/The area of segment AP

$$= \frac{1}{2}(2r)^2 \left(\frac{\pi}{3} \right) - \frac{1}{2}(2r)^2 \sin 60^\circ$$

$$= \frac{2\pi r^2}{3} - \sqrt{3}r^2$$

Luas kawasan berlerek = $A_{S_{APB}} + 2$ Luas tembereng AP
 The area of shaded region = $A_{S_{APB}} + 2 \times$ The area of segment AP

$$= \frac{4\pi r^2}{3} + 2 \left(\frac{2\pi r^2}{3} - \sqrt{3}r^2 \right)$$

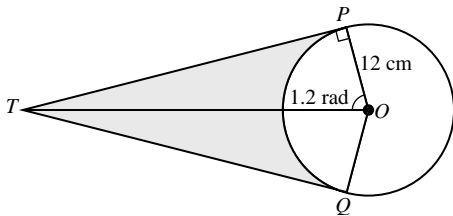
$$= \frac{8\pi r^2}{3} - 2\sqrt{3}r^2$$

$$= \frac{8\pi r^2 - 6\sqrt{3}r^2}{3}$$

$$= \frac{2r^2(4\pi - 3\sqrt{3})}{3}$$

$$= \frac{2}{3}r^2(4\pi - 3\sqrt{3}) \text{ (Tertunjuk/Shown)}$$

19



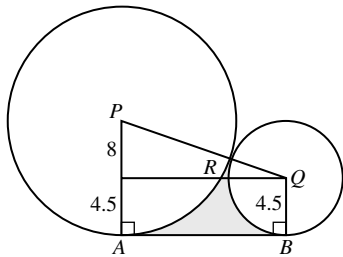
- (a) $PT = 12 \tan 1.2^r = 30.86$ cm
 (b) s_{PQ} major = $12(2\pi - 2 \times 1.2) = 46.6$ cm
 Perimeter = $2(30.86) + 46.6 = 108.33$ cm
 (c) Luas/Area = $2 \times \frac{1}{2}(30.87)(12) - \frac{1}{2}(12)^2(2 \times 1.2)$
 $= 197.52$ cm²

20 $AC = 2 \times r \sin \left(\frac{2\theta}{2} \right)$

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

- (a) $A_{OADC} = \frac{1}{2}r^2(2\theta) = r^2\theta$
 (b) $A_{ADC} = r^2\theta - \frac{1}{2}r^2 \sin(2\theta) = r^2 \left(\theta - \frac{1}{2} \sin 2\theta \right)$
 (c) $A = \frac{1}{2}\pi R^2 - A_{ADC}$
 $= \frac{1}{2}\pi \left(\frac{1}{2} \times 2r \sin \theta \right)^2 - \left[r^2\theta - \frac{1}{2}r^2 \sin(2\theta) \right]$
 $= \frac{1}{2}\pi r^2 \sin^2 \theta - r^2\theta + \frac{1}{2}r^2 \sin(2\theta)$
 $= \frac{1}{2}r^2 (\pi \sin^2 \theta - 2\theta + \sin 2\theta)$

21 (a)



$$PQ = 12.5 + 4.5$$

$$= 17 \text{ cm}$$

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

$$= 15 \text{ cm}$$

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

$$= 61.93^\circ$$

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

$$\approx 1.08 \text{ rad (Tertunjuk/Shown)}$$

$$\angle BQR = \pi - 1.08$$

$$= 2.062 \text{ rad}$$

$$\text{Perimeter} = s_{AR} + s_{BR} + AB$$

$$= 12.5(1.08) + 4.5(2.062) + 15$$

$$= 37.78 \text{ cm}$$

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

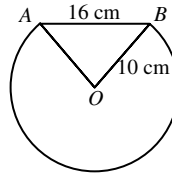
$$= A_{\text{trapezium}} - A_{APR} - A_{BQR}$$

$$= \frac{1}{2}(12.5 + 4.5)(15) - \frac{1}{2}(12.5)^2(1.08)$$

$$- \frac{1}{2}(4.5)^2(2.062)$$

$$= 22.25 \text{ cm}^2$$

22



$$AB = 2r \sin \frac{\angle AOB}{2}$$

$$\sin \frac{\angle AOB}{2} = \frac{16}{20}$$

$$\frac{\angle AOB}{2} = \sin^{-1} \left(\frac{16}{20} \right)$$

$$\angle AOB = 106.26^\circ / 1.855 \text{ rad}$$

- (a) Perimeter = $16 + 10(2\pi - 1.855)$
 $= 60.28$ cm
 (b) Luas tembereng/The area of the segment
 $= A_{AOB(\text{major})} + A_{\Delta AOB}$
 $= \frac{1}{2}(10)^2(2\pi - 1.855) + \frac{1}{2}(10)^2 \sin 106.26^\circ$
 $= 269.45 \text{ cm}^2$

Praktis Sumatif

Kertas 1

1 $s_{AB} = 2r$
 $2r + r + r = 48$
 $4r = 48$
 $r = 12$
 $\theta = 2 \text{ rad}$

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

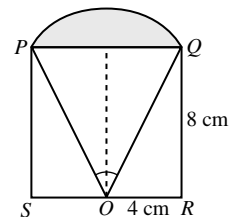
(b) $AB = 2(12) \sin \left(\frac{2^r}{2} \right)$
 $= 20.195 \text{ cm}$

2 (a) $OQ = \sqrt{8^2 + 4^2}$
 $= \sqrt{80}$
 $2\sqrt{80} \sin \frac{\angle POQ}{2} = 8$
 $\sin \frac{\angle POQ}{2} = 0.4472$

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

$$\angle POQ = 2(26.57^\circ)$$

$$= 53.14^\circ \times \frac{3.142}{180}$$



$$= 0.9276$$

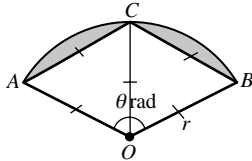
$$\approx 0.93 \text{ rad}$$

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

$$= \frac{1}{2}(\sqrt{80})^2 (0.93) - \frac{1}{2}(8)^2$$

$$= 5.2 \text{ cm}^2$$

3 $\theta = 2(60^\circ)$
 $= 120^\circ$
 $= \frac{2}{3}\pi$



Luas sektor AOB/The area of sector AOB = 104.73

$$\frac{1}{2}r^2\left(\frac{2}{3}\pi\right) = 104.73$$

$$r^2 = \frac{104.73(3)}{\pi}$$

$$= 100$$

$$r = 10$$

(b) Panjang lengkok ACB

The arc length of ACB = $r\theta$

$$= 10\left(\frac{2\pi}{3}\right)$$

$$= 20.95$$

Perimeter kawasan berlorek

The perimeter of the shaded region

$$= 2(10) + 20.95$$

$$= 40.95 \text{ cm}$$

Kertas 2

1 $\frac{AP}{9} = \tan 0.4'$

$$AP = 9(\tan 0.4')$$

$$= 3.805 \text{ cm}$$

Perimeter kawasan berlorek

The perimeter of the shaded region

$$= 2(3.805) + 9(0.8)$$

$$= 14.81 \text{ cm}$$

Luas bagi kawasan yang berlorek

The area of the shaded region

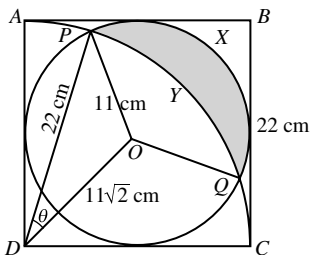
$$= 2 \times \frac{1}{2}(9)(3.805) - \frac{1}{2}(9)^2(0.8)$$

$$= 1.845 \text{ cm}^2$$

2 Jejari bulatan/Radius of circle = 11

$$OD = \frac{1}{2}\sqrt{22^2 + 22^2}$$

$$= 11\sqrt{2}$$



(a) Biar/Let $\angle PDQ = 2\theta$

$$11^2 = 22^2 + (11\sqrt{2})^2 - 2(22)(11\sqrt{2})^2 \cos/\cos \theta$$

$$\cos/\cos \theta = \frac{22^2 + (11\sqrt{2})^2 - 11^2}{2(22)(11\sqrt{2})}$$

$$\theta = \cos^{-1}/\cos^{-1} 0.8839$$

$$= 27.88^\circ$$

$$\angle PDQ = 2(27.88^\circ)$$

$$= 55.76^\circ \times \frac{\pi \text{ rad}}{180^\circ}$$

$$= 0.9733 \text{ rad}$$

(b) Perentas/Chord PQ = $2(22) \sin 27.88^\circ$

$$= 2(11) \sin \frac{\angle POQ}{2}$$

$$\frac{\angle POQ}{2} = \sin^{-1} \left[\frac{2(22)(\sin 27.88^\circ)}{2(11)} \right]$$

$$\angle POQ = 2(69.26^\circ)$$

$$= 138.52^\circ \times \frac{\pi \text{ rad}}{180^\circ}$$

$$= 2.4179 \text{ rad}$$

Luas kawasan berlorek = Luas tembereng PXQ -

Luas tembereng PYQ

Area of the shaded region = Area of segment PXQ -

Area of segment PYQ

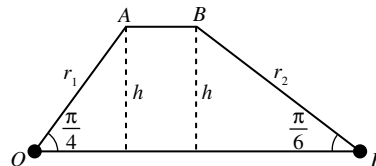
$$= \frac{1}{2}(11)^2(2.4179) - \frac{1}{2}(11)^2(\sin 138.52^\circ) -$$

$$\left[\frac{1}{2}(22)^2(0.9733) - \frac{1}{2}(22)^2(\sin 55.76^\circ) \right]$$

$$= 106.21 - 35.48$$

$$= 70.73 \text{ cm}^2$$

3



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

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

$$\frac{1}{2} = \frac{h}{r_2}$$

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

$$h = \frac{r_2}{2} \dots \textcircled{2}$$

$\textcircled{1} = \textcircled{2}$:

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

$$\frac{r_1}{r_2} = \frac{\sqrt{2}}{2} \text{ (Tertunjuk/Shown)}$$

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

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

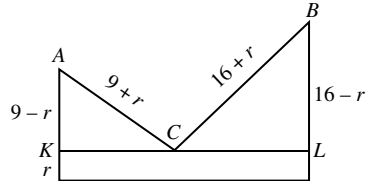
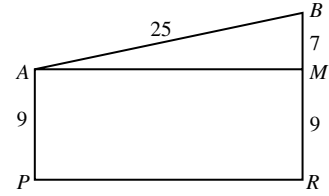
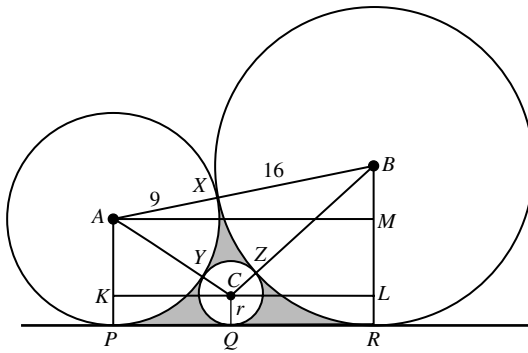
$$= \left(\frac{\sqrt{2}}{2}\right)^2\left(\frac{3}{2}\right)$$

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

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

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

- 4 (a) Jejari bagi ketiga-tiga bulatan berserenjang dengan tangen sepunya PQR
The radii of the three circles are perpendicular to the common tangent PQR.



$$\begin{aligned} KL &= AM \\ &= \sqrt{25^2 - 7^2} \\ &= 24 \end{aligned}$$

$$KL = KC + CL$$

$$\begin{aligned} 24 &= \sqrt{(9+r)^2 - (9-r)^2} + \sqrt{(16+r)^2 - (16-r)^2} \\ &= \sqrt{81 + 18r + r^2 - (81 - 18r + r^2)} + \sqrt{16^2 + 32r + r^2 - (16^2 - 32r + r^2)} \\ &= \sqrt{81 + 18r + r^2 - 81 + 18r - r^2} + \sqrt{16^2 + 32r + r^2 - 16^2 + 32r - r^2} \\ &= \sqrt{36r} + \sqrt{64r} \\ &= 6\sqrt{r} + 8\sqrt{r} \\ &= 14\sqrt{r} \end{aligned}$$

$$\sqrt{r} = \frac{24}{14}$$

$$r = 2\frac{46}{49} \text{ cm}$$

- (b) Luas kawasan berlorek = Luas trapezium ABRP – Luas sektor APX – Luas sektor BXR – Luas bulatan berpusat C
The area of shaded region = The area of trapezium ABRP – The area of sector APX – The area of sector BXR – The area of circle centred C

$$\text{Luas trapezium ABRP} / \text{The area of trapezium ABRP} = \frac{1}{2}(9 + 16)(24) = 300 \text{ cm}^2$$

$$\cos \angle ABM / \cos \angle ABM = \frac{7}{25}$$

$$\angle ABM = \cos^{-1} \frac{7}{25} / \cos^{-1} \frac{7}{25}$$

$$= 73.73^\circ$$

$$= 73.73^\circ \times \frac{\pi}{180^\circ}$$

$$= 1.287 \text{ rad}$$

$$\angle BAP = \pi - 1.287$$

$$= 1.855 \text{ rad}$$

$$\text{Luas sektor APX} / \text{The area of sector APX} = \frac{1}{2}(9)^2(1.855) = 75.1275 \text{ cm}^2$$

$$\text{Luas sektor BXR} / \text{The area of sector BXR} = \frac{1}{2}(16)^2(1.287) = 164.736 \text{ cm}^2$$

$$\text{Luas bulatan} / \text{The area of circle} = \pi \left(2\frac{46}{49}\right)^2 = 27.1356 \text{ cm}^2$$

$$\text{Luas kawasan berlorek} / \text{The area of shaded region} = 300 - 75.1275 - 164.736 - 27.1356 = 33 \text{ cm}^2$$