

1.

	Sudut pada pusat yang dicangkum oleh <i>Angle at the centre subtended by</i>	Sudut pada lilitan yang dicangkum oleh <i>Angle at the circumference subtended by</i>
(a)	lengkuk minor PQ <i>minor arc PQ</i> a	lengkuk minor PQ <i>minor arc PQ</i> b
(b)	lengkuk minor PQ <i>minor arc PQ</i> x	lengkuk minor PQ <i>minor arc PQ</i> y
(c)	lengkuk major PQ <i>major arc PQ</i> c	lengkuk major PQ <i>major arc PQ</i> d
(d)	lengkuk minor PQ <i>minor arc PQ</i> n	lengkuk minor PQ <i>minor arc PQ</i> m

2. (a) $x = 50^\circ$
 $y = 50^\circ$
(b) $x = 25^\circ$
 $y = 25^\circ$
(c) $x = 30^\circ$
 $y = 30^\circ$
(d) $x = 20^\circ$
 $y = 20^\circ$

Sudut-sudut pada lilitan yang dicangkum oleh lengkuk yang sama atau sama panjang adalah sama ($x = y$).
The angles at the circumference subtended by the same arc or the arcs of the same length are equal ($x = y$).

3. Saiz sudut pada lilitan yang dicangkum oleh suatu lengkuk adalah berkadaran dengan panjang lengkuk tersebut.

The size of the angle at the circumference subtended by an arc is proportional to the length of the arc.

4. (a) $p = q$
 $r = s$
(b) $a = b = c$
 $d = e$
(c) $x = y$
(d) $j = k$
5. (a) $x = \angle CAD = 40^\circ$
(b) $x = \angle CAD = 55^\circ$
(c) $x = \angle CAD = 32^\circ$
(d) $x = \angle CBD = 30^\circ$
6. (a) $x = 45^\circ$
(b) $x = 25^\circ$
(c) $x = 35^\circ$
(d) $\frac{x}{54^\circ} = \frac{5}{15}$
 $x = 18^\circ$
(e) $\frac{x}{33^\circ} = \frac{8}{4}$
 $x = 66^\circ$
(f) $\frac{x}{24^\circ} = \frac{14}{7}$
 $x = 48^\circ$

7. (a) $x = 20^\circ$
 $y = 40^\circ$
(b) $x = 90^\circ$
 $y = 180^\circ$
(c) $x = 100^\circ$
 $y = 200^\circ$
(d) $x = 70^\circ$
 $y = 140^\circ$

Sudut pada pusat adalah dua kali sudut pada lilitan yang dicangkum oleh lengkuk yang sama ($y = 2x$).

The angle at the centre is twice the angle at the circumference subtended by the same arc ($y = 2x$).

90°

8. (a) Sudut pada pusat bulatan yang dicangkum oleh lengkok yang sama panjang adalah sama.

The angles at the centre subtended by the arcs of the same length are equal.

- (b) Saiz sudut pada pusat bulatan yang dicangkum oleh suatu lengkok adalah berkadar dengan panjang lengkok tersebut.

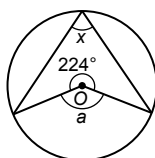
The size of the angle at the centre subtended by an arc is proportional to the length of the arc.

9. (a) $y = 2x$
(b) $y = 2x$
(c) $x = 2y$
(d) $x = 2y$

10. (a) $x = 90^\circ$
(b) $x = 2 \times 30^\circ$
 $= 60^\circ$
(c) $2x = 80^\circ$
 $x = \frac{80^\circ}{2}$
 $= 40^\circ$
(d) $2x = 210^\circ$
 $x = \frac{210^\circ}{2}$
 $= 105^\circ$
(e) $2x = 120^\circ$
 $x = \frac{120^\circ}{2}$
 $= 60^\circ$
(f) $\angle PQR = 90^\circ$
 $x = 180^\circ - 90^\circ - 40^\circ$
 $= 50^\circ$

11. (a) $\frac{x}{195^\circ} = \frac{7}{21}$
 $x = 65^\circ$
(b) $x = 36^\circ$
(c) $\frac{x}{43^\circ} = \frac{8}{4}$
 $x = 86^\circ$

12. (a)



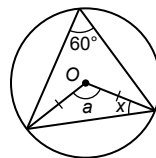
$$a = 360^\circ - 224^\circ$$

$$= 136^\circ$$

$$x = \frac{136^\circ}{2}$$

$$= 68^\circ$$

- (b)



$$a = 2 \times 60^\circ$$

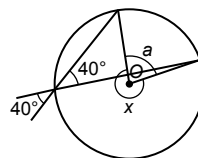
$$= 120^\circ$$

$$x = \frac{180^\circ - 120^\circ}{2}$$

$$= \frac{60^\circ}{2}$$

$$= 30^\circ$$

- (c)



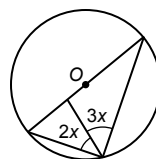
$$a = 2 \times 40^\circ$$

$$= 80^\circ$$

$$x = \frac{360^\circ - 80^\circ}{2}$$

$$= 140^\circ$$

- (d)



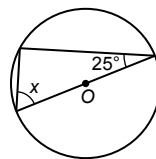
$$2x + 3x = 90^\circ$$

$$5x = 90^\circ$$

$$x = \frac{90^\circ}{5}$$

$$= 18^\circ$$

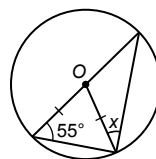
- (e)



$$x = 180^\circ - 90^\circ - 25^\circ$$

$$= 65^\circ$$

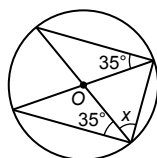
- (f)



$$x = 90^\circ - 55^\circ$$

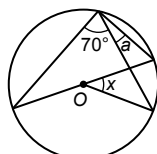
$$= 35^\circ$$

(g)



$$x = 90^\circ - 35^\circ \\ = 55^\circ$$

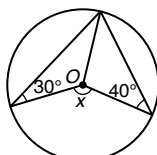
(h)



$$a = 90^\circ - 70^\circ \\ = 20^\circ$$

$$x = 2 \times 20^\circ \\ = 40^\circ$$

(i)



$$x = 2 \times (30^\circ + 40^\circ) \\ = 2 \times 70^\circ \\ = 140^\circ$$

13. (a) $\angle PQS = \angle PRS = 55^\circ$

$$\angle PQS = \angle PRS = 55^\circ$$

$$\angle OQP = \angle OPQ = 30^\circ$$

$\triangle OPQ$ ialah segi tiga sama kaki.
 $\triangle OPQ$ is an isosceles triangle.

$$\angle SQT = \angle PQS - \angle OQP \\ = 55^\circ - 30^\circ \\ = 25^\circ$$

$$x = 180^\circ - 90^\circ - 25^\circ \\ = 65^\circ$$

$\triangle QST$ ialah segi tiga bersudut tegak.
 $\triangle QST$ is a right-angled triangle.

(b) $\angle ABD = \angle BAC = 32^\circ$

$$\angle ODB = \angle OBD = 32^\circ$$

$\triangle OBD$ ialah segi tiga sama kaki.
 $\triangle OBD$ is an isosceles triangle.

$$x = 90^\circ - 32^\circ \\ = 58^\circ$$

$$y = 32^\circ$$

$\triangle OAC$ ialah segi tiga sama kaki.
 $\triangle OAC$ is an isosceles triangle.

$$x + y = 58^\circ + 32^\circ \\ = 90^\circ$$

$$(c) \angle OHG = \frac{180^\circ - 102^\circ}{2} \\ = \frac{78^\circ}{2} \\ = 39^\circ$$

$\triangle OGH$ ialah segi tiga sama kaki.
 $\triangle OGH$ is an isosceles triangle.

$$2x + x + 39^\circ = 90^\circ$$

$\angle EHG = 90^\circ$

$$3x = 90^\circ - 39^\circ$$

$$3x = 51^\circ$$

$$x = \frac{51^\circ}{3} \\ = 17^\circ$$

$$(d) x = 2 \times 35^\circ \\ = 70^\circ$$

Lengkuk PQ = lengkok RS
Arc PQ = arc RS

$$y = \frac{180^\circ - 70^\circ}{2} \\ = 55^\circ$$

$\triangle ORS$ ialah segi tiga sama kaki.
 $\triangle ORS$ is an isosceles triangle.

(e) $\angle OQR = 35^\circ$

$$\angle QOR = 180^\circ - 35^\circ - 35^\circ \\ = 110^\circ$$

$$\angle QPR = \frac{110^\circ}{2} \\ = 55^\circ$$

$$x = 180^\circ - 35^\circ - 35^\circ - 30^\circ - 55^\circ \\ = 25^\circ$$



>> Kaedah Alternatif ...

$$\begin{aligned} \angle OQR &= 35^\circ \\ \angle PQR &= 30^\circ + 35^\circ \\ &= 65^\circ \\ \angle PQR &= 2 \times 65^\circ \\ &= 130^\circ \\ x &= \frac{180^\circ - 130^\circ}{2} \\ &= 25^\circ \end{aligned}$$

(f) (i) $\angle LNM = \angle KNL$

$$= 28^\circ$$

$$\angle KNM = 28^\circ + 28^\circ$$

$$= 56^\circ$$

$$x = 180^\circ - 90^\circ - 56^\circ \\ = 34^\circ$$

(ii) $KN = 2 \times 6.5$

$$= 13 \text{ cm}$$

$$\sin x = \frac{MN}{KN}$$

$\triangle KMN$ ialah segi tiga bersudut tegak.
 $\triangle KMN$ is a right-angled triangle.

$$\sin 34^\circ = \frac{MN}{13}$$

$$MN = 13 \times \sin 34^\circ$$

$$MN = 7.27 \text{ cm}$$

(g) (i) $\angle PTR$
 $= 180^\circ - 62^\circ - 20^\circ$
 $= 98^\circ$

(ii) $\angle RQS$
 $= \angle RTS$
 $= 180^\circ - 98^\circ$
 $= 82^\circ$

(iii) $\angle RUS$
 $= \angle QUT$
 $= 360^\circ - 62^\circ - 98^\circ - 98^\circ$
 $= 102^\circ$

(h) $\angle AOD = 60^\circ$
 $\triangle AOD$ ialah segi tiga sama sisi.
 $\triangle AOD$ is an equilateral triangle.

$x = \frac{60^\circ}{2}$
 $= 30^\circ$

14. (a) Sisi empat $ABCD$ itu dikenali sebagai sisi empat kitaran.

The quadrilateral $ABCD$ is known as cyclic quadrilateral.

(b) Keempat-empat bucu sebuah sisi empat kitaran menyentuh lilitan sebuah bulatan.

The four vertices of a cyclic quadrilateral touch the circumference of a circle.

(c) Berdasarkan rajah di atas, $\angle A$ dan $\angle C$ serta $\angle B$ dan $\angle D$ dikenali sebagai sudut bertentangan.

Based on the above diagram, $\angle A$ and $\angle C$ as well as $\angle B$ and $\angle D$ are known as opposite angles.

15. (a) (i) Bukan sisi empat kitaran. Bucu R tidak terletak pada lilitan.

Not a cyclic quadrilateral. Vertex R does not lie on the circumference.

(b) (i) Bukan sisi empat kitaran. Bucu O tidak terletak pada lilitan.

Not a cyclic quadrilateral. Vertex O does not lie on the circumference.

(c) (i) Sisi empat kitaran. Semua bucu terletak pada lilitan.

A cyclic quadrilateral. All vertices lie on the circumference.

(ii) $\angle P$ dan/ and $\angle R$,
 $\angle Q$ dan/ and $\angle S$

(d) (i) Sisi empat kitaran. Semua bucu terletak pada lilitan.

A cyclic quadrilateral. All vertices lie on the circumference.

(ii) $\angle P$ dan/ and $\angle R$,
 $\angle Q$ dan/ and $\angle S$

(e) (i) Bukan sisi empat kitaran. Bucu O tidak terletak pada lilitan.

Not a cyclic quadrilateral. Vertex O does not lie on the circumference.

(f) (i) Sisi empat kitaran. Semua bucu terletak pada lilitan.

A cyclic quadrilateral. All vertices lie on the circumference.

(ii) $\angle P$ dan/ and $\angle R$,
 $\angle Q$ dan/ and $\angle S$

16. (a)

Sudut peluaran Exterior angle	Sudut pedalaman bertentangan yang sepadan Corresponding interior opposite angle
r	t
u	q

(b)

Sudut peluaran Exterior angle	Sudut pedalaman bertentangan yang sepadan Corresponding interior opposite angle
a	e
d	b

17.

$a = 60^\circ$ $b = 100^\circ$ $c = 120^\circ$
 $d = 80^\circ$ $e = 100^\circ$ $f = 120^\circ$

(a) $a + c = 180^\circ$, $b + d = 180^\circ$

(b) Hasil tambah sudut-sudut pedalaman yang bertentangan dalam sebuah sisi empat kitaran ialah 180° .

The sum of the interior opposite angles in a cyclic quadrilateral is 180° .

(c) Sudut peluaran sebuah sisi empat kitaran bersamaan dengan sudut pedalaman bertentangan yang sepadan.

The exterior angle of a cyclic quadrilateral is equal to its corresponding interior opposite angle.

18. (a) $a + c = 180^\circ$

$b + d = 180^\circ$

$a + b + c + d = 360^\circ$

(b) $p + r = 180^\circ$

$q + s = 180^\circ$

$p + q + r + s = 360^\circ$

(c) $x = y$



19. (a) $m = 180^\circ - 105^\circ$
 $= 75^\circ$
 $n = 180^\circ - 95^\circ$
 $= 85^\circ$

(b) $m = 112^\circ$
 $n = 97^\circ$

(c) $m = 180^\circ - 85^\circ$
 $= 95^\circ$
 $n = 80^\circ$

(d) $m = 180^\circ - 72^\circ$
 $= 108^\circ$
 $n = 180^\circ - 47^\circ$
 $= 133^\circ$

(e) $m = 180^\circ - 110^\circ$
 $= 70^\circ$
 $n = 180^\circ - 26^\circ - 80^\circ$
 $= 74^\circ$

(f) $m = 180^\circ - 68^\circ$
 $= 112^\circ$
 $n = m = 112^\circ$

(g) $m = 180^\circ - 82^\circ$
 $= 98^\circ$
 $n = 180^\circ - 59^\circ - 100^\circ$
 $= 21^\circ$

(h) $a = 180^\circ - 120^\circ$
 $= 60^\circ$
 $m = 180^\circ - 51^\circ - 60^\circ$
 $= 69^\circ$
 $n = 51^\circ + 60^\circ$
 $= 111^\circ$

20. (a) $2x = 180^\circ - 92^\circ$
 $2x = 88^\circ$
 $x = \frac{88^\circ}{2}$
 $= 44^\circ$

$4y + 2y = 180^\circ$
 $6y = 180^\circ$
 $y = \frac{180^\circ}{6}$
 $= 30^\circ$

(b) $a = 180^\circ - 85^\circ$
 $= 95^\circ$
 $x = 180^\circ - 50^\circ - 95^\circ$
 $= 35^\circ$
 $y = 180^\circ - 88^\circ$
 $= 92^\circ$

(c) $x = \frac{180^\circ - 70^\circ}{2}$
 $= \frac{110^\circ}{2}$
 $= 55^\circ$

$y = 180^\circ - 55^\circ$
 $= 125^\circ$

21. (a) $\angle OPQ = \frac{180^\circ - 66^\circ}{2}$
 $\triangle OPQ$ ialah segi tiga sama kaki.
 $\triangle OPQ$ is an isosceles triangle.

 $= \frac{114^\circ}{2}$
 $= 57^\circ$

$x = 180^\circ - 20^\circ - 57^\circ$
 $= 103^\circ$

(b) $\angle ACB = \angle ABC = \angle BCD = 38^\circ$
 $p = \angle CAB$
 $= 180^\circ - 38^\circ - 38^\circ$
 $= 104^\circ$

(c) $\angle GHJ = \angle GKL = 100^\circ$
 $\angle HGJ = \frac{180^\circ - 100^\circ}{2}$
 $= \frac{80^\circ}{2}$
 $= 40^\circ$

$x = 180^\circ - 40^\circ - 62^\circ$
 Hasil tambah sudut pedalaman bertentangan ialah 180° .
 Sum of interior opposite angles is 180° .

 $= 78^\circ$

(d) $\angle OBC = \angle OCB = 35^\circ$
 $\angle OBA = \angle OAB = 30^\circ$
 $\angle ABC = 35^\circ + 30^\circ$
 $= 65^\circ$

$x = 180^\circ - 65^\circ$
 Hasil tambah sudut pedalaman bertentangan ialah 180° .
 Sum of interior opposite angles is 180° .

 $= 115^\circ$

22. (a) Garis TVS ialah tangen kepada bulatan pada titik V .

Line TVS is a tangent to the circle at point V .

Garis SWU ialah tangen kepada bulatan pada titik W .

Line SWU is a tangent to the circle at point W .

(b) Garis ABC ialah tangen kepada bulatan pada titik B .

Line ABC is a tangent to the circle at point B .

Garis CDF ialah tangen kepada bulatan pada titik D .

Line CDF is a tangent to the circle at point D .

23. (i) (a) (i) $M : 90^\circ$

(ii) $Q : 90^\circ$

(iii) $T : 90^\circ$

(b) Tangen kepada bulatan adalah berserenjang dengan jejari bulatan.

The tangent to the circle is perpendicular to the radius of the circle.

(ii) (a) (i) Panjang AB / Length of AB : 2.35 cm

(ii) Panjang AC / Length of AC : 2.35 cm

(iii) $\angle OAB : 23^\circ$

(iv) $\angle OAC : 23^\circ$

(v) $\angle AOB : 67^\circ$

(vi) $\angle AOC : 67^\circ$

(b) (i) $\angle BAC = 23^\circ + 23^\circ = 46^\circ$

(ii) $\angle BOC = 67^\circ + 67^\circ = 134^\circ$

(iii) $\angle BAC + \angle BOC = 46^\circ + 134^\circ = 180^\circ$

(c) (i) Panjang AB adalah sentiasa sama dengan panjang AC.

The length of AB is always the same as the length of AC.

(ii) Garis OA ialah pembahagi dua sama sudut bagi $\angle BAC$ dan $\angle BOC$.

The line OA is the angle bisector of $\angle BAC$ and $\angle BOC$.

(iii) $\angle BAC$ dan $\angle BOC$ ialah sudut penggenap.

$\angle BAC$ and $\angle BOC$ are supplementary angles.

(iv) Saiz dan bentuk bagi $\triangle OAB$ dan $\triangle OAC$ adalah sama. Maka, $\triangle OAB$ dan $\triangle OAC$ adalah kongruen.

The size and shape of the $\triangle OAB$ and $\triangle OAC$ are the same. Hence, $\triangle OAB$ and $\triangle OAC$ are congruent.

(iii) (a) (i) $\angle MAC : 70^\circ$

(ii) $\angle NAB : 50^\circ$

(iii) $\angle ABC : 70^\circ$

(iv) $\angle ACB : 50^\circ$

(b) Sudut di antara tangen dengan perentas adalah sama dengan sudut dalam tembereng selang-seli yang dicangkum oleh perentas itu.

The angle between the tangent and the chord is the same as the angle in the alternate segment which is subtended by the chord.

24. (a) $x = 90^\circ$

(b) $x + y = 180^\circ$

(c) $p = r$
 $q = s$

25. (a) $\angle AOB = 180^\circ - 130^\circ = 50^\circ$

$x = 180^\circ - 90^\circ - 50^\circ = 40^\circ$

(b) $AB = BC$
 $\angle OBA = \angle OBC = 90^\circ$
 $\angle OCB = \angle OAB = 35^\circ$
 $x = 180^\circ - 35^\circ - 35^\circ = 110^\circ$

26. (a) $x = 360^\circ - 67^\circ - 67^\circ = 226^\circ$

(b) $\angle POR = 360^\circ - 248^\circ = 112^\circ$
 $\angle QOR = 112^\circ \div 2 = 56^\circ$
 $x = 180^\circ - 90^\circ - 56^\circ = 34^\circ$

(c) $\angle POR = 180^\circ - 70^\circ = 110^\circ$
 $\angle QOR = 110^\circ \div 2 = 55^\circ$
 $x = \frac{180^\circ - 55^\circ}{2} = \frac{125^\circ}{2} = 62.5^\circ$

(d) $\angle PQR = 42^\circ + 42^\circ = 84^\circ$
 $\angle POR = 180^\circ - 84^\circ = 96^\circ$
 $x = 360^\circ - 96^\circ = 264^\circ$

(e) $\angle POR = 360^\circ - 225^\circ = 135^\circ$
 $x = 180^\circ - 135^\circ = 45^\circ$



27. (a) $BC = CD$

Maka / Hence,

$$m = 1.3$$

(b) $OD = OB = 3 \text{ cm}$

$$\angle ODC = 90^\circ$$

$$m = \sqrt{3^2 + 4^2}$$

$$= \sqrt{9 + 16}$$

$$= \sqrt{25}$$

$$= 5$$

(c) $CD = CB = 12 \text{ cm}$

$$\angle ODC = 90^\circ$$

$$m = \sqrt{13^2 - 12^2}$$

$$= \sqrt{169 - 144}$$

$$= \sqrt{25}$$

$$= 5$$

28. (a) $x = 90^\circ$

$$y = 70^\circ$$

(b) $x = 55^\circ$

$$y = 180^\circ - 55^\circ - 38^\circ - 40^\circ$$

$$= 47^\circ$$

(c) $x = 90^\circ - 32^\circ$

$$= 58^\circ$$

$$y = 32^\circ$$

(d) $x = 90^\circ - 28^\circ$

$$= 62^\circ$$

$$y = 90^\circ - 25^\circ$$

$$= 65^\circ$$

(e) $x = \angle QSR = \angle SQR$

$$= 60^\circ$$

$$y = \angle USQ$$

$$= 180^\circ - 70^\circ - 60^\circ$$

$$= 50^\circ$$

29. (a) $x = 64^\circ$

$$y = \frac{180^\circ - 64^\circ}{2}$$

$$= \frac{116^\circ}{2}$$

$$= 58^\circ$$

$$z = y = 58^\circ$$

$$x + y + z = 64^\circ + 58^\circ + 58^\circ$$

$$= 180^\circ$$

(b) $GJ = GK$, maka $\triangle JGK$ ialah segi tiga sama kaki

$GJ = GK$, hence $\triangle JGK$ is an isosceles triangle.

$$\angle GJK = 75^\circ$$

$$x = 180^\circ - 75^\circ - 75^\circ$$

$$= 30^\circ$$

$$y = 180^\circ - 68^\circ - 75^\circ$$

$$= 37^\circ$$

(c) (i) $x = 180^\circ - 80^\circ = 100^\circ$

(ii) $AF = AE - FE$

$$= 34 - 22$$

$$= 12 \text{ cm}$$

$$AC = AB + BC$$

$$= 12 + 22$$

$$= 34 \text{ cm}$$

(d) $\angle TQR = 85^\circ$

$$x = 85^\circ - 65^\circ$$

$$= 20^\circ$$

(e) (i) $\angle QAV = 50^\circ + 50^\circ$

$$= 100^\circ$$

$$\angle QRV = 180^\circ - 100^\circ$$

$$= 80^\circ$$

$$m = 180^\circ - 80^\circ$$

$$= 100^\circ$$

(ii) $\sin \angle QAR = \frac{QR}{AR}$

$$\sin 50^\circ = \frac{12}{AR}$$

$$AR = 15.7 \text{ cm}$$

$$\angle WRB = 80^\circ \div 2$$

$$= 40^\circ$$

$$\cos \angle WRB = \frac{RW}{RB}$$

$$\cos 40^\circ = \frac{17}{RB}$$

$$RB = 22.2 \text{ cm}$$

$$AB = AR + RB$$

$$= 15.7 + 22.2$$

$$= 37.9 \text{ cm}$$

30. (a) $x = 42^\circ$

$$\angle URS = 180^\circ - 78^\circ$$

$$= 102^\circ$$

$$y = 180^\circ - 42^\circ - 102^\circ$$

$$= 36^\circ$$

(b) $x = \frac{84^\circ}{2}$

$$= 42^\circ$$

$$\angle ABE = \angle EFG$$

$$= 110^\circ$$

$$\angle FBE = \frac{108^\circ}{2}$$

$$= 54^\circ$$

$$y = 110^\circ - 54^\circ$$

$$= 56^\circ$$

$$y - x = 56^\circ - 42^\circ$$

$$= 14^\circ$$



>> Kaedah Alternatif ...

$$\angle PFE = \frac{180^\circ - 108^\circ}{2}$$

$$= 36^\circ$$

$$y + \angle BAF = \angle BFG$$

$$y + 90^\circ = 110^\circ + 36^\circ$$

$$y = 146^\circ - 90^\circ$$

$$= 56^\circ$$

$$\begin{aligned}
 \text{(c) } \angle STQ &= \angle SQR \\
 &= 50^\circ \\
 \angle OTS &= 50^\circ - 35^\circ \\
 &= 15^\circ \\
 \angle TOS &= 180^\circ - 15^\circ - 15^\circ \\
 &= 150^\circ \\
 \angle TQS &= \frac{150^\circ}{2} \\
 &= 75^\circ \\
 x &= 180^\circ - 50^\circ - 75^\circ \\
 &= 55^\circ \\
 \angle TSQ &= x \\
 &= 55^\circ \\
 \angle OST &= \angle OTS \\
 &= 15^\circ \\
 y &= 55^\circ - 15^\circ \\
 &= 40^\circ \\
 x + y &= 55^\circ + 40^\circ \\
 &= 95^\circ
 \end{aligned}$$



Kaedah Alternatif ...

$$\begin{aligned}
 \angle OQT &= \angle OTQ = 35^\circ \\
 \angle OQS &= y
 \end{aligned}$$

Maka/ Hence

$$\begin{aligned}
 x + 35^\circ + y + 50^\circ &= 180^\circ \\
 x + y &= 180^\circ - 35^\circ - 50^\circ \\
 &= 95^\circ
 \end{aligned}$$

$$\begin{aligned}
 \text{(d) } \angle MLQ &= \angle LPQ \\
 &= 180^\circ - 120^\circ \\
 &= 60^\circ \\
 2x &= 180^\circ - 74^\circ - 60^\circ \\
 2x &= 46^\circ \\
 x &= \frac{46^\circ}{2} \\
 &= 23^\circ
 \end{aligned}$$

Power PT3

Bahagian A

- $x = 110^\circ$
 $y = 180^\circ - 80^\circ$
 $= 100^\circ$
 $x + y = 110^\circ + 100^\circ$
 $= 210^\circ$
Jawapan/ Answer: C
- p dan s ialah sudut pada suatu lilitan bulatan yang dicangkum oleh lengkok yang sama.
 p and s are the angles at the circumference subtended by the same arc.

Jawapan/ Answer: C

$$3. x = \frac{54^\circ + 42^\circ}{2} = 48^\circ$$

Jawapan/ Answer: B

$$\begin{aligned}
 4. x &= 50^\circ, y = 55^\circ \\
 y - x &= 55^\circ - 50^\circ \\
 &= 5^\circ
 \end{aligned}$$

Jawapan/ Answer: A

$$\begin{aligned}
 5. \text{ Sudut refleks } POR / \text{ Reflex angle } POR \\
 &= 360^\circ - 160^\circ \\
 &= 200^\circ
 \end{aligned}$$

$$\begin{aligned}
 \angle PQR &= 200^\circ \div 2 \\
 &= 100^\circ
 \end{aligned}$$

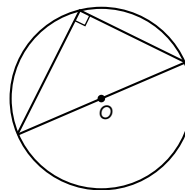
$$\begin{aligned}
 x &= 360^\circ - 160^\circ - 35^\circ - 100^\circ \\
 &= 65^\circ
 \end{aligned}$$

Jawapan/ Answer: D

Bahagian B

- (i) ☒
 - (ii) ☒

(b)



7. (a)

$x = 180^\circ + 80^\circ$	
$x = 180^\circ - 80^\circ$	☒
$x = 180^\circ - 100^\circ$	

- (i) $x = 35^\circ$
- (ii) $x = 6$
- (iii) $x = 50^\circ$

Bahagian C

- (i) Tangen / Tangent
 - (ii) $\angle a$
 - (iii) $\angle c$
- (i) $\angle POR = 180^\circ - 48^\circ - 48^\circ$
 $= 84^\circ$
 $x = \frac{84^\circ}{2}$
 $= 42^\circ$



$$\begin{aligned} \text{(ii)} \quad \angle QOR &= 2 \times 50^\circ \\ &= 100^\circ \\ x &= 180^\circ - 100^\circ \\ &= 80^\circ \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad \text{Sudut refleks / Reflex angle QOS} \\ &= 2 \times 115^\circ \\ &= 230^\circ \end{aligned}$$

$$\begin{aligned} \text{Sudut cakak / Obtuse angle QOS} \\ &= 360^\circ - 230^\circ \\ &= 130^\circ \\ x &= 360^\circ - 90^\circ - 90^\circ - 130^\circ \\ &= 50^\circ \end{aligned}$$

$$\begin{aligned} \text{9. (a)} \quad x + y &= 165^\circ \\ x + 2x &= 165^\circ \\ 3x &= 165^\circ \\ x &= 55^\circ \\ y &= 2x \\ &= 2 \times 55^\circ \\ &= 110^\circ \end{aligned}$$

$$\begin{aligned} \text{(b) (i)} \quad \angle QPR &= \angle QRP = 47^\circ \\ x &= 180^\circ - \angle QPR - \angle QRP - \angle SPR \\ &= 180^\circ - 3 \times 47^\circ \\ &= 39^\circ \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad y &= \angle PQR \\ &= 180^\circ - 2 \times 47^\circ \\ &= 86^\circ \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad \tan \angle VSN &= \frac{12}{33} \\ \angle VSN &= 19.98^\circ \\ x &= \angle VNS \\ &= 180^\circ - 90^\circ - 19.98^\circ \\ &= 70.02^\circ \end{aligned}$$

Power KBAT

$$\begin{aligned} \text{1. (a)} \quad \cos \angle APO &= \frac{AP}{OP} & \left[\cos \angle APO = \frac{AP}{OP} \right] \\ &= \frac{2.5}{12.5} \end{aligned}$$

$$\begin{aligned} \angle APO &= \cos^{-1} 0.2 & [\angle APO = \cos^{-1} 0.2] \\ &= 78^\circ 28' \end{aligned}$$

$$\text{Maka/ Hence, } \angle APB = 78^\circ 28' \times 2 = 156^\circ 56'$$

$$\begin{aligned} \text{(b)} \quad \angle DOC &= 180^\circ - \angle APB \\ &= 180^\circ - 156^\circ 56' \\ &= 23^\circ 4' \end{aligned}$$

$$\begin{aligned} \text{Luas sektor minor COD / Area of minor sector COD} \\ &= \frac{23^\circ 4'}{360^\circ} \times 3.142 \times 3^2 \\ &= 1.81 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad \text{Luas sektor minor APB / Area of minor sector APB} \\ &= \frac{156^\circ 56'}{360^\circ} \times 3.142 \times 2.5^2 \\ &= 8.56 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} OA &= \sqrt{OP^2 - AP^2} \\ &= \sqrt{12.5^2 - 2.5^2} \\ &= 12.25 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Luas OAPB / Area of OAPB} &= 2 \times \frac{1}{2} \times 12.25 \times 2.5 \\ &= 30.63 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Luas kawasan berlorek / Area of shaded region} \\ &= 30.63 - 1.81 - 8.56 \\ &= 20.26 \text{ cm}^2 \end{aligned}$$