REG-POC-2425-ASM-SET 1-MATH
Suggested solutions

Multiple Choice Questions

1. B	2. C	3. A	4. A	5. C
6. C	7. B	8. A	9. A	10. C
11. B	12. B	13. A	14. C	15. B
16. A	17. A	18. C	19. A	20. B
21. B	22. D	23. B	24. D	25. D
26. D	27. A	28. B	29. D	30. C

1. B

$OS \perp XY$ and $OX = OH = 10\,\text{cm}$

$OS = \sqrt{10^2 - 8^2}$

$= 6\,\text{cm}$

2. C

Let O be the centre of the circle.

Let the radius be r cm.

$OM = (r - 8)\,\text{cm}$

$AM = \dfrac{32}{2} = 16\,\text{cm}$

$r^2 = (r - 8)^2 + 16^2$

$r^2 = r^2 - 16r + 320$

$r = 20$

3. A

$CD = \dfrac{14}{2} = 7\,\text{cm}$

$OC = \sqrt{20^2 - 7^2}$

$= \sqrt{351}\,\text{cm}$

Required radius $= \sqrt{(\sqrt{351})^2 + (7 + 8)^2}$

$= 24\,\text{cm}$

4. A

Let O be the centre of the circle.

Let M and N be mid-points of AB and CD respectively.

$BM = \dfrac{14}{2} = 7\,\text{cm}$

$OM = \sqrt{25^2 - 7^2}$

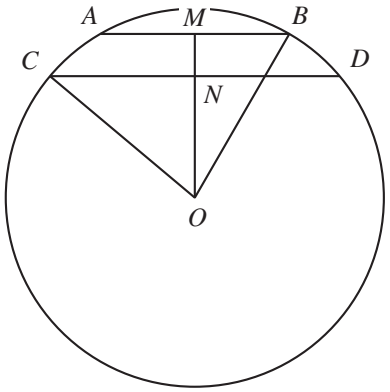
$= 24\,\text{cm}$

$MN = 24 - 9 = 15\,\text{cm}$

$CN = \sqrt{25^2 - 15^2}$

$= 20\,\text{cm}$

$CD = 2(20) = 40\,\text{cm}$



5. C

Let M be the mid-point of AB.

$AM = BM = \dfrac{30}{2} = 15\,\text{cm}$

$OM = \sqrt{25^2 - 15^2}$

$= 20\,\text{cm}$

$OD = 25 + 27 = 52\,\text{cm}$

$BM = \sqrt{52^2 - 20^2}$

$= 48\,\text{cm}$

$BD = 48 - 15 = 33\,\text{cm}$

6. C

Let O be the centre and M be mid-point of CD.

Rotate AE such that $AE // CD$.

We have $AP = EQ = OM$.

$CM = \dfrac{16}{2} = 8\,\text{cm}$

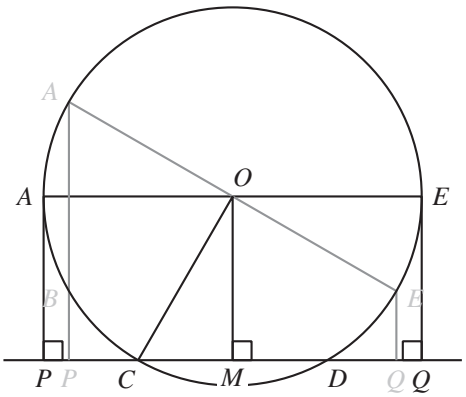
$OC = \dfrac{34}{2} = 17\,\text{cm}$

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

$= 15\,\text{cm}$

$AP + EQ = 15 + 15$

$= 30\,\text{cm}$



7. B

$AP = \dfrac{24}{2} = 12\,\text{cm}$

$OP \perp AB$

Radius $= \sqrt{12^2 + 5^2}$

$= 13\,\text{cm}$

8. A

Let M be mid-point of CD such that $OM \perp CD$.

$CM = \dfrac{5 + 13}{2} = 9\,\text{cm}$

$OQ = PM = 9 - 5 = 4\,\text{cm}$

9. A

Let M be the mid-point of CD.

$CM = \dfrac{24}{2} = 12\,\text{cm}$

$OA = \dfrac{26}{2} = 13\,\text{cm}$

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

$= 5\,\text{cm}$

Required distance is 5 cm.

10. C

$BD = \sqrt{10^2 - 6^2}$

$= 8\,\text{cm}$

$\cos \angle AOD = \dfrac{6}{10}$

$\angle AOD \approx 53.1^\circ$

$\angle AOB = 2\angle AOD$

$\approx 106^\circ$

Required area $= \dfrac{(3)(8)}{2} + 10^2\pi\left(\dfrac{\angle AOB}{360^\circ}\right) - 2 \times \dfrac{(6)(10)}{2}$

$\approx 57\,\text{cm}^2$

11. B

$MB = \dfrac{AB}{2} = 5\,\text{cm}$

$BN = \dfrac{BC}{2} = 8\,\text{cm}$

Required area $= (8)(5)$

$= 40\,\text{cm}^2$

12. B

$OD = \dfrac{AB}{2} = 6\,\text{cm}$ and $DM = \dfrac{DC}{2} = 5\,\text{cm}$

$OM = \sqrt{OD^2 - DM^2} = \sqrt{6^2 - 5^2} = \sqrt{11}\,\text{cm}$

13. A

$OA = OC = 15\,\text{cm}$
$OM = \sqrt{15^2 - 12^2} = 9\,\text{cm}$
$MC = 15 - 9 = 6\,\text{cm}$

14. C

$PQ = PM + MQ = 18\,\text{cm}$
$OR = \dfrac{PQ}{2} = 9\,\text{cm}$
$OM = 9 - 4 = 5\,\text{cm}$
$RM = \sqrt{9^2 - 5^2} = \sqrt{56}\,\text{cm}$

15. B

Let M and N be mid-points of AB and CD respectively.
$AM = \dfrac{AB}{2} = 6$ and $OM^2 = 7^2 - AM^2 = 13$.
$CN = \dfrac{CD}{2} = 5$ and $ON^2 = 7^2 - CN^2 = 24$.
$OK = \sqrt{OM^2 + ON^2} = \sqrt{37}$.

16. A

Let $OA = r$ cm.
$\angle OMA = 90^\circ$
Consider $\triangle OAM$.

$$r^2 = (r-2)^2 + 3^2$$
$$r^2 = r^2 - 4r + 13$$
$$r = 3.25$$

$OM = r - 2 = 1.25\,\text{cm}$

17. A

Let M be the mid-point of AC. Then $OM \perp AC$. Consider the area of $\triangle OAB$,

$$\frac{(AB)(OM)}{2} = \frac{(OB)(OA)}{2}$$
$$\frac{\sqrt{3^2+4^2}(OM)}{2} = 6$$
$$OM = 2.4$$

$AM = \sqrt{OA^2 - OM^2} = 3.2$ and $BM = \sqrt{OB^2 - OM^2} = 1.8$.
$BC = CM - BC = AM - BM = 1.4$.

18. C

Let M be the mid-point of AB. Required distance is OM.
$AM = \dfrac{AB}{2} = 10$ and $OM = \sqrt{OA^2 - AM^2} = 24$.

19. A

$OM \perp BC$ and $OM = \sqrt{OC^2 - MC^2} = 8$.
$AM = \sqrt{OA^2 - OM^2} = 4\sqrt{5}$ and $AD = 2AM = 8\sqrt{5}$.

20. B

Let G be the foot of perpendicular of B on OC.

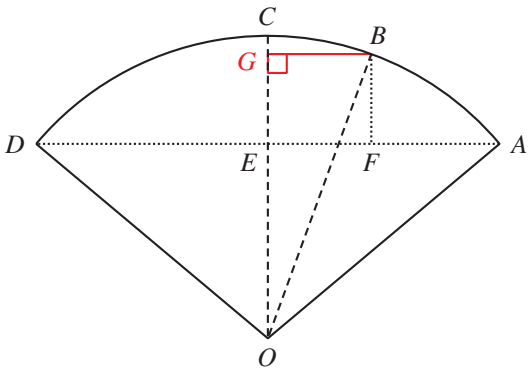
$AE = \dfrac{9 + 39}{2} = 24$ cm.

Radius $= \sqrt{24^2 + 18^2} = 30$ cm.

$BG = EF = 24 - 9 = 15$ cm.

$$\sin \angle BOG = \frac{15}{30}$$
$$\angle BOG = 30^\circ$$

Required area $= (30)^2\pi \times \dfrac{30^\circ}{360^\circ} = 75\pi$ cm^2.



21. B

$AM = AN$ and $MN = 2(2) = 4$ cm
$HK = MN = 4$ cm

22. D

Let O be the centre of the circle.
$\angle BMO = \angle CNO = 90^\circ$
$\angle BMN = 90^\circ - 82^\circ = 8^\circ$
$\angle BNM = \angle BMN = 8^\circ$
$\angle DNM = 90^\circ + 8^\circ = 98^\circ$

23. B

$AB \perp OP$, $CD \perp OQ$ and $OP = OQ = \dfrac{16}{2} = 8$ cm.
$AP = \sqrt{17^2 - 8^2}$
$= 15$ cm
$AB = 2(15) = 30$ cm

24. D

Let O be the centre of the circle.
$OM \perp AB$, $ON \perp CD$ and $OM = ON$.
$\angle OMN = 100^\circ - 90^\circ = 10^\circ$
$\angle ONM = \angle OMN = 10^\circ$
$\angle CNM = 90^\circ + 10^\circ = 100^\circ$

25. D

$\angle ABC = 360° - 90° \times 2 - 110° = 70°$.

$OM = ON$, $OM \perp AB$, $ON \perp BC$. So, $AB = BC$.

$\angle BAC = \dfrac{180° - 70°}{2} = 55°$.

26. D

$OM \perp AB$, $ON \perp BC$ and $AB = BC$. So, $OM = ON$.

$\angle MON = 360° - 90° \times 2 - 68° = 112°$.

$\angle OMN = \dfrac{180° - 112°}{2} = 34°$.

27. A

Let M, N and T be mid-points of AB, CD and EF respectively such that $OM \perp AB$, $ON \perp CD$ and $OT \perp EF$.

$OM = ON = OT$.

$\triangle OTR \cong \triangle ONR$ and $\triangle ONQ \cong \triangle OMQ$.

Let $\angle ORN = a$ and $\angle OQN = b$.

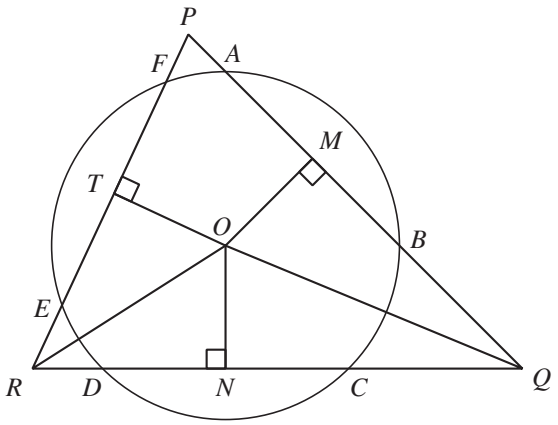
Then $\angle ORT = a$ and $\angle OQM = b$.

In $\triangle PQR$,

$$2a + 2b + 38° = 180°$$
$$a + b = 71°$$

In $\triangle QOR$,

$$a + b + \angle QOR = 180°$$
$$\angle QOR = 109°$$



28. B

Let D, E and F be mid-points of PQ, RS and TU respectively.

$\triangle BOD \cong \triangle BOE$ and $\triangle COF \cong \triangle COE$.

Let $\angle OBD = a$ and $\angle OCE = b$.

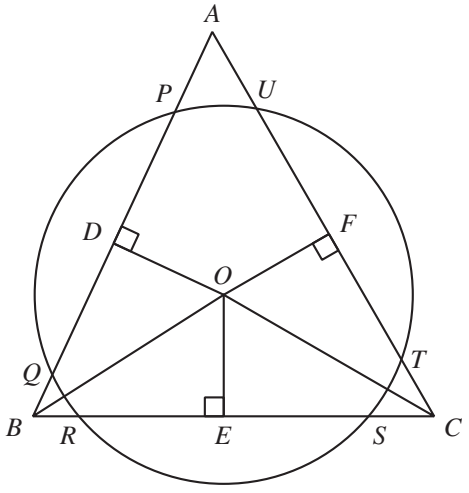
Then $\angle OBE = a$ and $\angle OCF = b$.

$\angle BOC + a + b = 180°$

$$a + b = 72°$$

$\angle BAC = 180° - 2a - 2b$

$$= 180° - 2(72°)$$
$$= 36°$$



29. D

Since $AD = BQ = CQ$, the distances from three chords to centre are equal.

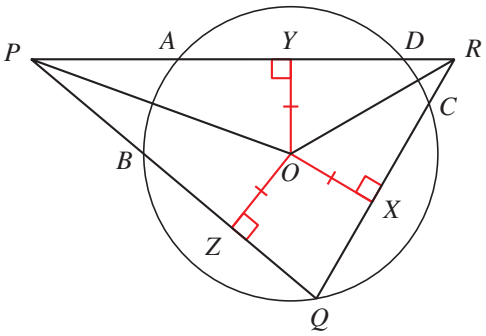
Note that $\triangle OYP \cong \triangle OZP$ and $\triangle OYR \cong \triangle OXR$.

Let $\angle YPO = \angle ZPO = a$ and $\angle YRO = \angle XRO = b$. In $\triangle POR$,

$$130^\circ + a + b = 180^\circ$$
$$a + b = 50^\circ$$

In $\triangle PQR$,

$$\angle PQR + 2(a + b) = 180^\circ$$
$$\angle PQR = 80^\circ$$



30. C

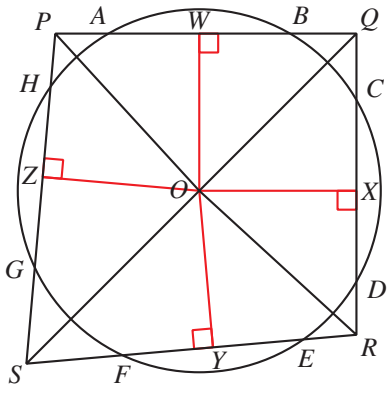
Let W, X, Y and Z be mid-points of AB, CD, EF and GH respectively.

$\triangle PWO \cong \triangle PZO$, $\triangle QWO \cong \triangle QXO$.

$\triangle RXO \cong \triangle RYO$, $\triangle SYO \cong \triangle SZO$.

$\angle XOZ = 2 \times \angle POQ = 172^\circ$.

$\angle ROS = \dfrac{1}{2}(\text{reflex } \angle XOZ) = \dfrac{360^\circ - 172^\circ}{2} = 94^\circ$.



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