



SYDNEY BOYS HIGH SCHOOL
MOORE PARK, SURRY HILLS

2006

10MaB
Circle Geometry Test

Mathematics

General Instructions

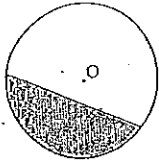
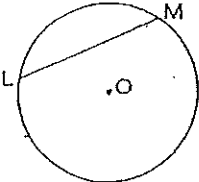
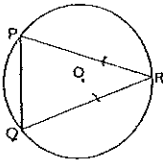
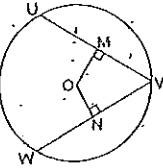
- Write using black or blue pen

- Calculators may NOT be used.

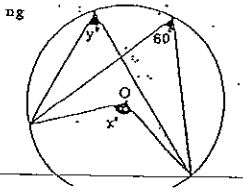
- MARKS MAY NOT BE AWARDED FOR MESSY OR BADLY ARRANGED WORK.

- Attempt all questions.

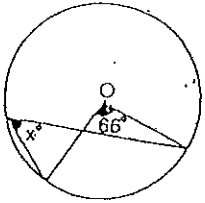
Examiner: *A.Ward*

Question.	Answer.	
<p>1. What is the shaded region called?</p> 		
<p>2. What is the element of a circle called that is shown as LM</p> 		
<p>3. If Arc PR = Arc QR which of the following are true?</p> <p>A. $PR = QR$</p> <p>B. $\angle QPR = \angle PQR$</p> 		
<p>4. If $OM = ON$ which of the following are true?</p> <p>A. $UV = VW$</p> <p>B. $MV = NV$</p> 		

5. In the following diagram find x and y .



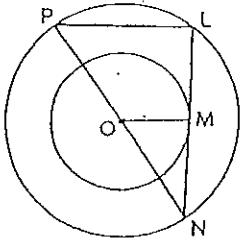
6. What is the value of x ?



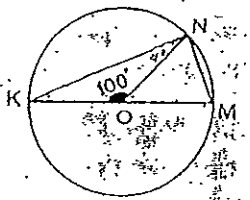
7. The line LN touches the inner circle at N.

Which statement is false?

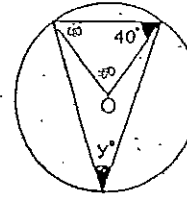
- A. $LM = ON$
- B. $LM = MN$
- C. LP is parallel to MO
- D. $\angle MLP = 90^\circ$



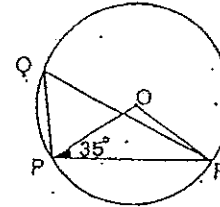
8. If $\angle KON$ is 100° , what is the magnitude of $\angle ONM$?



9. What is the value of y ?



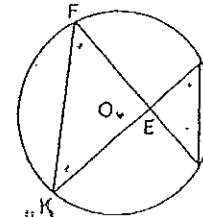
10. What is the magnitude of $\angle PQR$?



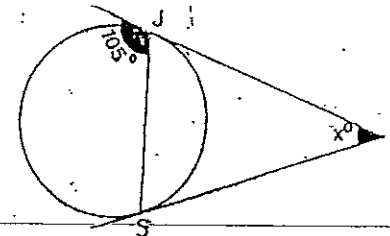
11. F, G, H and K are any 4 points on the circle.

Then $\triangle FEK$ and $\triangle GEH$ must be:

- A. congruent
- B. equilateral
- C. isosceles
- D. similar

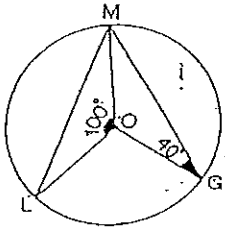


12. If PJ and PS are tangents to the circle, of what magnitude is x ?

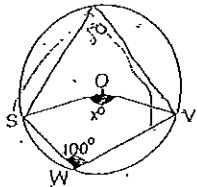


13. Given the following circle, which statement is false?

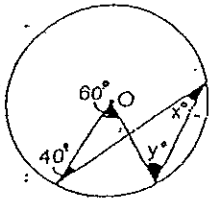
- A. $\angle LMG = 80^\circ$
- B. $\angle OML = 40^\circ$
- C. $\angle OMG = 40^\circ$
- D. $\angle LOG = 80^\circ$



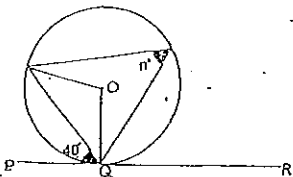
14. Find the magnitude of x .



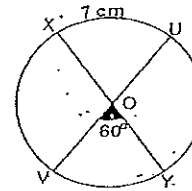
15. Find the values of x and y .



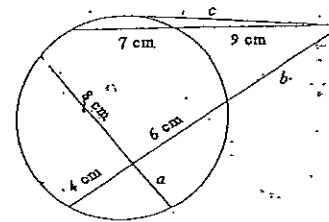
16. If PR is a tangent to the circle at point Q then what is the magnitude of n ?



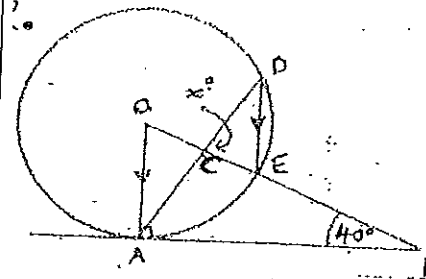
17. If Arc UX = 7cm find the circumference of the circle.



18. Find the value of the pronumerals, reasons are not necessary but working must be shown.

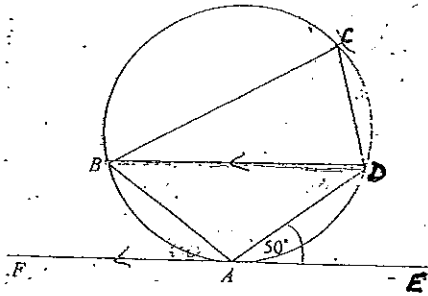


19. O is the centre of the circle and BA is the tangent. Find x giving reasons.

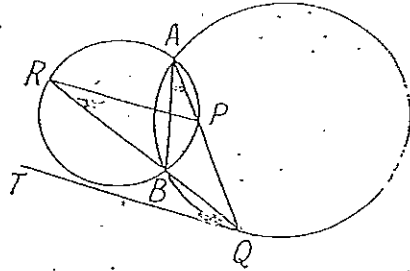


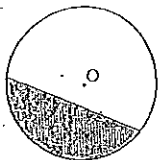
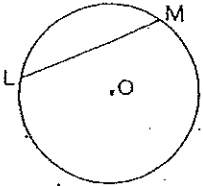
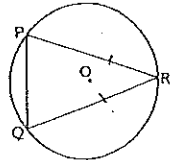
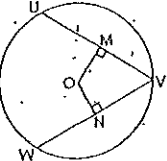
20. ABCD is a cyclic quadrilateral. FAE is a tangent at A. BD is parallel to FE, $BC \parallel AD$. $\angle DAE = 50^\circ$. Giving reasons find;

- A. $\angle BAF$ and
- B. $\angle BDC$

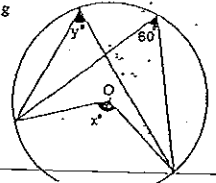
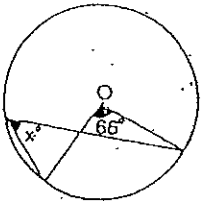
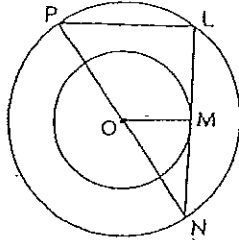
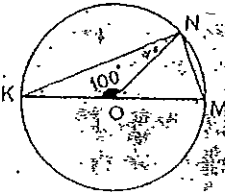


21. These two circles intersect at A and B. AP produced cuts the larger circle at Q. QB produced cuts the smaller circle at R. TQ is a tangent to the larger circle. Prove that RP is parallel to TQ giving reasons.



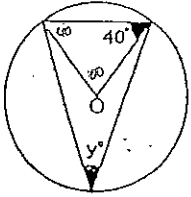
Question.	Answer.	
1. What is the shaded region called? 	Minor Segment	2
2. What is the element of a circle called that is shown as LM? 	Chord or arc	2
3. If Arc PR = Arc QR which of the following are true? A. $PR = QR$ B. $\angle QPR = \angle PQR$ 	A & B	2
4. If $OM = ON$ which of the following are true? A. $UV = VW$ B. $MV = NV$ 	A & B	2

(8)

5. In the following diagram find x and y . 	$y = 60^\circ$ ✓ $x = 120^\circ$ ✓
6. What is the value of x ? 	$x = 33^\circ$ ✓
7. The line LN touches the inner circle at N. Which statement is <u>false</u> ? A. $LM = ON$ B. $LM = MN$ C. LP is parallel to MO D. $\angle MLP = 90^\circ$ 	A ✓
8. If $\angle KON$ is 100° , what is the magnitude of $\angle ONM$? 	$\angle ONM = 40^\circ$ $\angle KNM = 90^\circ$ $\therefore \angle ONM = 90 - 40$ $\angle ONM = 50^\circ$ ✓

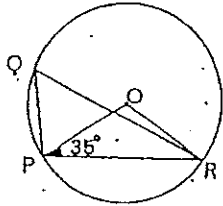
(8)

9. What is the value of y ?



$y = 50^\circ$ ✓

10. What is the magnitude of $\angle PQR$?



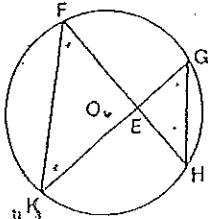
$\angle POR = 110^\circ$
 $\angle PQR = 55^\circ$ ✓

11. F, G, H and K are any 4 points on the circle.

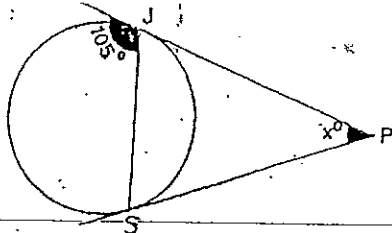
Then $\triangle FEK$ and $\triangle GEH$ must be:

- A. congruent
- B. equilateral
- C. isosceles
- D. similar

D ✓



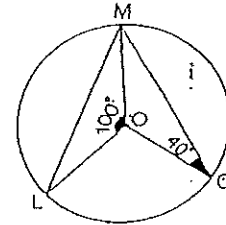
12. If PJ and PS are tangents to the circle, of what magnitude is x ?



$x = 30^\circ$ ✓

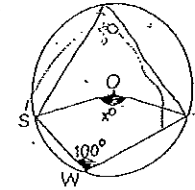
13. Given the following circle, which statement is false?

- A. $\angle LMG = 80^\circ$
- B. $\angle OML = 40^\circ$
- C. $\angle OMG = 40^\circ$
- D. $\angle LOG = 80^\circ$



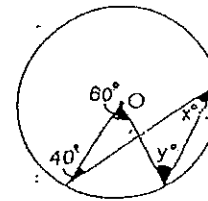
D ✓

14. Find the magnitude of x .



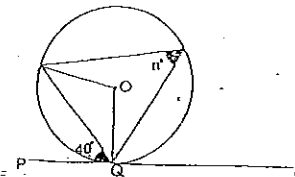
~~100~~
 160° ✓

15. Find the values of x and y .



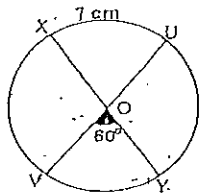
$x = \del{40} 30^\circ$ ✓
 $y = \del{40} 70^\circ$ ✓

16. If PR is a tangent to the circle at point Q then what is the magnitude of n ?



$n = 40^\circ$ ✓

17. If Arc UX = 7cm find the circumference of the circle.



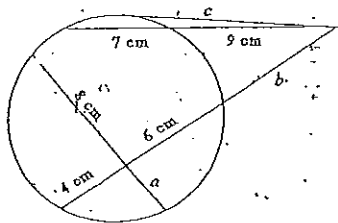
$$\frac{60}{360} \times 7$$

circumference = 42cm



2

18. Find the value of the pronumerals, reasons are not necessary but working must be shown.



$$8a = 4 \times 6$$

$$a = 3 \quad \checkmark \text{ (1)}$$

$$b(b+10) = 9 \times 16$$

$$b^2 + 10b - 144 = 0$$

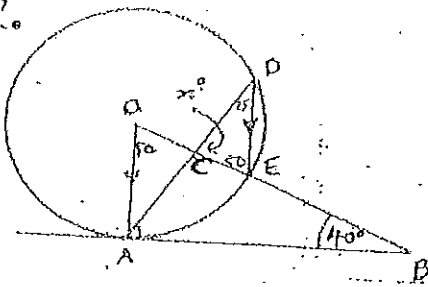
$$(b-8)(b+18) = 0$$

$$b = 8$$

$$c = 12 \quad \checkmark \text{ (1)}$$

3

19. O is the centre of the circle and BA is the tangent. Find x giving reasons.



$\angle BAD = 90^\circ$ (a radius OA meets a tangent at the point of contact at right angles)

$\angle AOB = 50^\circ$ (L sum A)

$\angle DEC = 50^\circ$ (alternate Ls AQDE)

$\angle CDE = 25^\circ$ (L subtended by an arc to the centre is double an L subtended by the same arc to the circumference)

$\therefore x^\circ = 180 - 50 - 25$ (L sum)

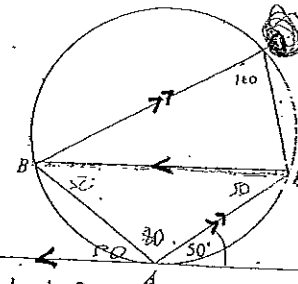
$\therefore x^\circ = 105^\circ$

5

20. ABCD is a cyclic quadrilateral. FAE is a tangent at A. BD is parallel to FE.

$\angle DAE = 50^\circ$. Giving reasons find;

- A. $\angle BAF$ and
- B. $\angle BDC$



Construct BD

a) $\angle ABD = 50^\circ$ (L in alternate segment)

$\angle DBA = \angle BAF$ (alternate Ls BDHFE)

$\therefore \angle BAF = 50^\circ \quad \checkmark \text{ (3)}$

b) $\angle BAD = 80^\circ$ (L sum straight line FAE)

$\therefore \angle BCD = 100^\circ$ (opposite angles of a cyclic quadrilateral are supplementary)

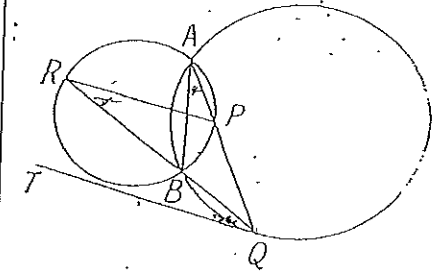
$\therefore \angle CBD + \angle CDB = 80^\circ$ (L sum A)

$\angle CBD = 50^\circ \quad \checkmark \text{ (BC || AD)}$

$\therefore \angle BDC = 30^\circ \quad \checkmark \text{ (2 1/2)}$

2 1/2

21. These two circles intersect at A and B. AP produced cuts the larger circle at Q. QB produced cuts the smaller circle at R. TQ is a tangent to the larger circle. Prove that RP is parallel to TQ giving reasons.



Let $\angle TQR = x^\circ$

$\angle BAQ = x^\circ$ (L in alternate segment)

$\angle PRQ = x^\circ$ (L subtended by same arc BP)

$\therefore \angle PRQ = \angle TQR$ (both equal to $\angle BAQ$)

$\therefore RP \parallel TQ$ (alternate angles $\angle PRQ$ & $\angle TQR$ are equal only if $RP \parallel TQ$)

5