

# Study Guide

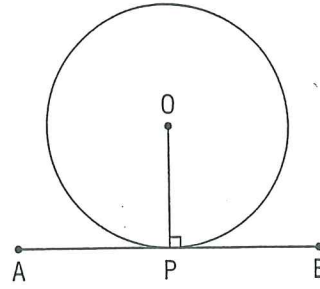
## U5 REVIEW Package

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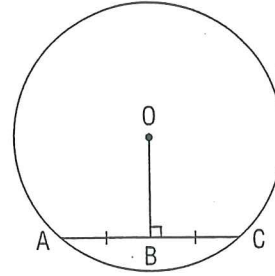
### NOTES:

(part 1)

- ▶ A tangent to a circle is perpendicular to the radius at the point of tangency.  
That is,  $\angle APO = \angle BPO = 90^\circ$

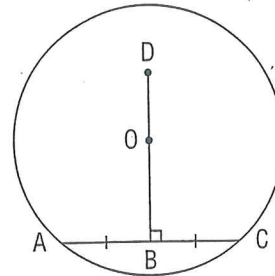


- ▶ The perpendicular from the centre of a circle to a chord bisects the chord.  
When  $\angle OBC = \angle OBA = 90^\circ$ , then  $AB = BC$

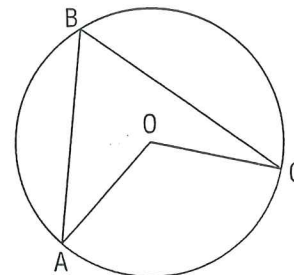


- ▶ A line segment that joins the centre of a circle to the midpoint of a chord is perpendicular to the chord.  
When O is the centre of a circle and  $AB = BC$ , then  $\angle OBC = \angle OBA = 90^\circ$

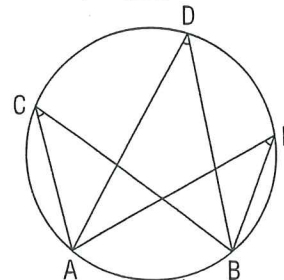
- ▶ The perpendicular bisector of a chord in a circle passes through the centre of the circle.  
When  $\angle OBC = \angle OBA = 90^\circ$ , and  $AB = BC$ , then the centre O of the circle lies on DB.



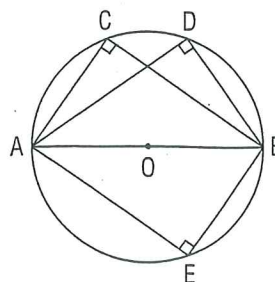
- ▶ The measure of a central angle subtended by an arc is twice the measure of an inscribed angle subtended by the same arc.  
 $\angle AOC = 2\angle ABC$ , or  
 $\angle ABC = \frac{1}{2}\angle AOC$

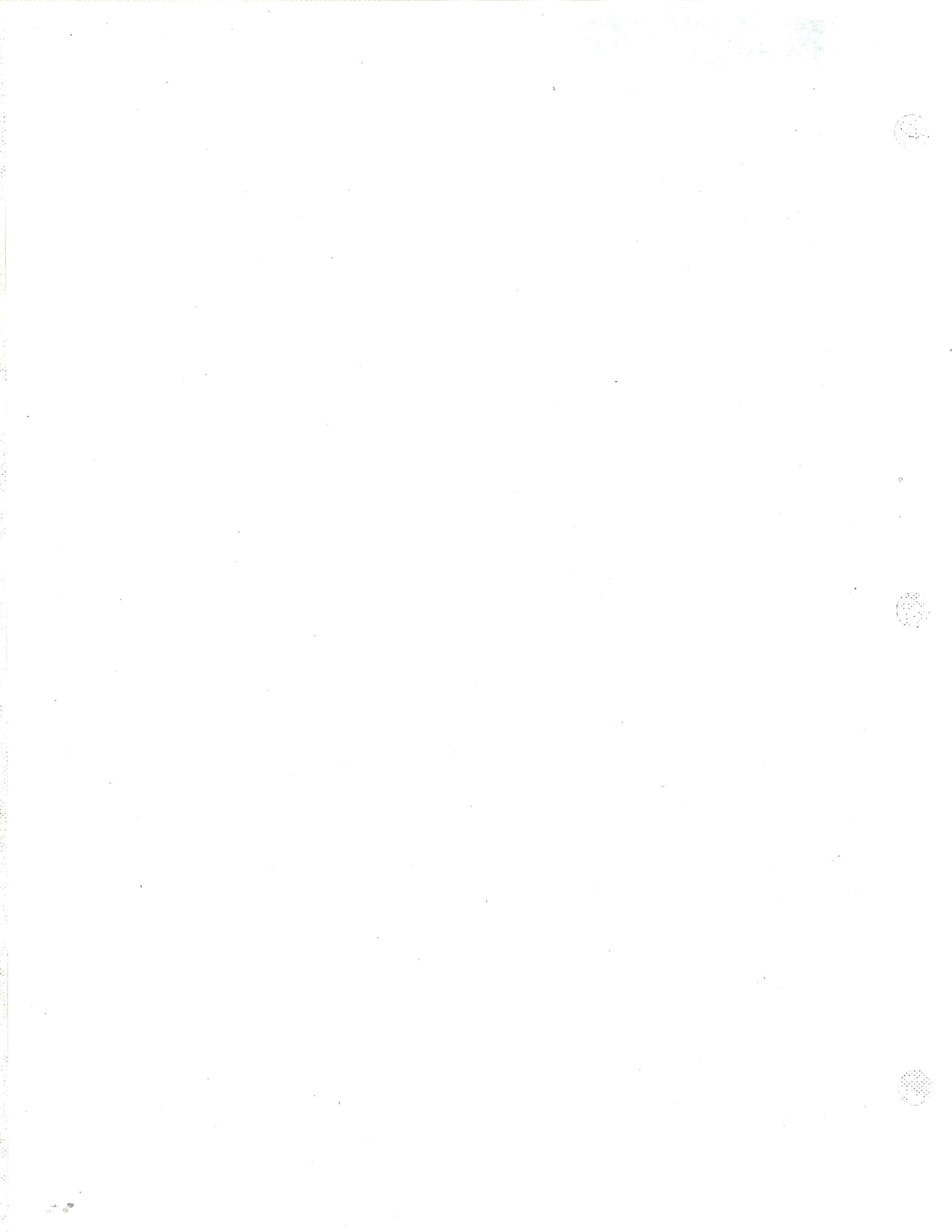


- ▶ All inscribed angles subtended by same arc are congruent.  
 $\angle ACB = \angle ADB = \angle AEB$



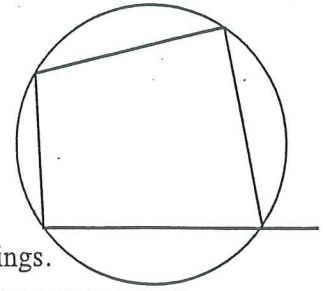
- ▶ All inscribed angles subtended by a semicircle are right angles.  
 $\angle ACB = \angle ADB = \angle AEB = 90^\circ$





**Angles in a Cyclic Quadrilateral.**

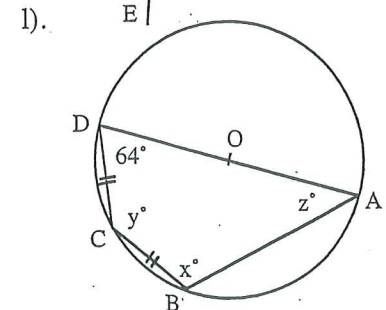
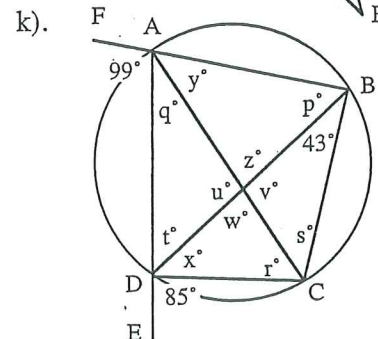
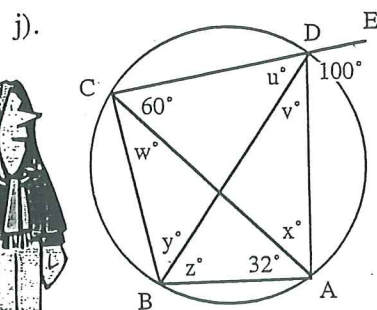
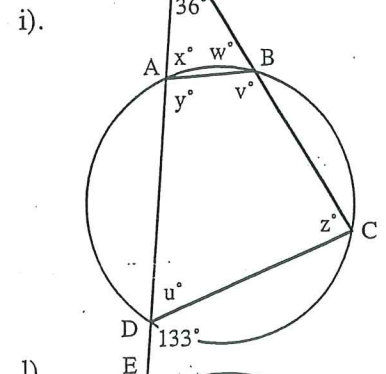
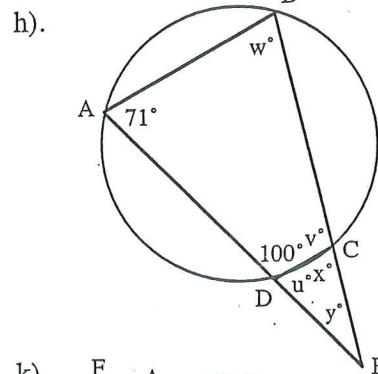
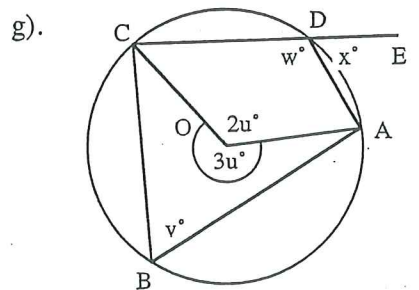
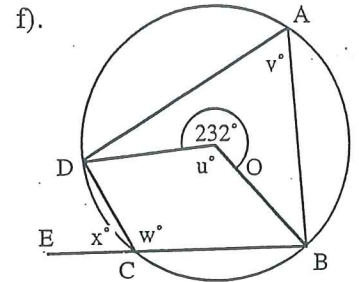
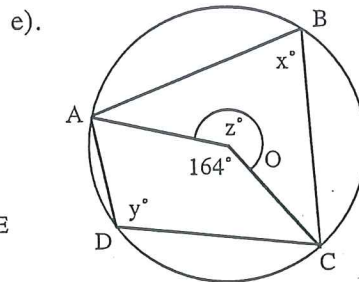
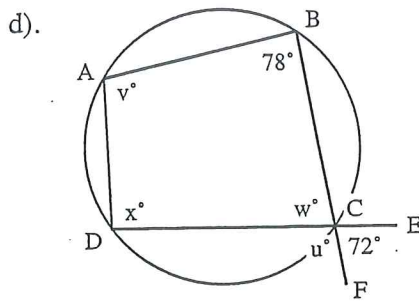
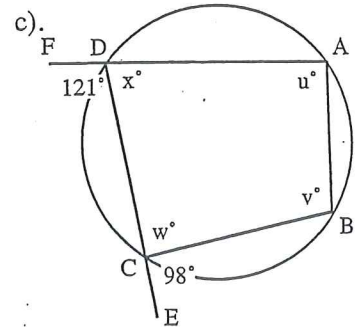
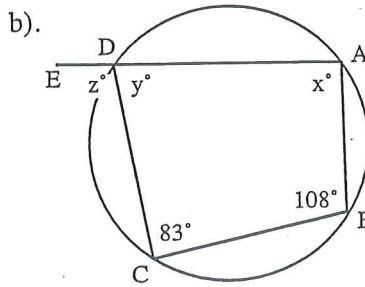
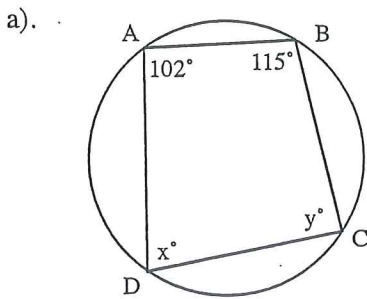
- 1). Draw a circle of any size.  
 Draw a quadrilateral inside the circle as shown in the diagram.  
 Extend one of the sides of the quadrilateral.  
 Measure and record all the angles.  
 Repeat these instructions for another **two** circles. Write your findings.

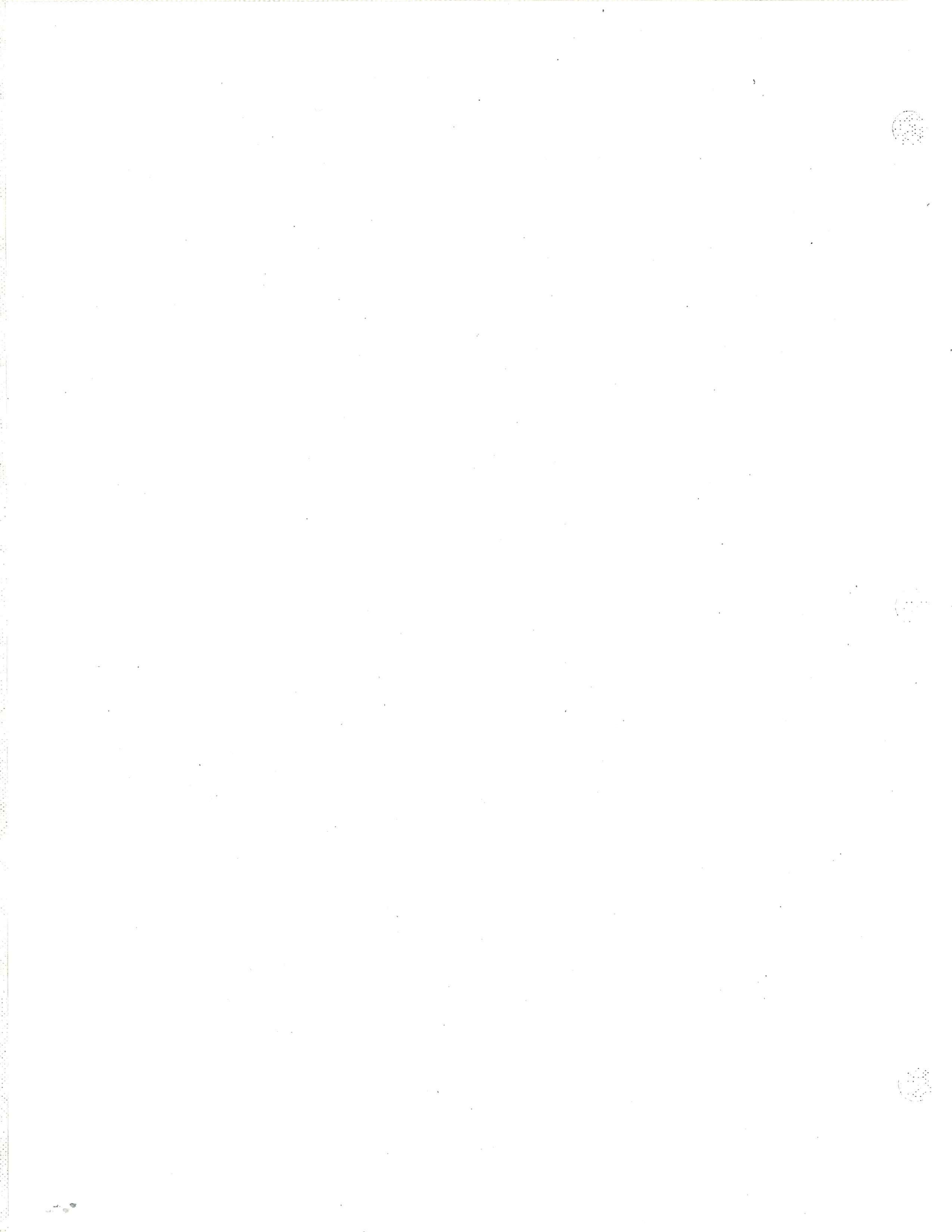


A quadrilateral whose vertices **all** touch the circumference of a circle is called a **cyclic quadrilateral**.

- 2). Copy each of the following diagrams and find the marked angles.  
 Where marked, the letter O represents the centre of the circle.

Diagrams not to scale





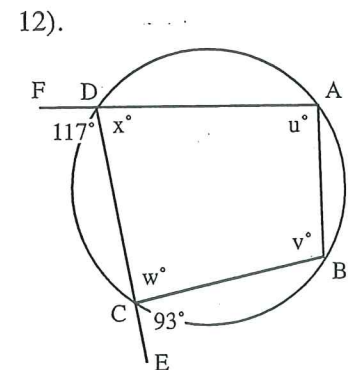
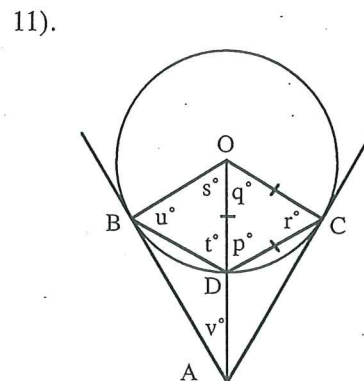
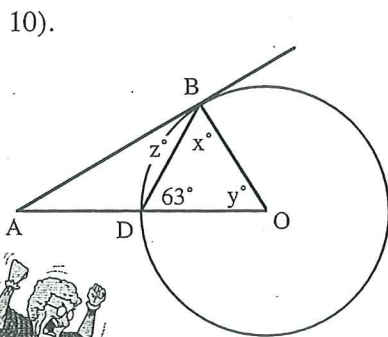
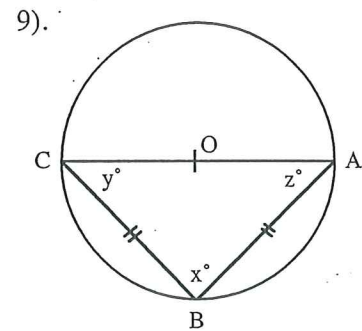
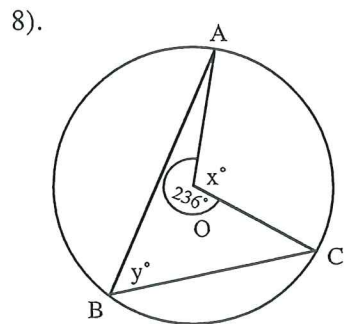
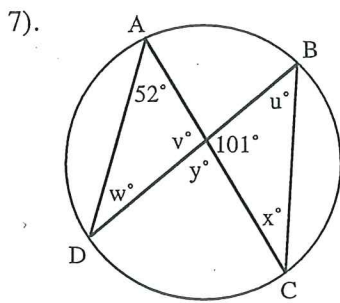
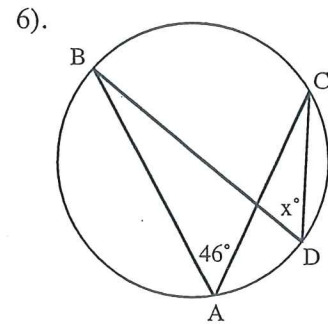
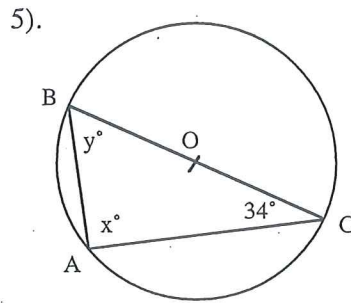
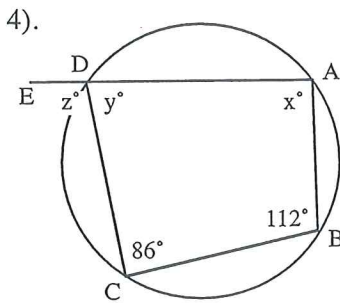
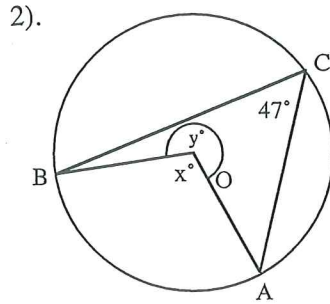
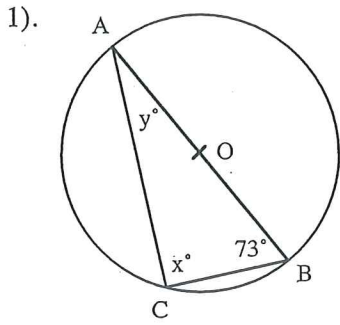
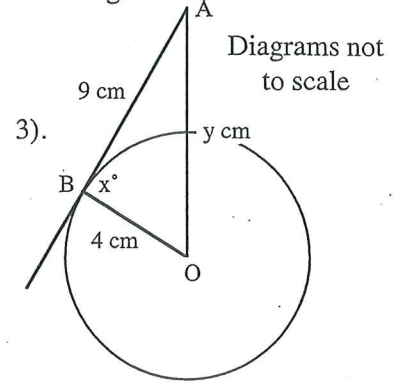


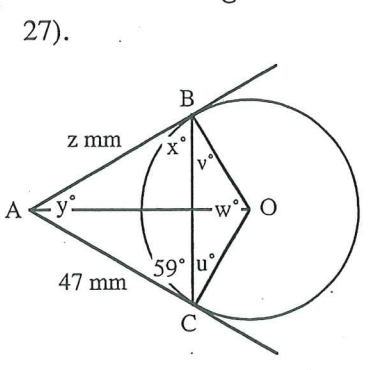
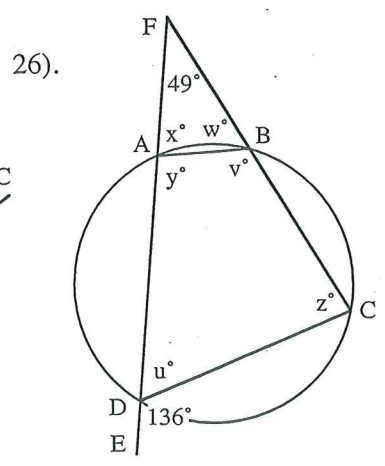
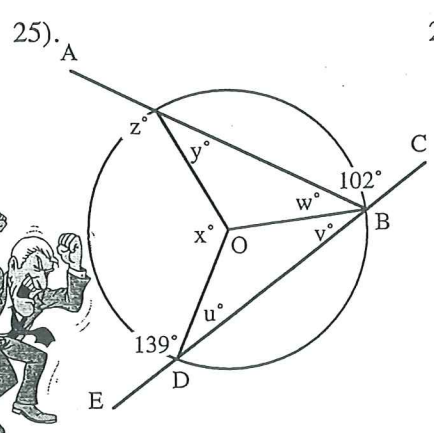
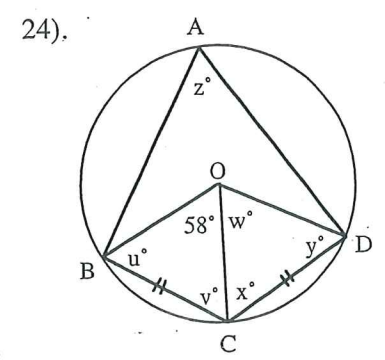
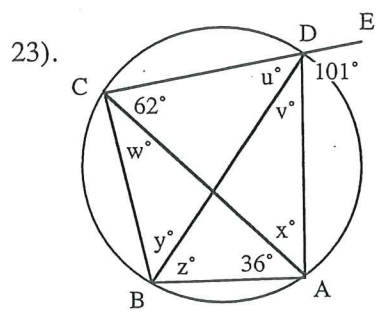
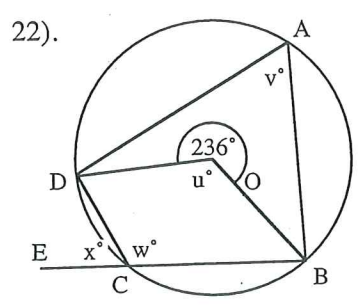
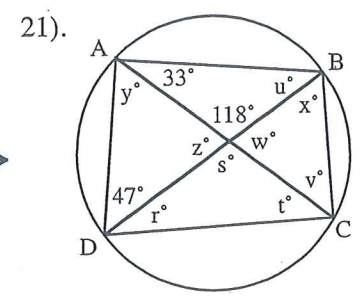
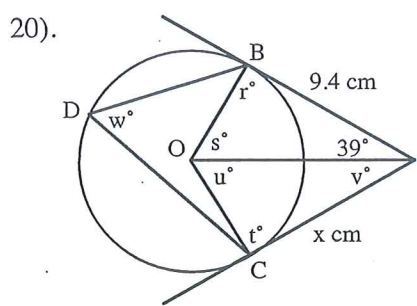
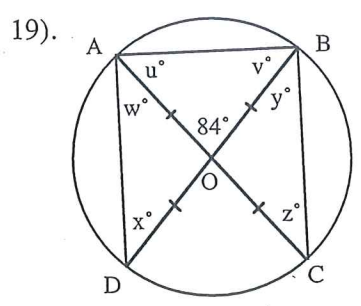
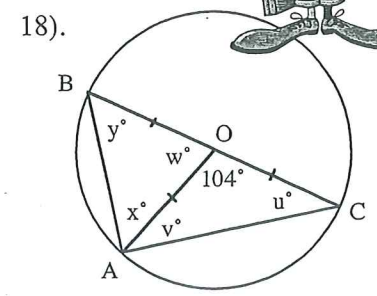
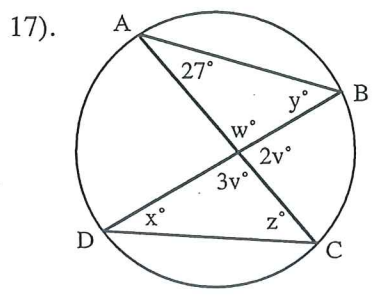
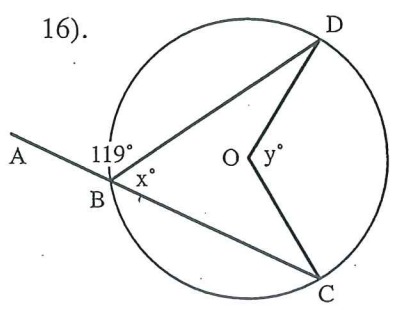
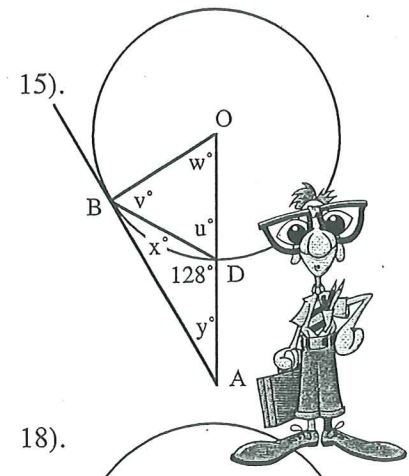
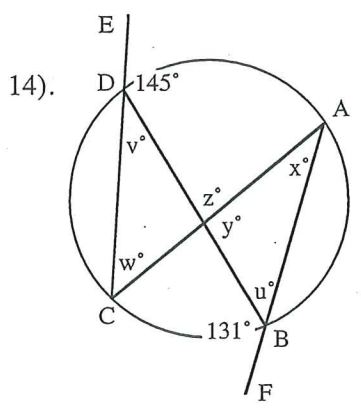
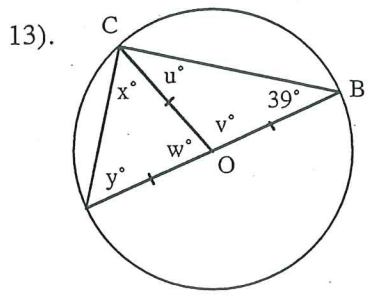
### Circle Properties 4.



#### Mixed Questions.

Copy each of the following diagrams and find the marked angles and lengths.  
The letter O represents the centre of the circle.





# U5 Review Answers (Part 1)

- j).  $u = 32^\circ, v = 32^\circ, w = 116^\circ, x = 58^\circ$   
 k).  $u = 58.5^\circ, v = 58.5^\circ, w = 63^\circ, x = y = 58.5^\circ, z = 63^\circ$   
 l).  $w = 114^\circ, x = 57^\circ, y = 57^\circ$

## Page 17. Circle Properties 2.

- 1). Angle in the same segment are equal  
 2). a).  $x = 64^\circ$     b).  $x = 41^\circ$     c).  $u = 47^\circ, v = 35^\circ, w = 98^\circ, x = 98^\circ$   
 d).  $u = 45^\circ, v = 94^\circ, w = 41^\circ, x = 41^\circ, y = 86^\circ$     e).  $x = 62^\circ, y = 62^\circ$   
 f).  $u = 45^\circ, v = 38^\circ, w = 45^\circ, x = 38^\circ, y = 97^\circ, z = 83^\circ$   
 g).  $u = 53^\circ, v = 37^\circ, w = 37^\circ, x = 53^\circ, y = 106^\circ, z = 74^\circ$   
 h).  $u = 43^\circ, v = 43^\circ, w = 94^\circ, x = 43^\circ, y = 47^\circ, z = 47^\circ$   
 i).  $u = 74^\circ, v = 37^\circ, w = 37^\circ, x = 106^\circ, y = 53^\circ, z = 37^\circ$   
 j).  $v = 60^\circ, w = 120^\circ, x = 32^\circ, y = 28^\circ, z = 28^\circ$   
 k).  $u = 37^\circ, v = 37^\circ, w = 106^\circ, x = 37^\circ, y = 106^\circ$   
 l).  $r = 32^\circ, s = 109^\circ, t = 39^\circ, u = 39^\circ, v = 44^\circ, w = 71^\circ, x = 65^\circ, y = 65^\circ, z = 71^\circ$

## Page 18.

- 1). Opposite angles in a cyclic quadrilateral add up to  $180^\circ$   
 Exterior angle in cyclic quadrilateral is equal to the interior opposite angle.  
 2). a).  $x = 65^\circ, y = 78^\circ$     b).  $x = 97^\circ, y = 72^\circ, z = 108^\circ$   
 c).  $u = 98^\circ, v = 121^\circ, w = 82^\circ, x = 59^\circ$     d).  $u = 108^\circ, v = 108^\circ, w = 72^\circ, x = 102^\circ$   
 e).  $x = 82^\circ, y = 98^\circ, z = 196^\circ$     f).  $u = 128^\circ, v = 64^\circ, w = 116^\circ, x = 64^\circ$   
 g).  $u = 72^\circ, v = 72^\circ, w = 108^\circ, x = 72^\circ$   
 h).  $u = 80^\circ, v = 109^\circ, w = 80^\circ, x = 71^\circ, y = 29^\circ$   
 i).  $u = 47^\circ, v = 133^\circ, w = 47^\circ, x = 97^\circ, y = 83^\circ, z = 97^\circ$   
 j).  $u = 32^\circ, v = 48^\circ, w = 48^\circ, x = 40^\circ, y = 40^\circ, z = 60^\circ$   
 k).  $p = 42^\circ, q = 43^\circ, r = 42^\circ, s = 57^\circ, t = 57^\circ, u = 80^\circ, v = 80^\circ, w = 100^\circ,$   
 $x = 38^\circ, y = 38^\circ, z = 100^\circ$   
 l).  $x = 116^\circ, y = 128^\circ, z = 52^\circ$

## Page 19. Circle Properties 3.

- 1). Tangent to radii is  $90^\circ$ , two tangents from exterior point equal in length.  
 2). a).  $x = 90^\circ, y = 53^\circ$     b).  $x = 90^\circ, y = 13 \text{ cm}$     c).  $x = 90^\circ, y = 13.4 \text{ cm}$   
 d).  $x = 90^\circ, y = 10.4 \text{ m}$     e).  $x = 90^\circ, y = 62^\circ, z = 59^\circ$   
 f).  $x = 36^\circ, y = 108^\circ, z = 54^\circ$     g).  $u = 56^\circ, v = 68^\circ, w = 34^\circ, x = 22^\circ$   
 h).  $u = 50^\circ, v = 50^\circ, w = 80^\circ, x = 40^\circ, y = 10^\circ$   
 i).  $u = 90^\circ, v = 21^\circ, w = 42^\circ, x = 48^\circ, y = 138^\circ, z = 21^\circ$   
 j).  $u = 27^\circ, v = 27^\circ, w = 126^\circ, x = 63^\circ, y = 54^\circ, z = 43 \text{ mm}$   
 k).  $r = 90^\circ, s = 52^\circ, t = 90^\circ, u = 52^\circ, v = 38^\circ, w = 52^\circ, x = 19 \text{ cm}$   
 l).  $p = 60^\circ, q = 60^\circ, r = 60^\circ, s = 60^\circ, t = 60^\circ, u = 60^\circ, v = 30^\circ$

## Page 20.

- A 1). Angles in a semi circle are  $90^\circ$   
 2/3). Correct construction  
 B). 1). Correct construction  
 C). 1/2). Correct construction

## Page 21. Circle Properties 4.

- 1).  $x = 90^\circ, y = 17^\circ$     2).  $x = 94^\circ, y = 266^\circ$     3).  $x = 90^\circ, y = 9.8 \text{ cm}$   
 4).  $x = 94^\circ, y = 68^\circ, z = 112^\circ$     5).  $x = 90^\circ, y = 56^\circ$     6).  $x = 46^\circ$   
 7).  $u = 52^\circ, v = 101^\circ, w = 27^\circ, x = 27^\circ, y = 79^\circ$   
 8).  $x = 124^\circ, y = 62^\circ$     9).  $x = 90^\circ, y = 45^\circ, z = 45^\circ$   
 10).  $x = 63^\circ, y = 54^\circ, z = 27^\circ$     11).  $p = q = r = s = t = u = 60^\circ, v = 30^\circ$   
 12).  $u = 93^\circ, v = 117^\circ, w = 87^\circ, x = 63^\circ$





**Page 22.**

- 13).  $u = 39^\circ, v = 102^\circ, w = 78^\circ, x = 51^\circ, y = 51^\circ$
- 14).  $u = 49^\circ, v = 35^\circ, w = 49^\circ, x = 35^\circ, y = 96^\circ, z = 84^\circ$
- 15).  $u = 52^\circ, v = 52^\circ, w = 76^\circ, x = 38^\circ, y = 14^\circ$
- 16).  $x = 61^\circ, y = 122^\circ$       17).  $v = 36^\circ, w = 108^\circ, x = 27^\circ, y = 45^\circ, z = 45^\circ$
- 18).  $u = 38^\circ, v = 38^\circ, w = 76^\circ, x = 52^\circ, y = 52^\circ$
- 19).  $u = 48^\circ, v = 48^\circ, w = 42^\circ, x = 42^\circ, y = 42^\circ, z = 42^\circ$
- 20).  $r = 90^\circ, s = 51^\circ, t = 90^\circ, u = 51^\circ, v = 39^\circ, w = 51^\circ, x = 9.4 \text{ cm}$
- 21).  $r = 33^\circ, s = 118^\circ, t = 29^\circ, u = 29^\circ, v = 47^\circ, w = 62^\circ, x = 71^\circ, y = 71^\circ, z = 62^\circ$
- 22).  $u = 124^\circ, v = 62^\circ, w = 118^\circ, x = 62^\circ$
- 23).  $u = 36^\circ, v = 43^\circ, w = 43^\circ, x = 39^\circ, y = 39^\circ, z = 62^\circ$
- 24).  $u = 61^\circ, v = 61^\circ, w = 58^\circ, x = 61^\circ, y = 61^\circ, z = 58^\circ$
- 25).  $u = 41^\circ, v = 41^\circ, w = 37^\circ, x = 156^\circ, y = 37^\circ, z = 143^\circ$
- 26).  $u = 44^\circ, v = 136^\circ, w = 44^\circ, x = 87^\circ, y = 93^\circ, z = 87^\circ$
- 27).  $u = 31^\circ, v = 31^\circ, w = 118^\circ, x = 59^\circ, y = 62^\circ, z = 47 \text{ mm}$

**Page 23. Similar Shapes.**

- 1).  $a = j, b = k, c = r, f = u, h = p, i = o, q = v.$

Missing numbers only

- 2). 

1 2 4	1 3 9	1 4 16	1 5 25	4 4 16	4 6 36	4 8 64
9 6 36	9 9 81	9 12 144				

**Page 24.**

Missing numbers only

- 3). 

12 8 6 48	6 12 8 96	5 15 3 45	12 12 4 48	21 14 6 84
15 15 9 135	8 16 8 128	20 15 12 180		
- 4). 

4.5 6 6 18	4 8 4 16	1 6 3 9	6 8 6 24	7.5 10 6 30
3 9 6 27				
- 5). To link the areas multiply by the square of the scale factor
- 6). 

63	7 76	7 528	5 182.5	8.3 15.6
5.6 13.5	3 15.9	2.3 5		
- 7). 36      8). 31.5      9). 14      10). 108
- 11). 76.8      12). 12.3      13). 4.5

**Page 25. Similar Triangles 1.**

Pre-skills

- 1). 2    2). 4    3). 3    4). 4    5). 1.5    6). 8.4    7). 10.8
- 8). 6.75    9). 1    10). 1    11). 2    12). 3    13). 1.25    14). 6.25
- 15). 9.8    16). 10.67    17). 47    18). 17    19). 132    20). 146    21).  $g = h = 129$
- 22). 55    23). 12    24). 63    25). 71    26).  $x = y = 129$

Similar Triangles

- 1).  $a = e, b = c$       d odd      2).  $a = e, c = d$       b odd
- 3).  $a = c, d = e$       b odd      4).  $b = e, c = d$       a odd

**Page 26.**

- 5).  $a = b, c = d$       e odd      6).  $a = b, d = e$       c odd
- 7).  $b = d, c = e$       a odd
- 8). a). i). XY    ii). BC    iii). Z    iv). A  
b). i). YZ    ii). CB    iii). X    iv). A  
c). i). YZ    ii). AC    iii). X    iv). B
- 9).  $ADE = ABC$  (corresp),  $AED = ACB$  (Corresp), A is common. Equiangular
- 10).  $FEG = GIH$  (alt),  $EFG = GHI$  (alt),  $EGF = HGI$  (vert opp). Equiangular.
- 11).  $MON = POQ$  (vert opp),  $PO/ON = QO/OM$  . SAS.
- 12). U common,  $UYX = UVW$  (corresp),  $UXY = UWV$  (Corresp). Equiangular.
- 13).  $BAC = CED$  (alt),  $EDC = CBA$  (alt),  $DCE = ACB$  (vert opp). Equiangular.

