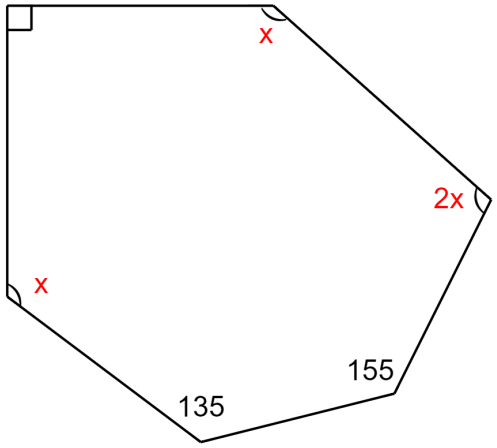
Year 10 Worksheet 2: Geometry

Question 1: Answer the following.

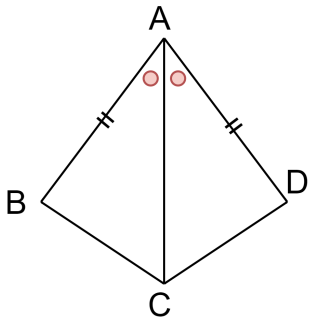
(1) Find the value of x in the hexagon.



A. 70° B. 65° C. 100°

D. 85° E. 55°

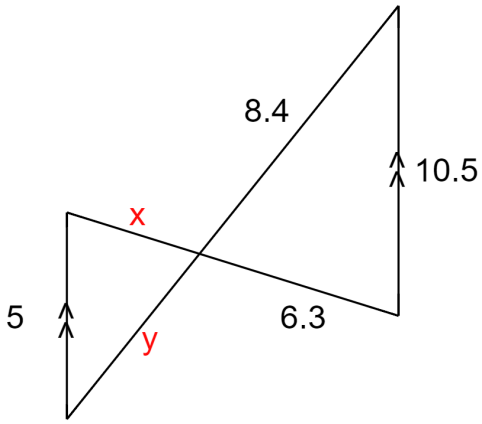
(2) Which test can be used to prove that $\Delta ABC \equiv \Delta ADC$



A. AAS B. AAA C. RHS

D. SSS E. SAS

(3) Find the value of side x in the diagram below.



A. 3 B. 4 C. 5

D. 2 E. 1

(4) Find the value of side y in the diagram.

A. 3 B. 4 C. 5

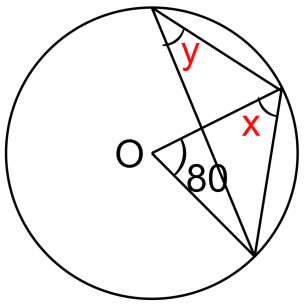
D. 2 E. 1

(5) Find the length of the chord of the circle that has a chord 5 cm from the center and a radius of 7 cm.

A. $2\sqrt{24}$ B. $2\sqrt{32}$ C. $2\sqrt{27}$ D. $7\sqrt{4}$ E. $\sqrt{20}$

(6) Find the value of the pronumerals in the diagram.

A. x = 60°, y = 30°
B. x = 40°, y = 50°
C. x = 50°, y = 40°
D. x = 45°, y = 45°
E. x = 30°, y = 50°

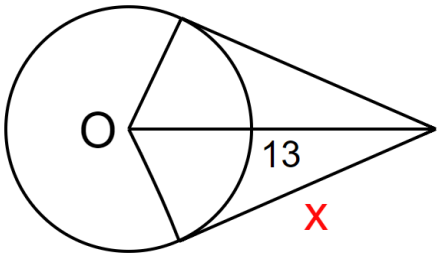


(7) A cyclic quadrilateral has an angle of 82° and another angle of 97°. Find the last two angles.

A. 98°, 83° B. 88°, 93° C. 100°, 81°

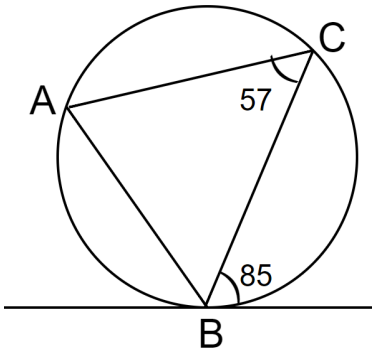
D. 90°, 91° E. 106°, 75°

(8) Find the value of x if the circle has a diameter of 10 cm.



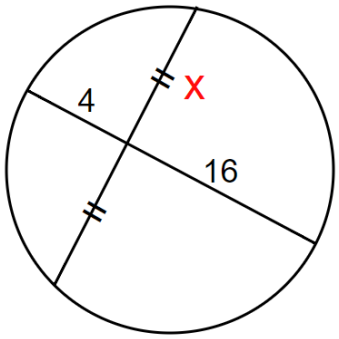
A. 14 B. 10.9 C. 17 D. 15.6 E. 12

(9) According to the alternate segment theorem, find the value of ∠ABC.



A. 57° B. 85° C. 40° D. 38° E. 25°

(10) Using intersecting chords theorem to find the value of x.

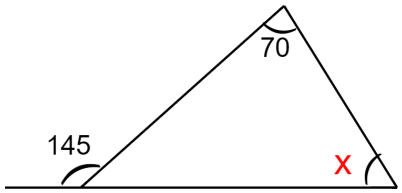


A. 6 B. 7.5 C. 8 D. 3.8 E. 5

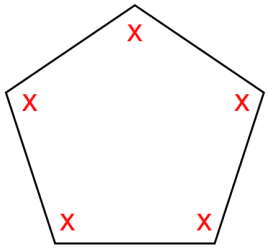
Question 2: Answer the following.

1 Find the value of each pronumeral.

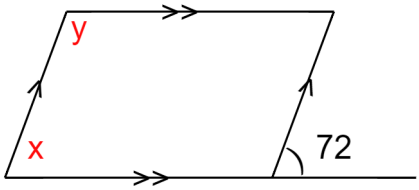
a.



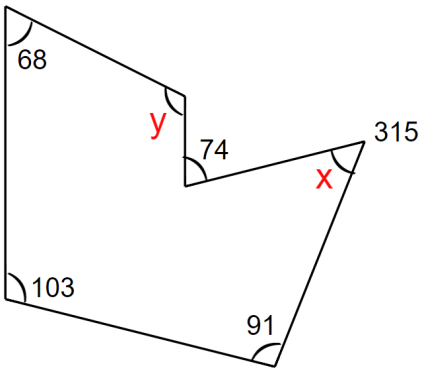
b.

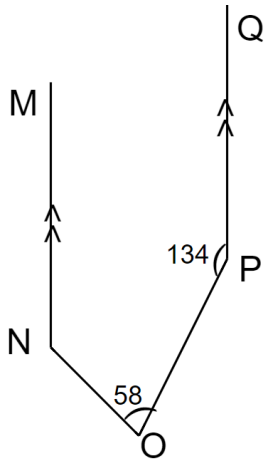
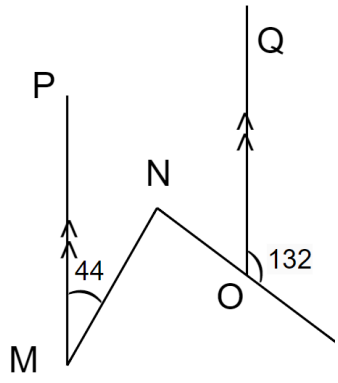


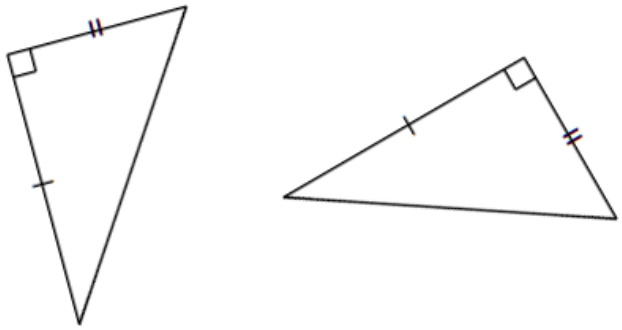
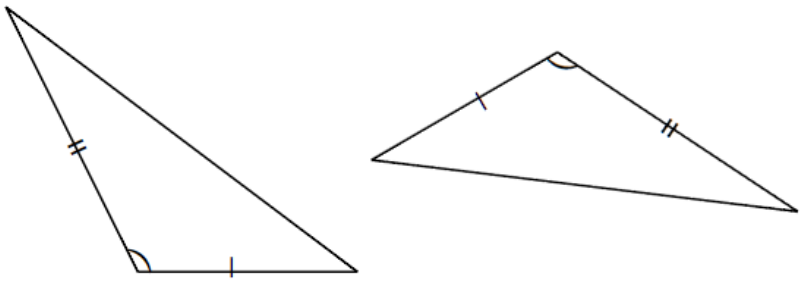
c.



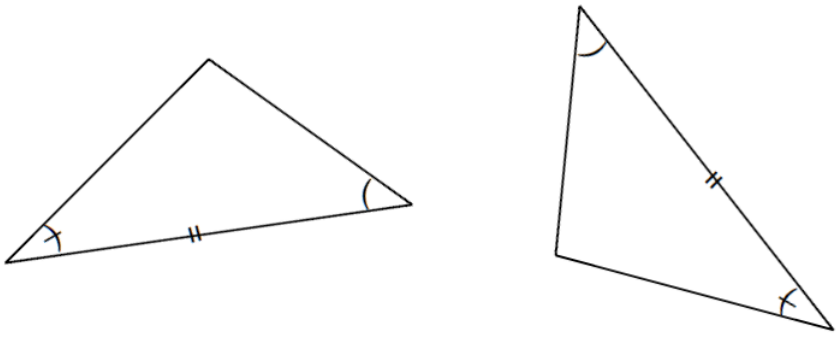
d.



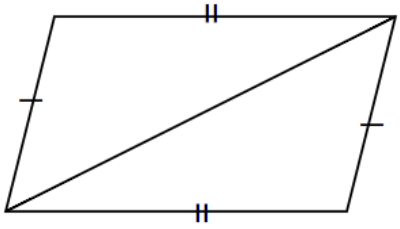
2	By adding a third parallel line, find the value of ∠MNO. a.  b. 

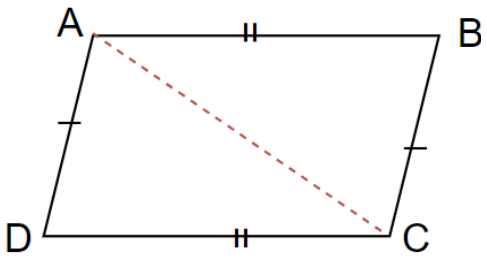
3	Prove the following triangles are congruent. a.  b. 

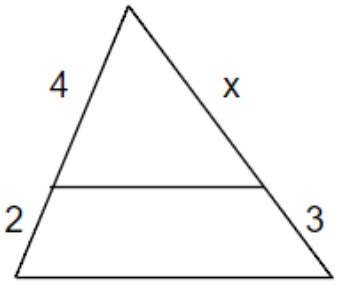
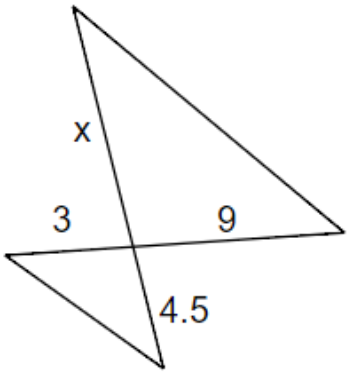
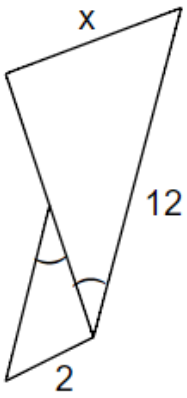
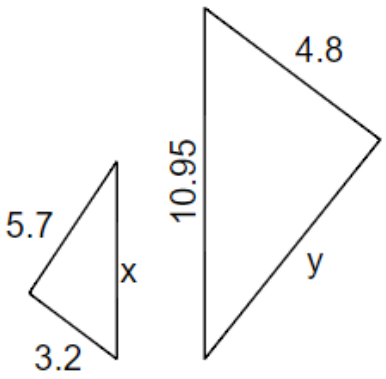
c.



d.

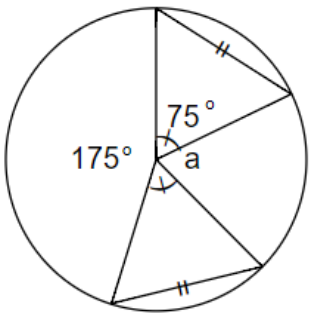


4	a. Prove that $\triangle ABC \equiv \triangle CDA$.  b. Prove that $AB \parallel CD$. c. Prove a quadrilateral ABCD is a parallelogram.

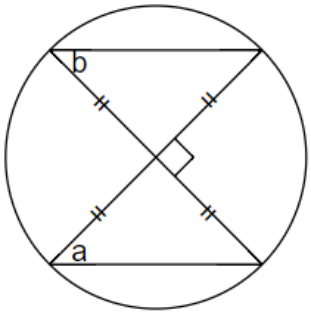
5	Prove each pair of similarity triangles, giving reasons and find the value of the missing sides. a.  b.  c.  d. 

6	Find the missing angles in each diagram.

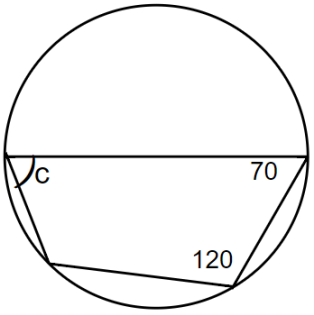
a.



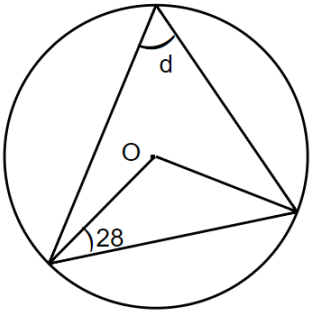
b.



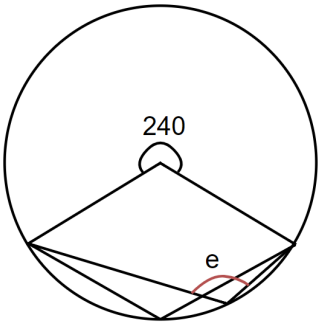
c.



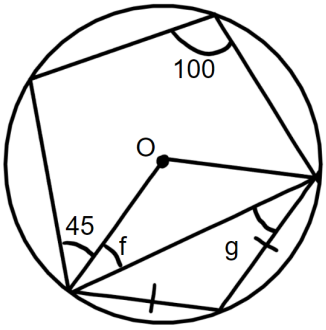
d.



e.

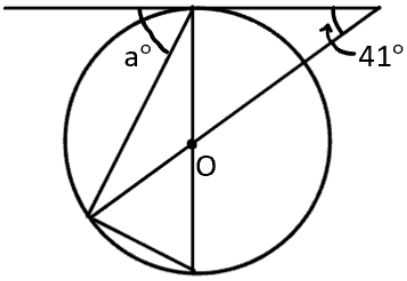


f.

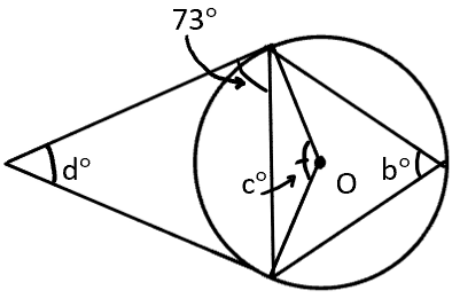


7 Find the missing angles in each diagram.

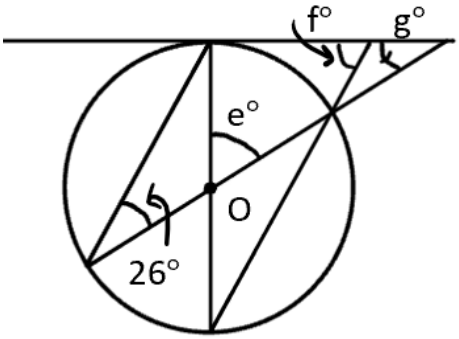
a.

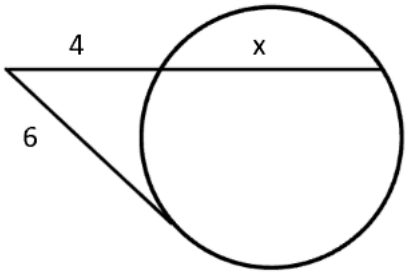
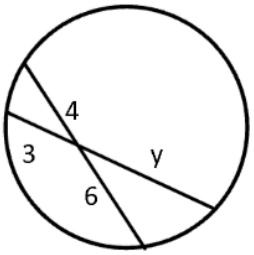
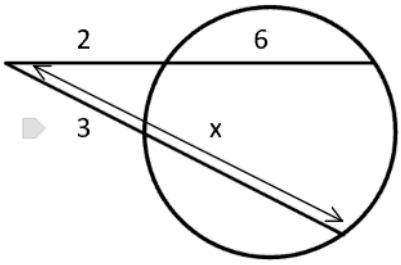


b.



c.



8	Find the missing pronumerals in each diagram. a.  b.  c. 

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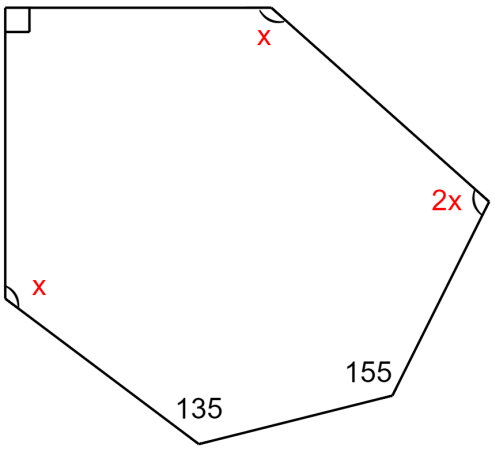
Answer Key

Question 1: Answer the following.

(1) Find the value of x in the hexagon.

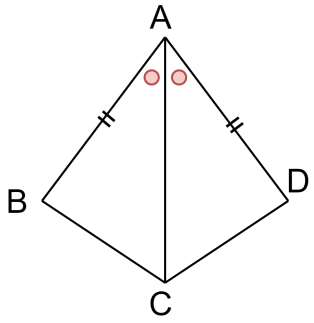


A. 70° B. 65° C. 100°

D. 85° E. 55°

Answer: D. 85°

(2) Which test can be used to prove that $\Delta ABC \equiv \Delta ADC$

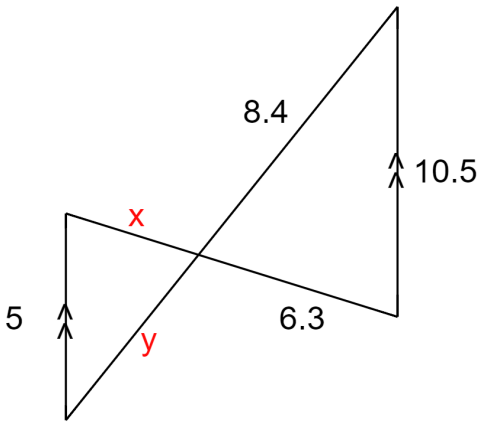


A. AAS B. AAA C. RHS

D. SSS E. SAS

Answer: E. SAS

(3) Find the value of side x in the diagram below.



A. 3 B. 4 C. 5

D. 2 E. 1

Answer: A. 3

(4) Find the value of side y in the diagram.

A. 3 B. 4 C. 5

D. 2 E. 1

Answer: B. 4

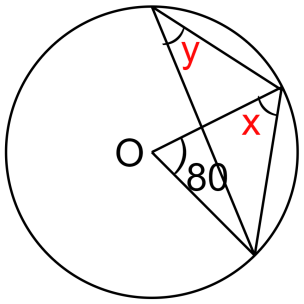
(5) Find the length of the chord of the circle that has a chord 5 cm from the center and a radius of 7 cm.

A. $2\sqrt{24}$ B. $2\sqrt{32}$ C. $2\sqrt{27}$ D. $7\sqrt{4}$ E. $\sqrt{20}$

Answer: A. $2\sqrt{24}$

(6) Find the value of the pronumerals in the diagram.

A. x = 60°, y = 30°
B. x = 40°, y = 50°
C. x = 50°, y = 40°
D. x = 45°, y = 45°
E. x = 30°, y = 50°



Answer: C. x = 50°, y = 40°

(7) A cyclic quadrilateral has an angle of 82° and another angle of 97°. Find the last two angles.

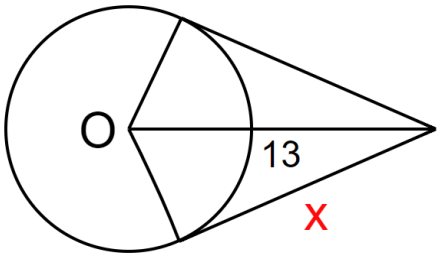
A. 98°, 83° B. 88°, 93° C. 100°, 81° D. 90°, 91° E. 106°, 75°

Answer: A. 98°, 83°

(8) Find the value of x if the circle has a diameter of 10 cm.

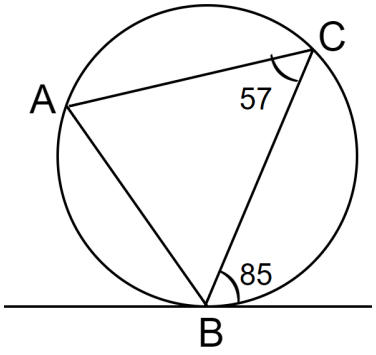
A. 14 B. 10.9 C. 17

D. 15.6 E. 12



Answer: E. 12

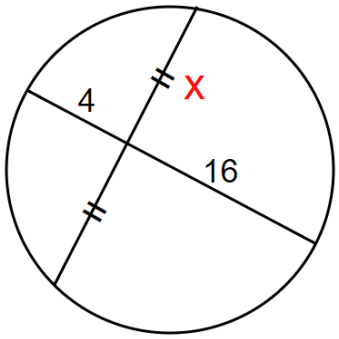
(9) According to the alternate segment theorem, find the value of ∠ABC.



A. 57° B. 85° C. 40° D. 38° E. 25°

Answer: D. 38°

(10) Using intersecting chords theorem to find the value of x.



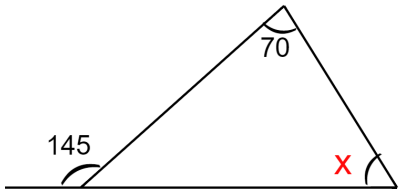
A. 6 B. 7.5 C. 8 D. 3.8 E. 5

Answer: C. 8

Question 2: Answer the following.

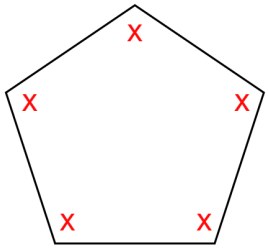
1 Find the value of each pronumeral.

a.



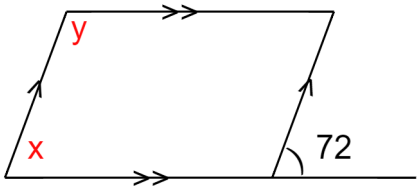
x = 145 - 70 = 75°

b.



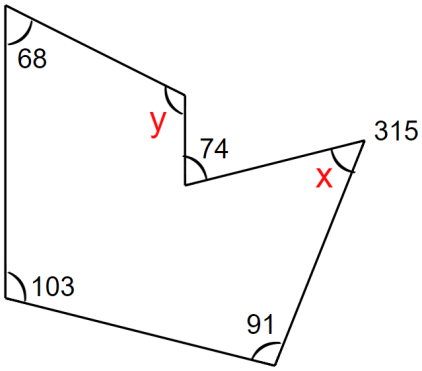
x = 108°

c.



x = 72°, y = 108°

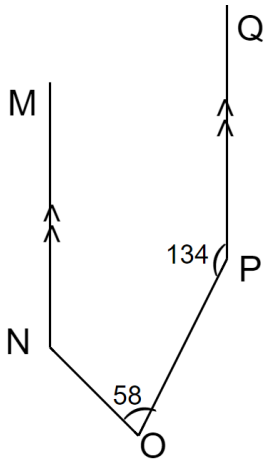
d.



x = 45°, y = 127°

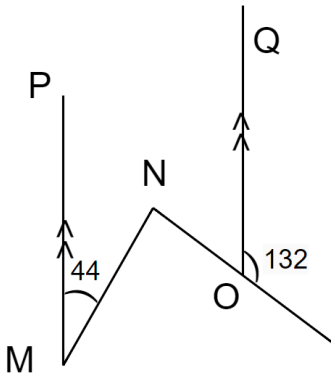
2 By adding a third parallel line, find the value of ∠MNO.

a.

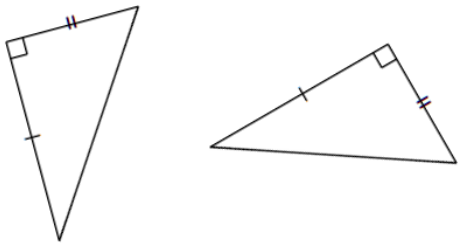
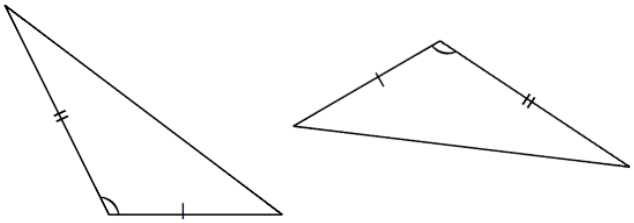
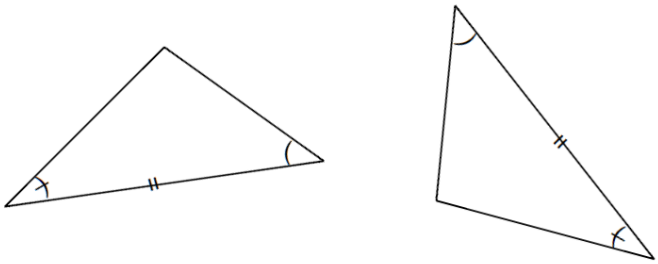
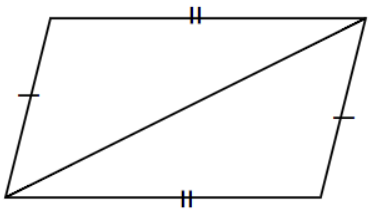


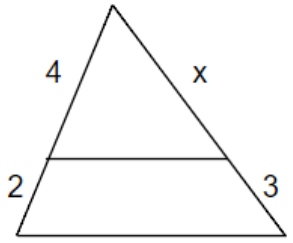
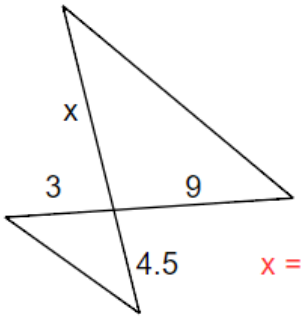
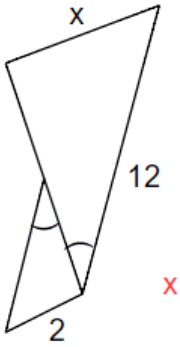
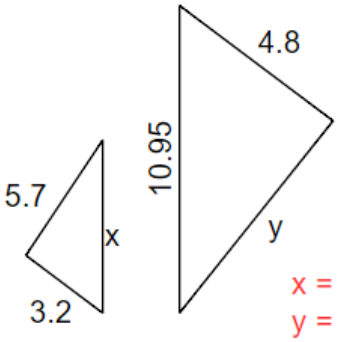
∠MNO = 168°

b.

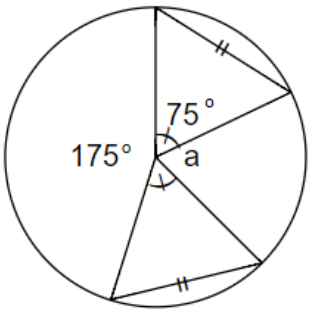


∠MNO = 92°

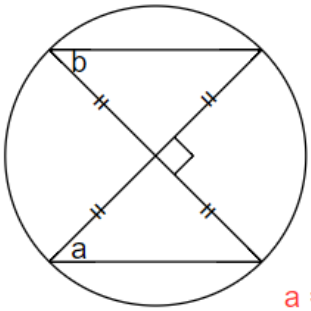
3	Prove the following triangles are congruent. a.  ANS: A right angle, the hypotenuse. b.  ANS: Two sides are equal and the angle between the two sides is equal (SAS: side, angle, side) c.  ANS: Two angles are the same and a corresponding. side is the same (ASA: angle, side, angle) d.  ANS: The three sides are equal (SSS: side, side, side)

4	a. Prove that $\triangle ABC \equiv \triangle CDA$. The three sides are equal (SSS: side, side, side) b. Prove that $AB \parallel CD$. Since $\triangle ABC \equiv \triangle CDA$, $\angle ACD = \angle BAC$ Thus, $AB \parallel CD$ (alternate angle) c. Prove a quadrilateral ABCD is a parallelogram. Similarly, $\angle DAC = \angle BCD$ Thus, $AD \parallel CB$ We have $AB \parallel CD$ and $AD \parallel CB$, thus ABCD is a parallelogram.
5	Prove each pair of similarity triangles, giving reasons and find the value of the missing sides.  x = 4.7  x = 13.5  x = 8  x = 7.3 y = 8.55

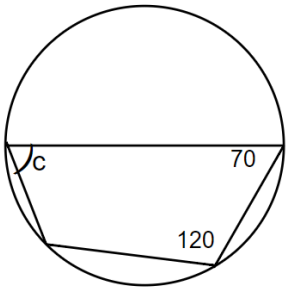
6



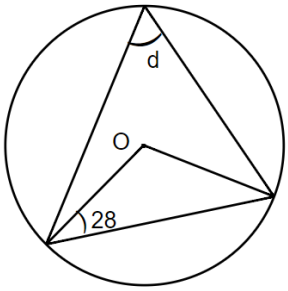
a = 35



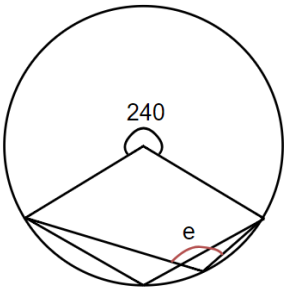
a = b = 45



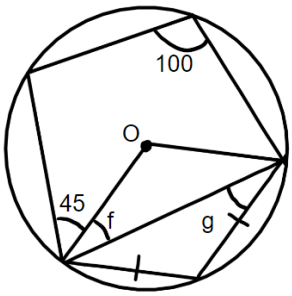
c = 180 - 120 = 60
(supplementary quadrilateral)



O = 124, d = 62
(angle at the centre)

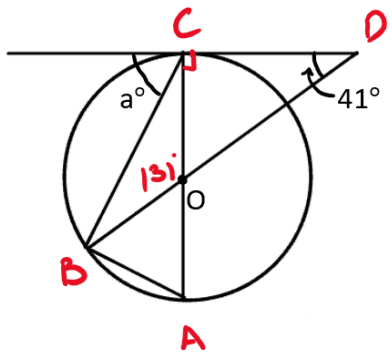


e = 240 / 2 = 120
(angle in a semicircle)



(45 + f) + 100 = 180
(supplementary quadrilateral)
f = g = 35 (alternate angles)

7 a.



① Consider ΔDOC

$\angle DCO = 90^\circ$

$\therefore \angle DOC = 90 - 41$

$= 49^\circ$

② $\angle DOC + \angle BOC = 180^\circ$

$\therefore \angle BOC = 180 - 49^\circ$

$= 131^\circ$

③ Consider ΔOBC

$\angle OCB = \angle OBC = (180 - 131)/2$

$= 24.5^\circ$

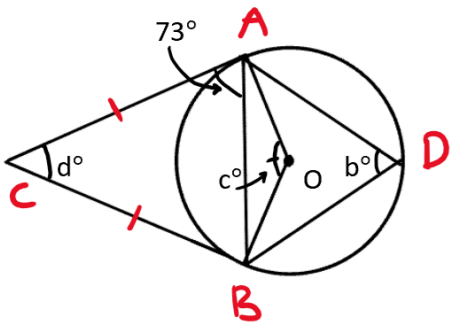
④ $\angle OCE = 90^\circ$

$= \angle OCB + a^\circ$

$= 24.5 + a^\circ$

$\therefore a^\circ = 65.5^\circ$

b.



$\angle ABC = \angle BAC = 73^\circ$

⊕ Consider ΔABC

$\angle ACB = d^\circ = 180^\circ - (73^\circ \times 2)$

$\hookrightarrow d = 34^\circ$

⊕ $\angle OAC = \angle OBC = 90^\circ$ (tangent)

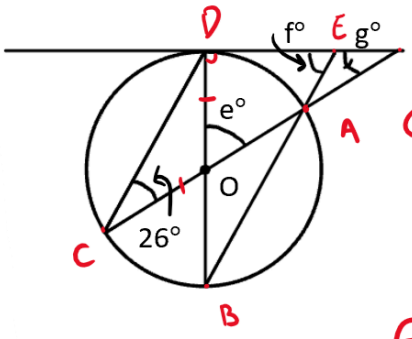
$\therefore \angle OAB = \angle OBA = 90 - 73^\circ$

$= 17^\circ$

Thus $c^\circ = 180 - (17 \times 2) = 146^\circ = c$

⊕ $b^\circ = c^\circ / 2 = 73^\circ = b$

C.



① $\angle EDB = 90°$

$\therefore \angle BED = 180° - (90° + 26°)$

$= 64° = f°$

② $\angle FDC = \angle FDB + \angle BDC$

$= 90° + 26° = 116°$

Consider $\triangle FDC$

Now $\angle CFD = 180° - 116° - 26°$

$= 38° = g°$

③ $\angle ODC = \angle OCD = 26°$ (isoceles $\triangle$)

$\therefore \angle DOC = 180 - (2 \times 26)$

$= 128°$

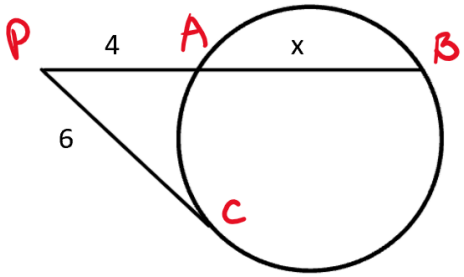
Thus $e° = 180° - 128°$

$= 52°$

OR $e° = 2 \times 26° = 52°$

8

a.

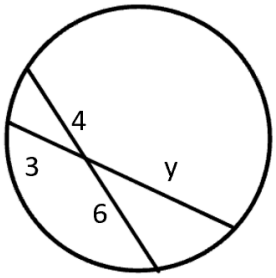


$AP \times BP = CP^2$

$4x = 36$

$x = 9$

b.

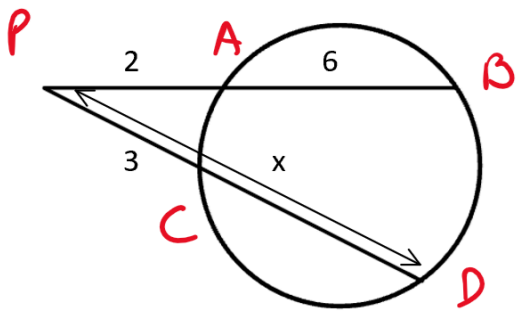


$4 \times 6 = 3y$

$24 = 3y$

$\therefore y = 8$

c.



$AP \times BP = CP \times DP$

$2 \times 12 = 3 \times x$

$\therefore x = 8$