
ANGLE CHASING

In the earlier topic of Basic Geometry, we learnt and revised some concepts related to

- Point, Line, Segment, Ray,
- Intersecting Lines and Angles formed by them,
- Parallel Lines and angles formed by them,
- Types of Triangles
- Types of Quadrilaterals
- Types of Polygons

In this topic , we will be applying all these concepts to find the values of angles in various geometric figures . While doing so , we will also prove some theorems already learnt in the previous topic.

Classwork:

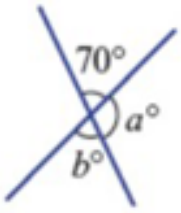
1. List the names of all Polygons with $3 - 10$ sides inclusive.

2. Decide if each of the following is true or false.

(a) The angle sum of a quadrilateral is $300°$.
(b) A square has 4 lines of symmetry.
(c) An isosceles triangle has two equal sides.
(d) An exterior angle on an equilateral triangle is $120°$.
(e) A kite has two pairs of equal opposite angles.

3. Find the values of the pronumerals giving reasons.

a)



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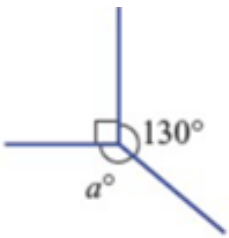

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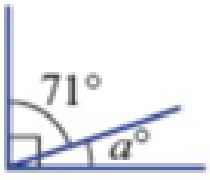

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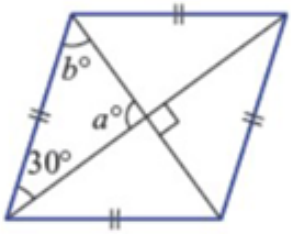

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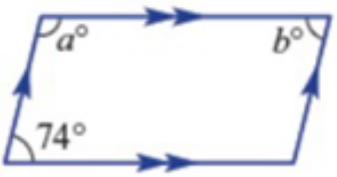
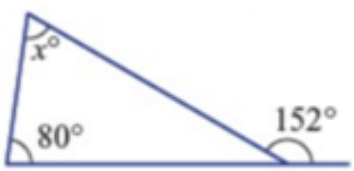
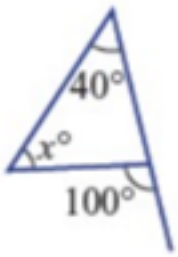
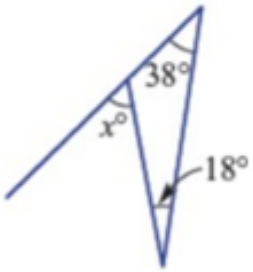


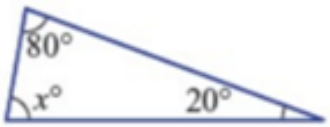
4. Using the exterior angle theorem, find the value of the pronumeral.

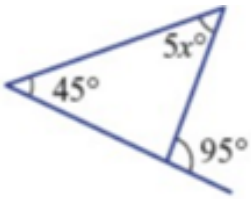
a) 

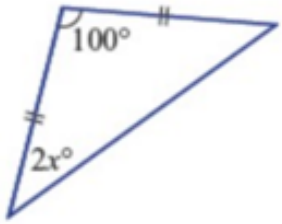
b) 

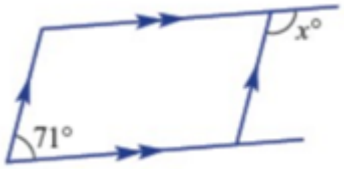
c) 

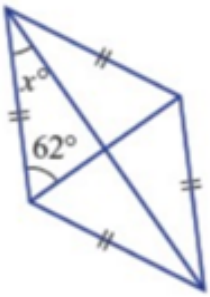
5. Find the value of the pronumeral, giving reasons.

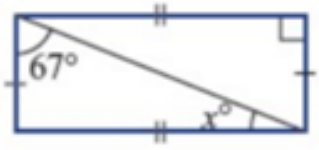
a) 

b) 

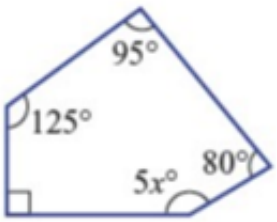
c) 

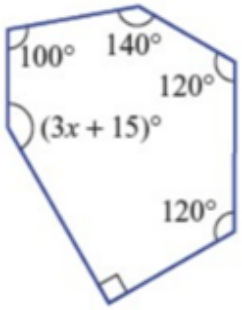
d) 

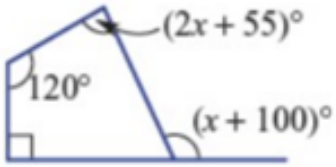
e) 

f) 

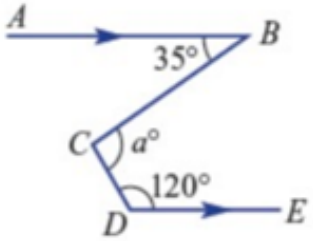
6. Find the value of x in the following, giving reasons.

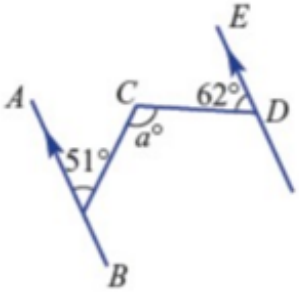
a) 

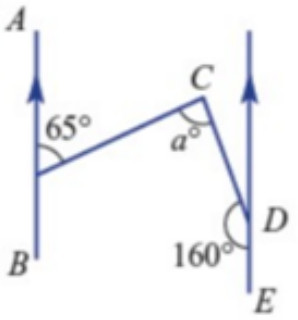
b) 

c) 

7. Find the value of the pronumeral a, giving reasons.

a) 

b) 

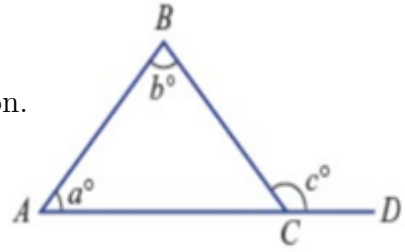
c) 

8. Find the value of x in this diagram giving reasons.
Hint: Form isosceles and/or equilateral triangles.

9. Prove that the exterior angle of a triangle is equal to the sum of the two opposite interior angles by following these steps.

a) Write $\angle BCA$ in terms of a and b and give a reason.

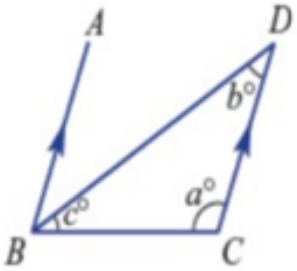
b) Find c in terms of a and b using $\angle BCA$ and give a reason.



10. a) Explain why in this diagram $\angle ABD$ is equal to $b°$.

b) Using $\angle ABC$ and $\angle BCD$ what can be said about a, b and c ?

c) What does your answer to part b show?



Homework:

1. Find the size of an interior angle of these polygons, if they are regular.

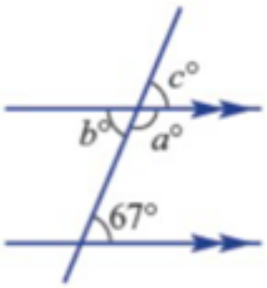
(a) Pentagon (b) Octagon (c) Decagon

2. State whether the following statements are True or False

(a) A parallelogram is a rhombus.
(b) A square is a rectangle.
(c) Vertically opposite angles are supplementary.
(d) Co-interior angles in parallel lines are supplementary.

3. Find the values of pronumerals giving reasons

a)



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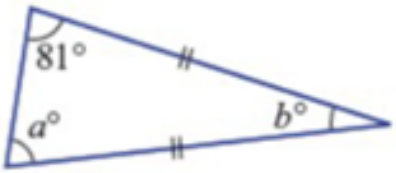

c)

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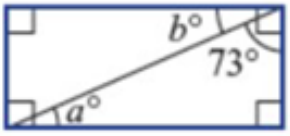
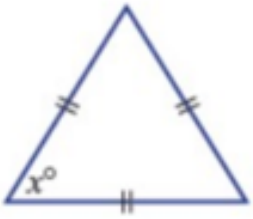


4. a) Find the size of an interior angle of a regular polygon with 100 sides.

   b) What is the size of an exterior angle of a 100-sided regular polygon?

5. Find the value of the pronumeral, giving reasons.

a)



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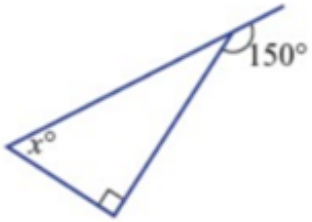

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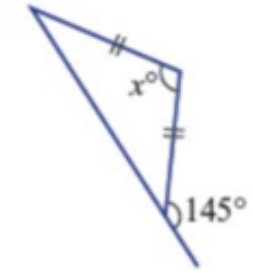
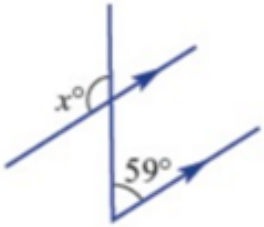


d)



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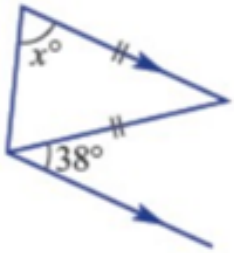

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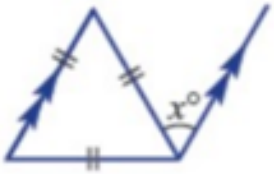
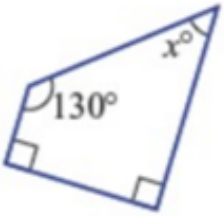


6. Find the value of x in the following, giving reasons.

a)



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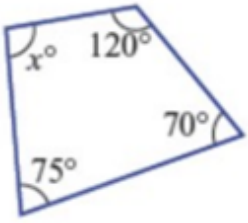

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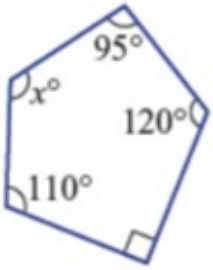
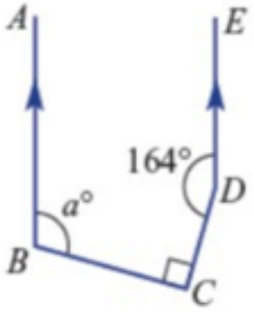
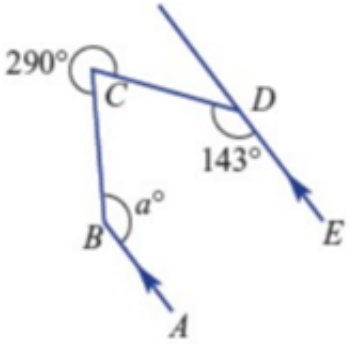
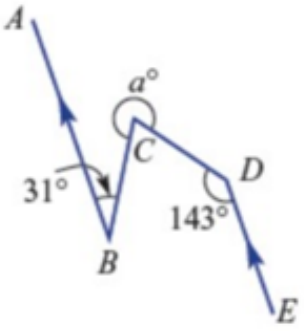


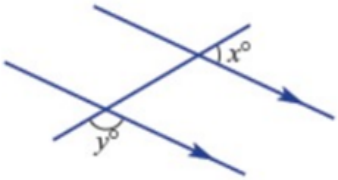
7. Find the value of the pronumeral 'a' giving reasons.

a) 

b) 

c) 

8. In this diagram $y = 4x$. Find the values of x and y.



9. The rule for the sum of the interior angles of a polygon is given by $S = 180(n - 2)$.

(a) Show that $S = 180n - 360$.

(b) Find a rule for the number of sides n of a polygon with an angle sum S, i.e. write n in terms of S.

(c) Write the rule for the size of an interior angle I of a regular polygon with n sides.

(d) Write the rule for the size of an exterior angle E of a regular polygon with n sides.

10. Find the number of sides of a polygon that has the following interior angles.

(a) 150° (b) 162° (c) 172.5°

Answer Key:

Classwork:

Q. no.	Answer
1	3-Triangle, 4-Quadrilateral, 5-Pentagon, 6-Hexagon, 7-Heptagon, 8-Octagon, 9-Nanogon, 10-Decagon
2	(a) False (b) True (c) True (d) True (e) False
3	(a) $a = 110°,\ b = 70°$ (b) $a = 140°$ (c) $a = 19°$ (d) $a = 90°,\ b = 60°$ (e) $a = 106°,\ b = 74°$
4	(a) $72°$ (b) $60°$ (c) $56°$
5	(a) $80°$ (b) 10 (c) 20 (d) $109°$ (e) $28°$ (f) $23°$
6	(a) 30 (b) 45 (c) 15
7	(a) $95°$ (b) $113°$ (c) $85°$
8	$115°$
9	**-**
10	**-**

Homework:

Q. no.	Answer
1	(a) $108°$ (b) $135°$ (c) $144°$
2	(a) False (b) True (c) False (d) True
3	(a) $a = 113°,\ b = c = 67°$ (b) $a = 81°,\ b = 18°$ (c) $a = 17°,\ b = 102°$ (d) $a = b = 17°$
4	(a) $176.4°$ (b) $3.6°$
5	(a) $60°$ (b) $60°$ (c) $110°$ (d) $121°$ (e) $71°$ (f) $60°$
6	(a) $50°$ (b) $95°$ (c) $125°$
7	(a) $106°$ (b) $147°$ (c) $292°$
8	$x = 36°,\ y = 144°$
9	(a) (b) $n = \frac{s + 360}{180}$ (c) $I = \frac{180(n-2)}{n}$ (d) $E = \frac{360}{n}$
10	(a) 12 (b) 20 (c) 48