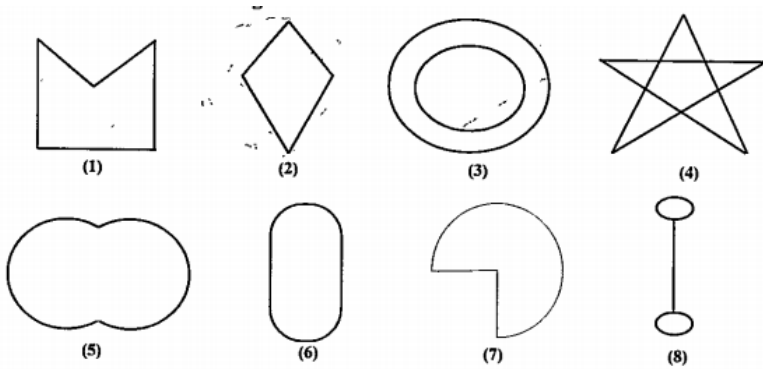# MATHS

BOOKS - ASHOK PUBLICATION ASSAM

Understanding Quadrilaterals.

Example

1. Given here are some figures.

Classify each of them on the basis of the following.
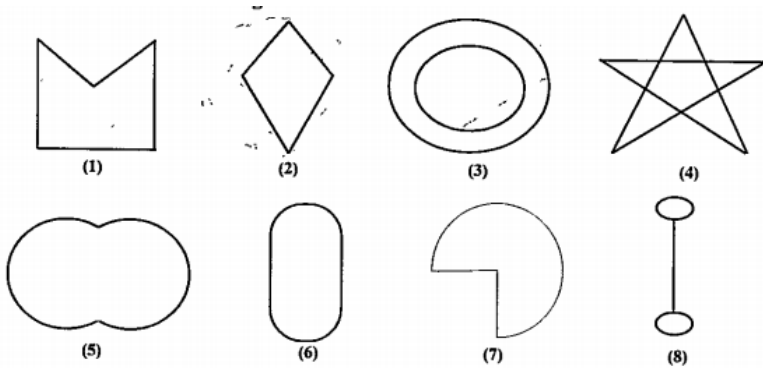
Simple curve

2. Given here are some figures.

Classify each of them on the basis of the following.

Simple curve

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3. Given here are some figures.

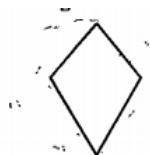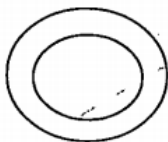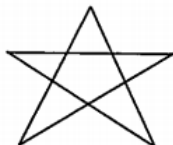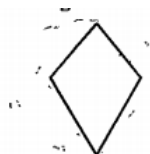Classify each of them on the basis of the following.

Convex polygon

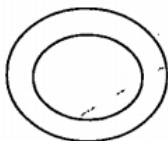**4.** Given here are some figures.

Classify each of them on the basis of the following.

Concave polygon.

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5. How many diagonals does each of the following have?

A convex quadrilateral.

▶ Watch Video Solution

6. How many diagonals does each of the following have?

A regular hexagon

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7. How many diagonals does each of the following have?

A triangle

8. What is the sum of the measures of the angles of a convex quadrilateral? Will this property hold if the quadrilateral is not convex? (Make non-convex quadrilateral and try!)

9. Examine the table. (Each figure is divided into triangles and the sum of the angles deduced from that.)

Figure				
Side	3	4.	5	6
Angle sum	$180°$	$2 \times 180°$ $= (4-2) \times 180°$	$3 \times 180°$ $= (5-2) \times 180°$	$4 \times 180°$ $= (6-2) \times 180°$

What can you say about the angle sum of a convex polygon with number of sides?

7

10. Examine the table. (Each figure is divided into triangles and the sum of the angles deduced from that.)

Figure				
Side	3	4.	5	6
Angle sum	180°	$2 \times 180°$ $= (4-2) \times 180°$	$3 \times 180°$ $= (5-2) \times 180°$	$4 \times 180°$ $= (6-2) \times 180°$

What can you say about the angle sum of a convex polygon with number of sides?

8

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11. Examine the table. (Each figure is divided into triangles and the sum of the angles deduced from that.)

Figure				
Side	3	4	5	6
Angle sum	180°	2×180° =(4−2)×180°	3×180° =(5−2)×180°	4×180° =(6−2)×180°

What can you say about the angle sum of a convex polygon with number of sides?

10

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12. Examine the table. (Each figure is divided into triangles and the sum of the angles deduced from that.)

Figure				
Side	3	4.	5	6
Angle sum	180°	$2 \times 180°$ $= (4-2) \times 180°$	$3 \times 180°$ $= (5-2) \times 180°$	$4 \times 180°$ $= (6-2) \times 180°$

What can you say about the angle sum of a convex polygon with number of sides?

n

13. What is regular polygon?

State the name of a regular polygon of

3 sides

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14. What is regular polygon?

State the name of a regular polygon of

4 sides

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15. What is regular polygon?

State the name of a regular polygon of

6 sides

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16. Find the angle measure x in the following

figures.

(a)
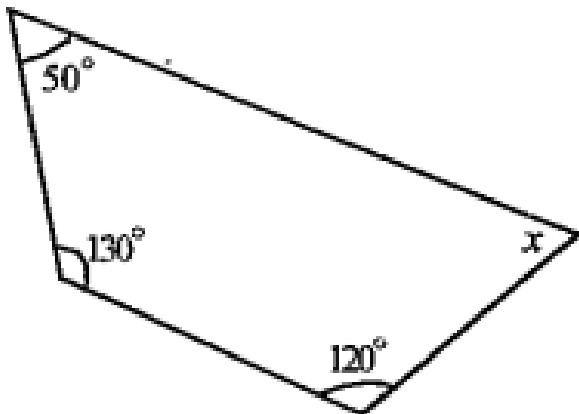
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17. Find the angle measure x in the following figures.
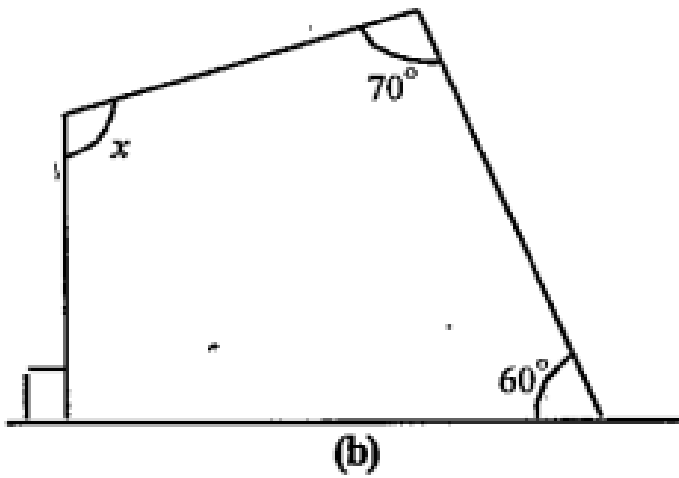
(b)

18. Find the angle measure x in the following figures.
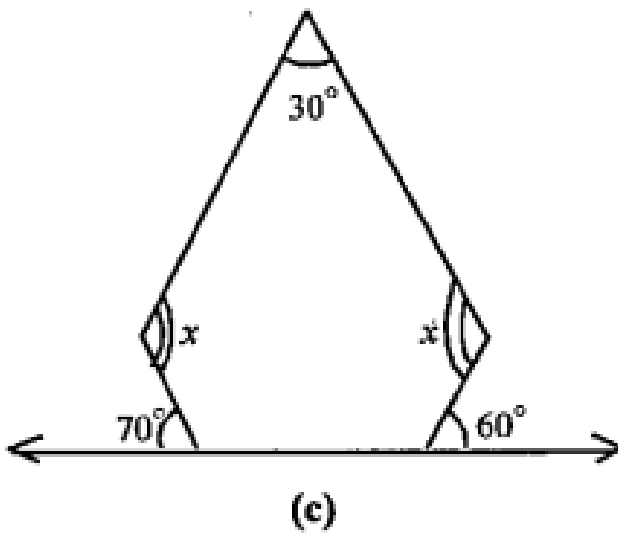
(c)

19. Find the angle measure x in the following figures.

(d)

20.

Find

$$x + y + z$$

21.
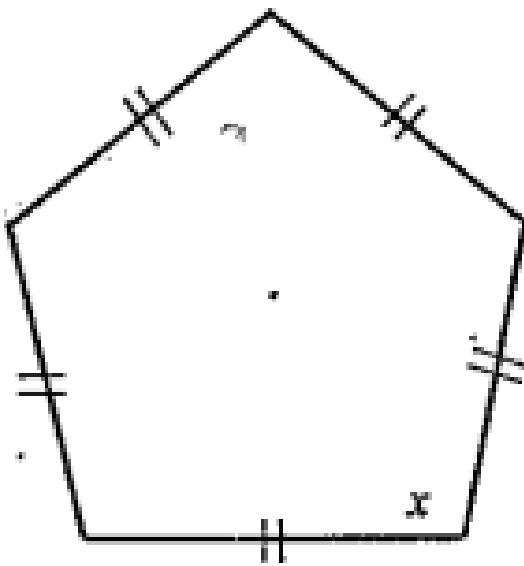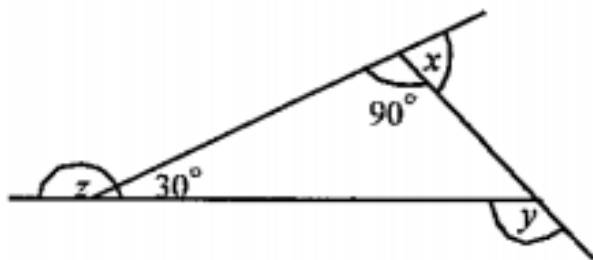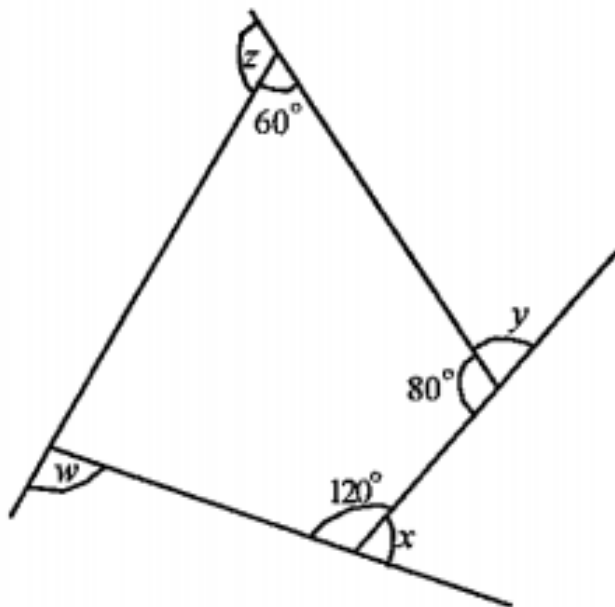
Find

$$x + y + z + w$$

22. Find x in the folloiwng figures.

(a)
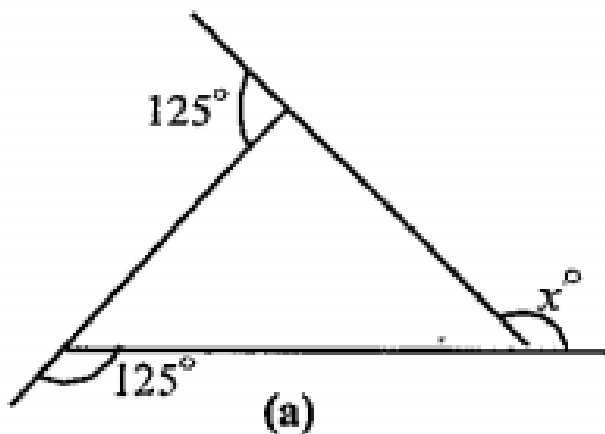
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23. Find x in the folloiwng figures.

(b)
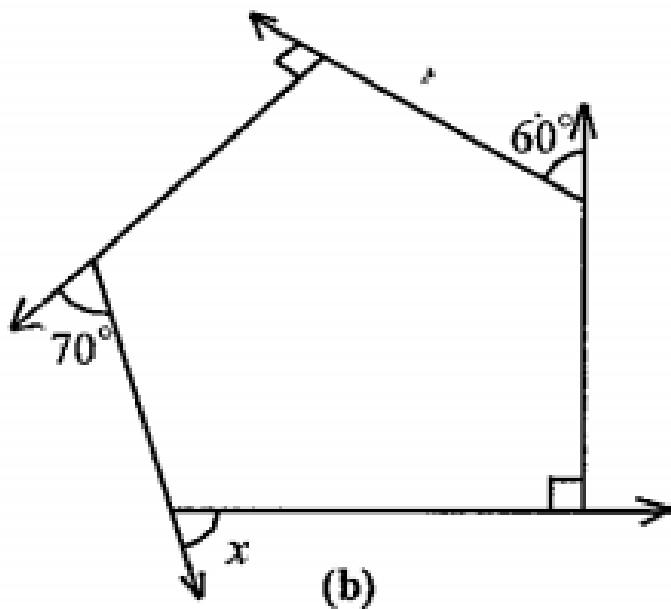
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24. Find the measure of each exterior angle of

a regular polygon of

9 sides

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25. Find the measure of each exterior angle of

a regular polygon of

15 sides

▶ Watch Video Solution

26. How many sides does a regular polygon have if the measure of an exterior angle is $24°$?

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27. How many sides does a regular polygon have if each of its interior angles is $165°$?

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28. Is it possible to have a regular polygon with measure of each exterior angle as $22°$?

29. Can 22 degree be an interior angle of a regular polygon? Why?

30. What is the minimum interior angle possible for a regular polygon? Why?

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31. What is the maximum exterior angle possible for a regular polygon?

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32. Given a parallelogram ABCD, Complete each statement along with the definition or property used.

AD = _____
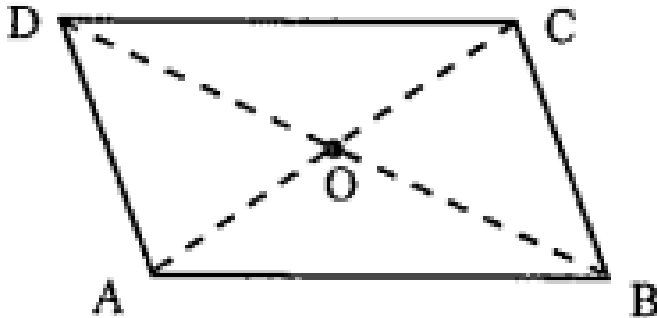
33. Given a parallelogram ABCD, Complete the statement along with the definition or property used.
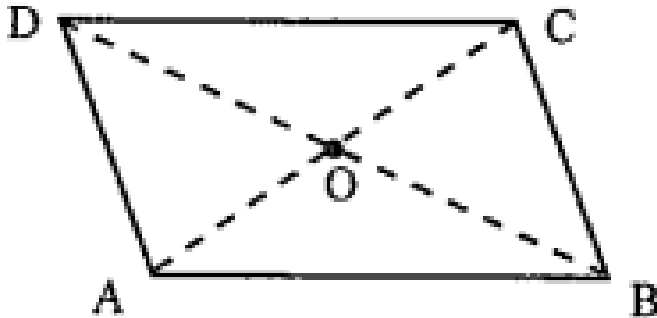
$\angle DCB$ = _____

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34. Given a parallelogram ABCD, Complete each statement along with the definition or property used.

AD = _____
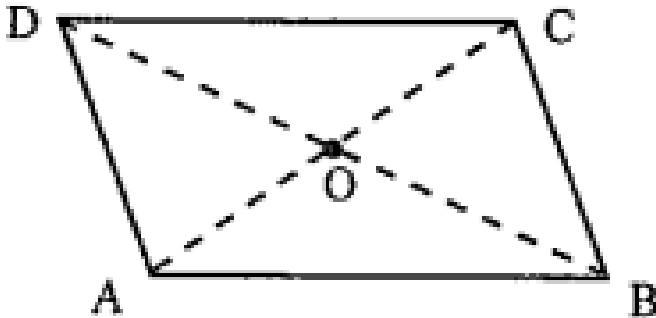
35. Given a parallelogram ABCD, Complete each statement along with the definition or property used.
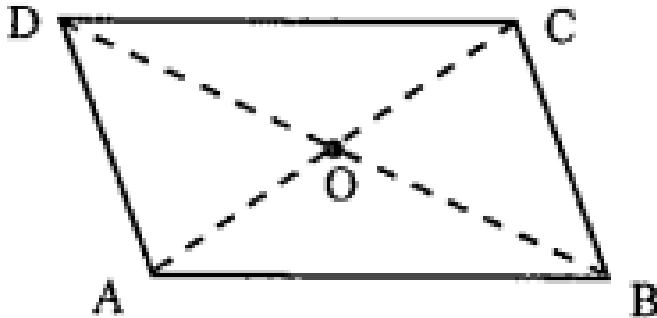
$m\angle DAB + m\angle CDA =$ _____

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36. Consider the following parallelograms.

Find the values of the unknowns x, y, z.

(i)
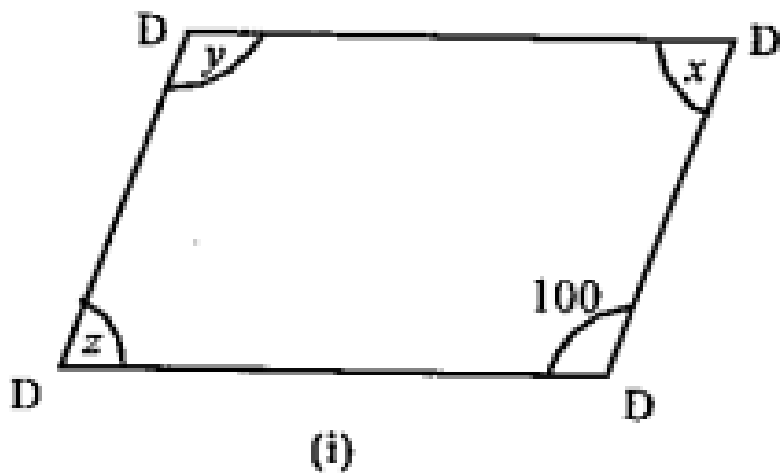
37. Consider the following parallelograms. Find the values of the unknowns x, y, z.

50°

(ii)
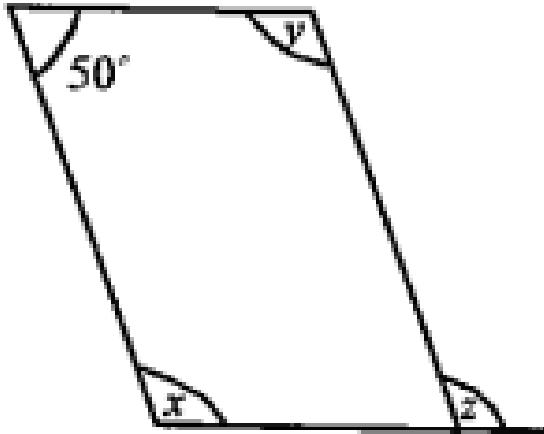
38. Consider the following parallelograms.

Find the values of the unknowns x, y, z.

(iii)
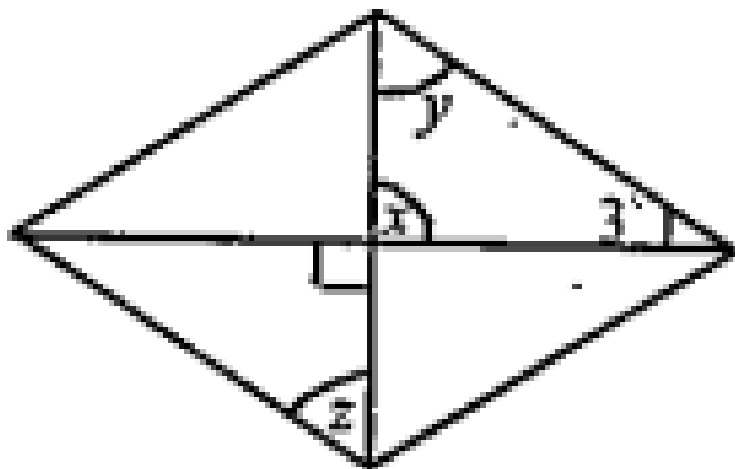
39. Consider the following parallelograms. Find the values of the unknowns x, y, z.

(iv)
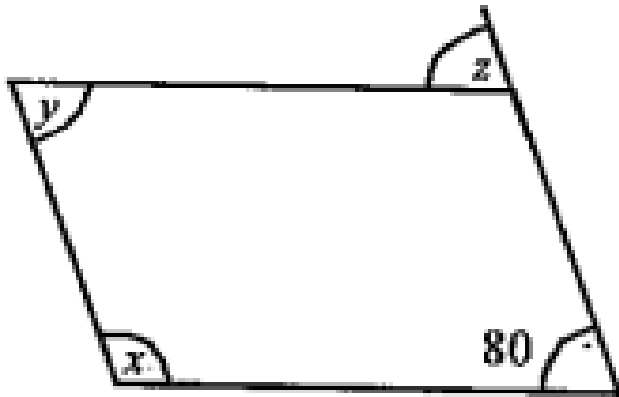
40. Consider the following parallelograms. Find the values of the unknowns x and y.

(v)
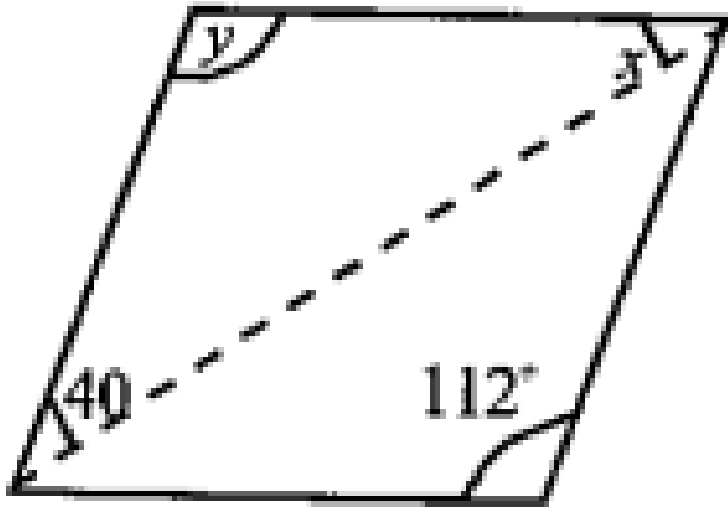
41. Can a quadrilateral ABCD be a parallelogram, if

$\angle D + \angle B = 180°$?

42. Can a quadrilateral ABCD be a parallelogram, if

AB = DC = 8 cm, AD = 4 cm and BC =4.4 cm?

43. Can a quadrilateral ABCD be a parallelogram, if

$\angle A = 70°$ and $\angle C = 65°$?

44. Draw a rough figure, of a quadrilateral that is not a parallelogram but has exactly two
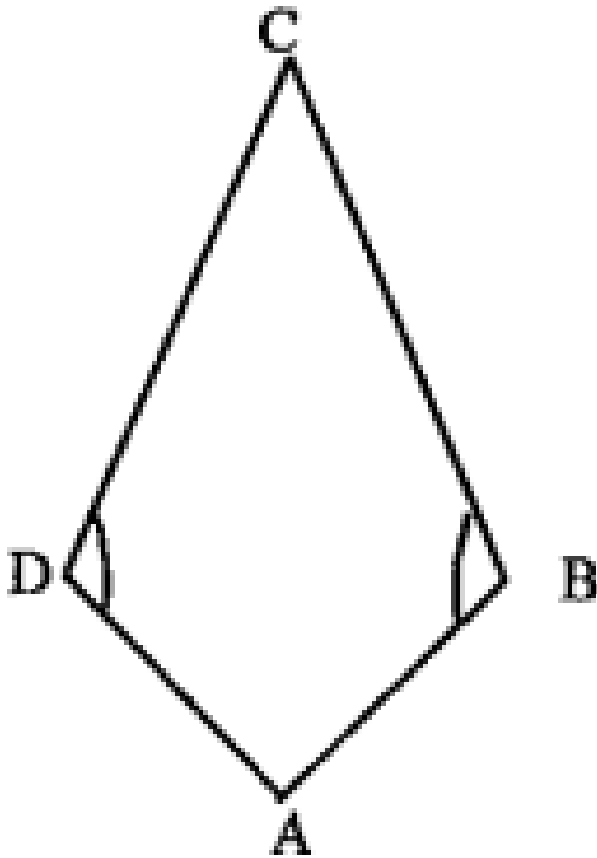
opposite angles of equal measure.

45. The measures of two adjacent angles of a parallelogram are in the ratio $3:2$. Find the measure of each of the angles of the parallelogram.

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46. Two adjacent angles of a parallelogram have equal measure. Find the measure of each of the angles of the parallelogram.

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47. The following figures GUNS and RUNS are parallelograms. Find x and y. (Lengths are in cm)
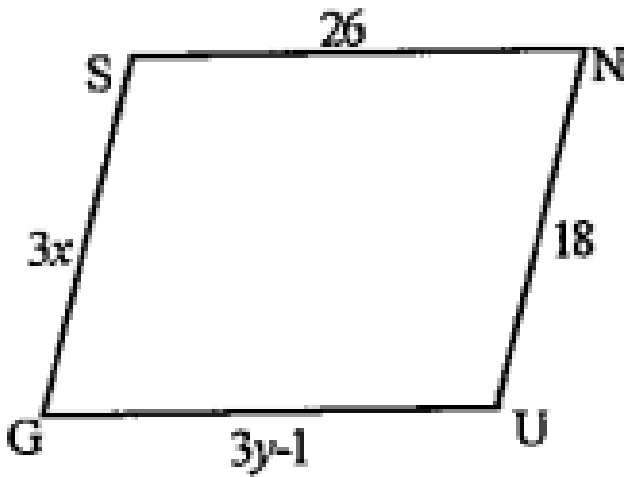
48. The following figures GUNS and RUNS are parallelograms. Find x and y. (Lengths are in cm)

The parallelogram has vertices S (top left), N (top right), R (bottom left), U (bottom right). The diagonals intersect. Segments labeled: 20 (from S toward center), $x+y$ (from center toward N), 16 (from R toward center), $y+7$ (from center toward U). The bottom side RU is labeled $3y-1$.
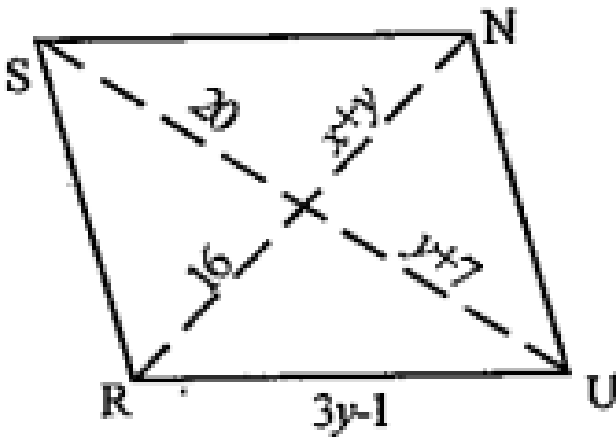
49. In the above figure both RISK and CLUE are parallelograms. Find the value of x.
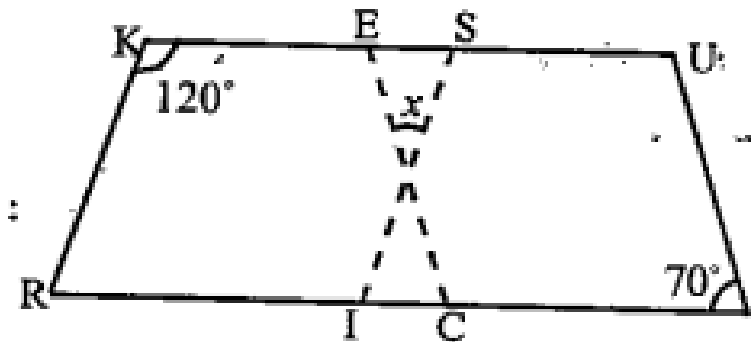
50. Explain how this figure is a trapezium. Which of its two sides are parallel?
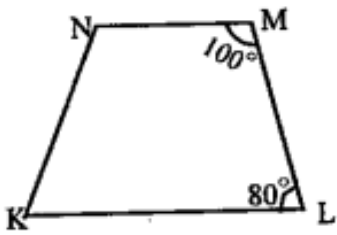
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51. Find $m\angle C$. If AB||DC.
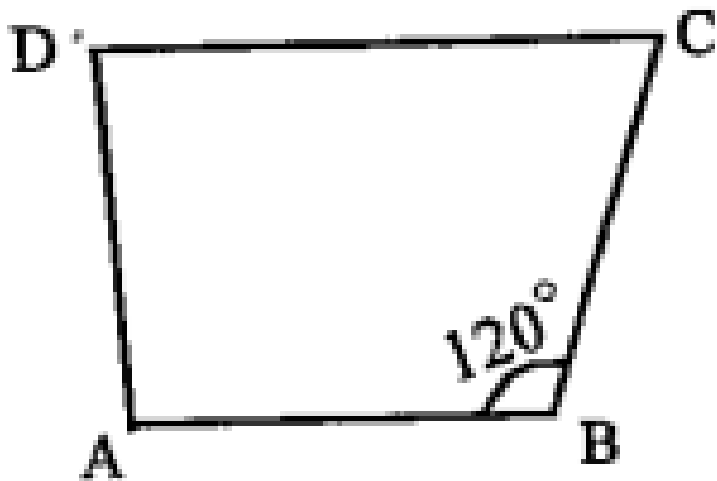
52. Find the the measure of $\angle P$ and $\angle S$ if $\overline{SP} \,||\, \overline{RQ}$

(If you find $m\angle R$, is there more than one

method to find $m\angle P$?)
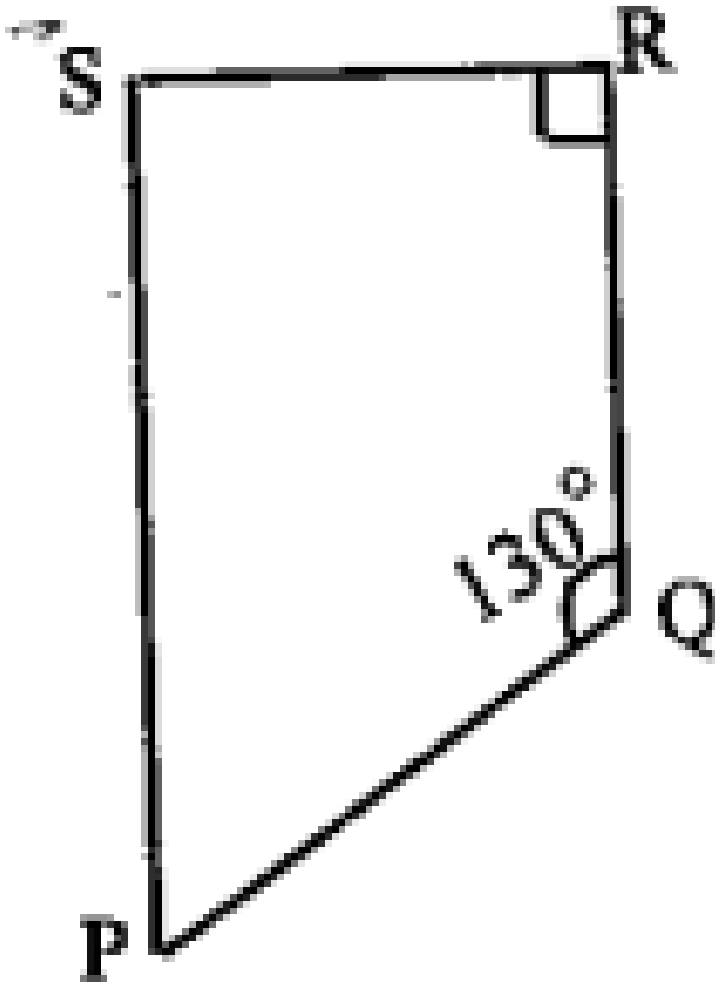
53. State whether True or False.

All rectangle are squares

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54. State whether True or False.

All rhombuses are parallelograms

> ▶ **Watch Video Solution**

55. State whether True or False.

All squares are rhombuses and also rectangles

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56. State whether True or False.

All squares are not parallelograms

Watch Video Solution

57. State whether True or False.

All kites are rhombuses

Watch Video Solution

58. State whether True or False.

All rhombuses are kites

59. State whether True or False.

All parallelograms are trapeziums

60. State whether True or False.

All squares are trapeziums.

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61. Identify all the quadrilaterals that have.

four sides of equal length

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62. Identify all the quadrilaterals that have.

four right angles

63. Explain how a square is.

a quadrilateral

64. Explain how a square is.

a parallelogram

65. Explain how a square is.

a rhombus

66. Explain how a square is.

a rectangle

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67. Name the quadrilaterals whose diagonals.

bisect each other

▶ **Watch Video Solution**

68. Name the quadrilaterals whose diagonals.

are perpendicular bisectors of each other

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69. Name the quadrilaterals whose diagonals.

are equal

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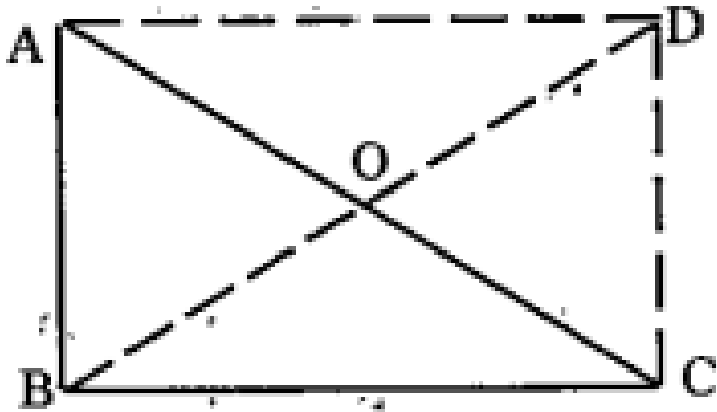**70.** Explain why a rectangle is a convex quadrilateral.

71. ABC is a right-angled triangle and O is the mid point of the side opposite to the right angle. Explain who O is equidistant from A,B and C. (The dotted lines are drawn additionally

to help you.)

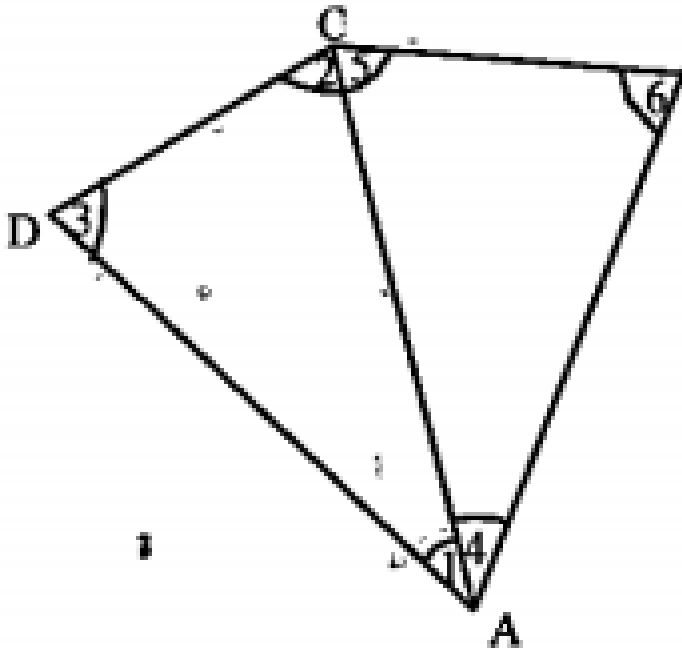**72.** Take any quadrilateral, say ABCD , Divide it into two triangles, by drawing a diagonal. You get six angles 1,2,3,4,5 and 6. Use the angle sum property of a triangle and argue how the

sum of the measures of and amount to

$$180° + 180° = 360°.$$

73. Take four congruent card-board copies of any quadrilateral ABCD, with angles as shown in the figures. Arrange the copies as shown in the figure, where angles $\angle 1, \angle 2, \angle 3, \angle 4$ meet at a point. What can you say about the sum of

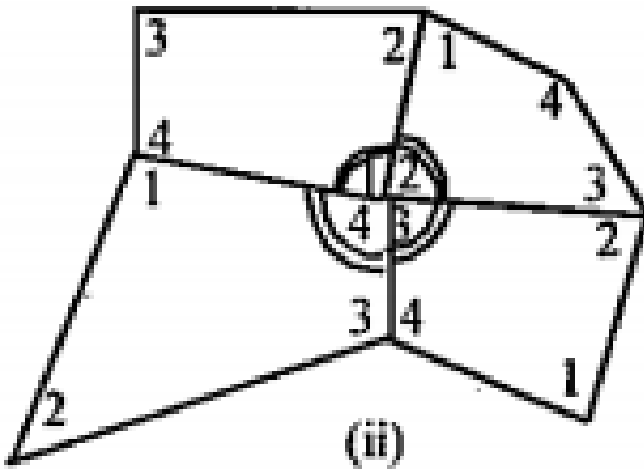the angles $\angle 1$, $\angle 2$, $\angle 3$ and $\angle 4$.

(i)
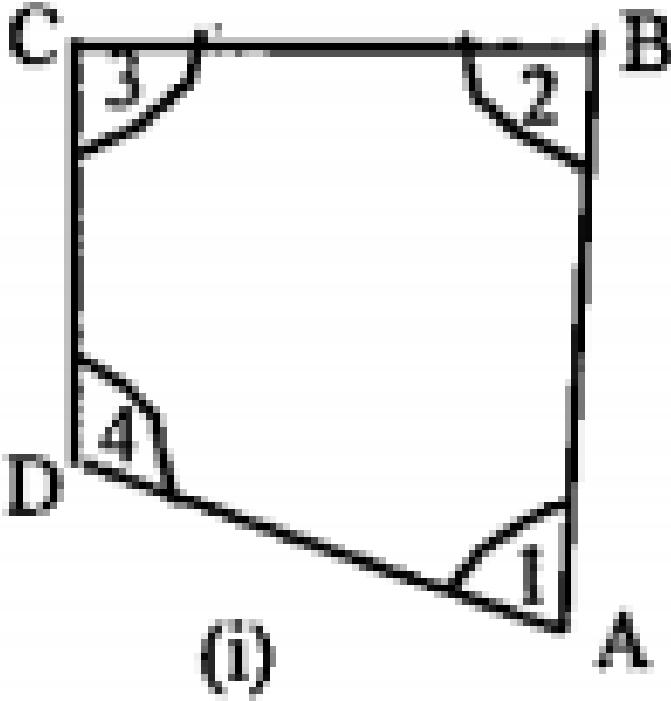
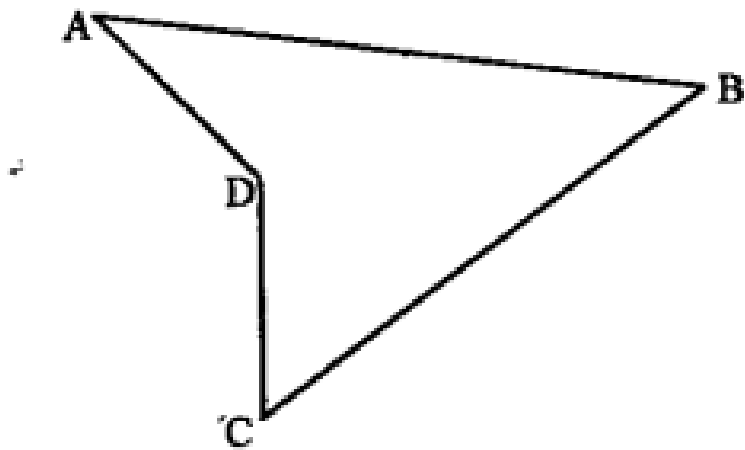**74.** Take four congruent card-board copies of any quadrilateral ABCD, with angles as shown in the figures. Arrange the copies as shown in the figure, where angles ∠1, ∠2, ∠3, ∠4 meet at a point. What can you say about the sum of the angles ∠1, ∠2, ∠3 and ∠4.

(ii)

75. Consider a concave quadrilateral ABCD, Split it into two triangles and find the sum of the interior angles.

76. Take a regular hexagon.

What is the sum of the measures of its exterior angles x,y,z,p,q,r?

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77. Take a regular hexagon.

Is x=y=z=p=q=r where x,y,z,p,q,r are exterior angles? Why?

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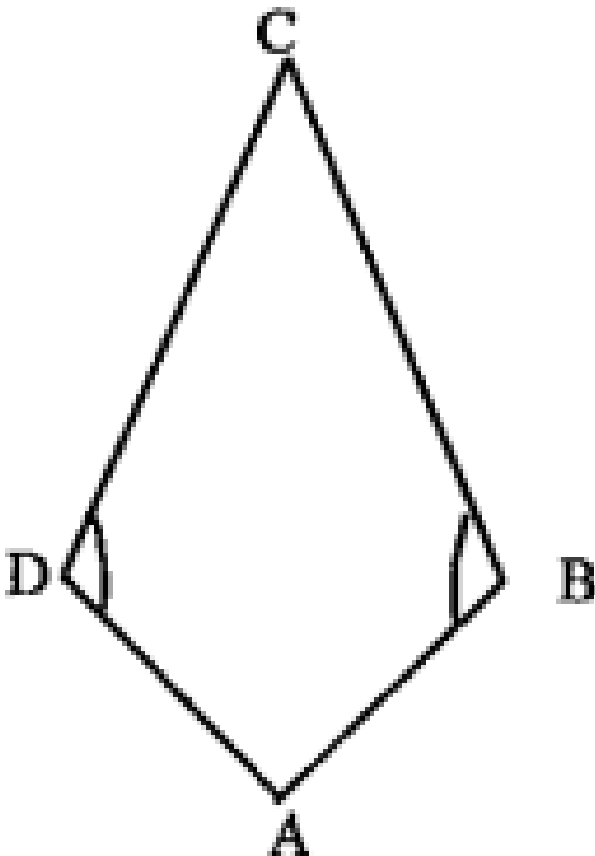**78.** What is the measure of each exterior angle?

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79. What is the measure of each interior angle?

▶ **Watch Video Solution**

80. Draw a rough figure, of a quadrilateral that is not a parallelogram but has exactly two opposite angles of equal measure.

81. A mason has made a concrete slab. He needs it to be rectangular. In what different ways can he make sure that it is rectangular?

82. A square was defined as a rectangle with all sides equal. Can we define it as rhombus with equal angles? Explore this idea.

83. Can a trapezium have all angles equal? Can it have all sides equal? Explain.

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