

Mathematics

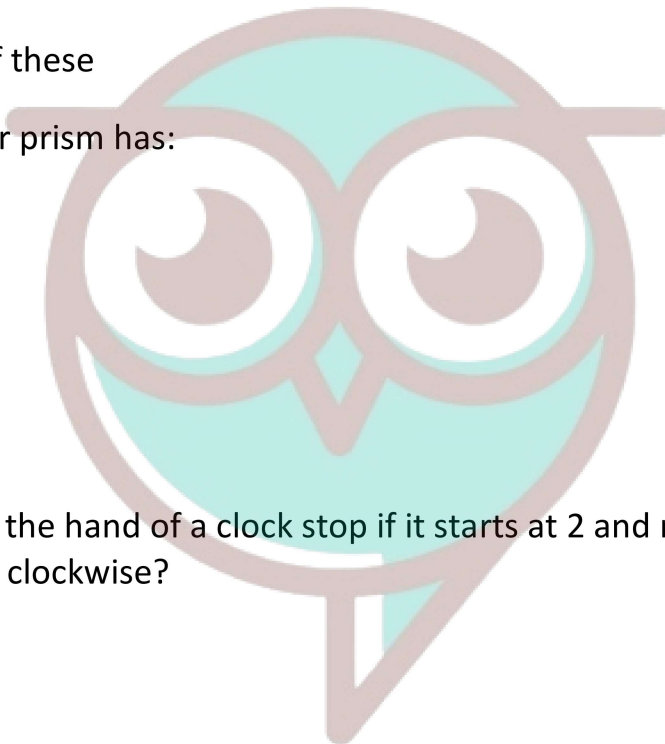
Chapter 5: Understanding Elementary Shapes



Important Questions

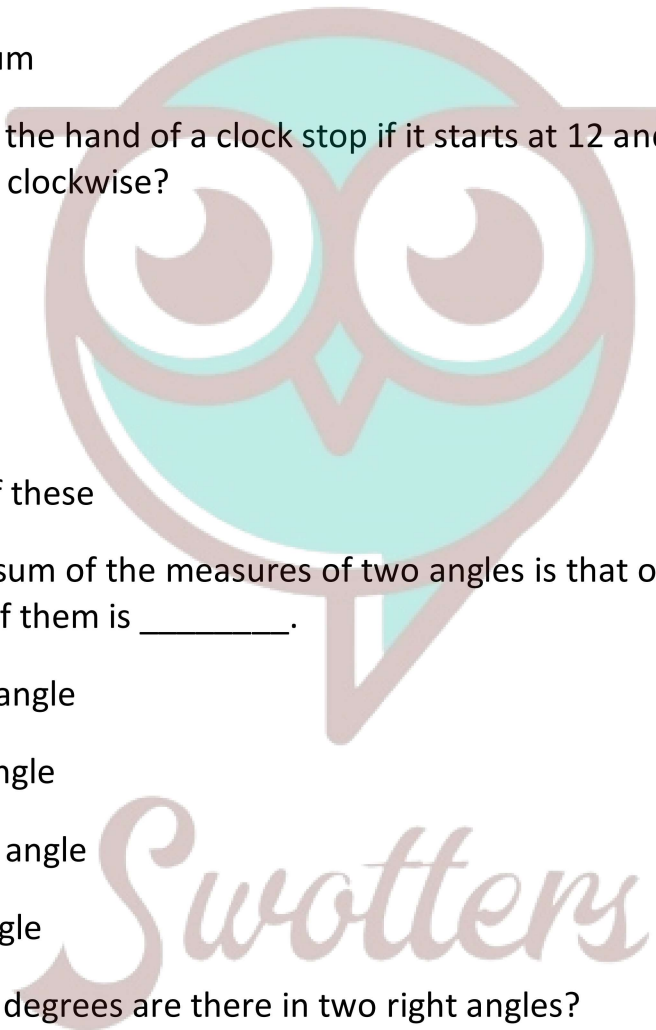
Multiple Choice Questions:

1. A quadrilateral having one pair of sides parallel is called:
 - A. square
 - B. trapezium
 - C. rectangle
 - D. None of these
2. A triangular prism has:
 - A. 9 faces
 - B. 8 faces
 - C. 7 faces
 - D. 5 faces
3. Where will the hand of a clock stop if it starts at 2 and makes of a revolution, clockwise?
 - A. 5
 - B. 8
 - C. 11
 - D. None of these
4. An angle whose measure is equal to half of a revolution is:
 - A. right angle
 - B. acute angle
 - C. straight angle
 - D. obtuse angle
5. A quadrilateral whose opposite sides are parallel is called:
 - A. square
 - B. rectangle



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- C. parallelogram
- D. None of these
6. A quadrilateral whose all the sides are equal and each angle is 90° is called a:
- A. square
- B. rhombus
- C. rectangle
- D. trapezium
7. Where will the hand of a clock stop if it starts at 12 and makes of a revolution, clockwise?
- A. 6
- B. 9
- C. 3
- D. None of these
8. When the sum of the measures of two angles is that of a right angle, then each one of them is _____.
- A. obtuse angle
- B. acute angle
- C. straight angle
- D. right angle
9. How many degrees are there in two right angles?
- A. 90°
- B. 180°
- C. 270°
- D. 360°
10. An angle formed by two opposite rays is called a:
- A. complete angle



- B. zero angle
- C. straight angle
- D. right angle
11. Where will the hand of a clock stop if it starts at 3 and makes of a revolution, clockwise?
- A. 6
- B. 12
- C. 9
- D. None of these
12. How many centimeters make 3m?
- A. 100
- B. 30
- C. 300
- D. 3000
13. When an arm of an angle is extended then how does its measure change?
- A. Doubled
- B. Tripled
- C. Remains the same
- D. Halved
14. Triangle having the angles 40° , 30° , 110° is called:
- A. acute angled triangle
- B. obtuse angled triangle
- C. right triangle
- D. none of these
15. An angle which is greater than a right angle but less than a straight angle is called:
- A. an acute angle

- B. an obtuse angle
- C. a complete angle
- D. straight angle

Match The Following:

	Column I		Column II
1.	Cube	A.	6
2.	Square pyramid	B.	12
3.	Triangular prism	C.	8
4.	Triangular pyramid	D.	9

Fill in the blanks:

1. Measure of a complete angle is _____°.
2. The triangle in which _____ sides are equal is called isosceles triangle.
3. Each of its angles rectangle measures _____°.
4. A cube has _____ vertices.

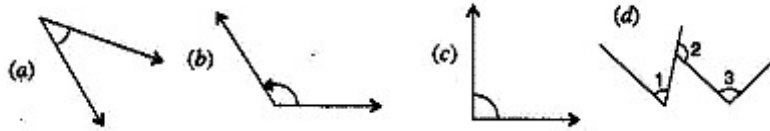
True /False:

1. Sum of any two sides of a triangle is greater than the third side.
2. An equilateral triangle is also considered as an isosceles triangle
3. A polygon is regular if its all sides are equal.
4. Opposite faces of a cuboid are equal in size.

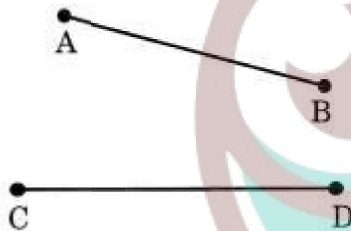
Very Short Questions:

1. How many faces a tetrahedron have?
2. What is the angle name for half a revolution?
3. Draw a hexagon and write its sides and diagonals?
4. If B is the mid point of (\overline{AC}) and C is the point of (\overline{BD}) where A, B, C, D lie on a straight line, say why $AB = CD$?

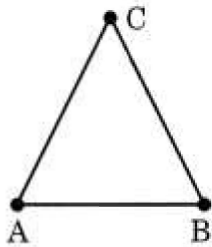
5. Draw a rough sketch of a regular octagon. Draw a rectangle by joining exactly four of the vertices of the octagon.
6. Measure the angles given below, using the Protractor and write down the measure.



7. All equilateral triangle are isosceles, but all isosceles triangle are not equilateral. Justify the statement.
8. Which of the following line-segments is longer?



9. How many line segments are used in making a triangle?

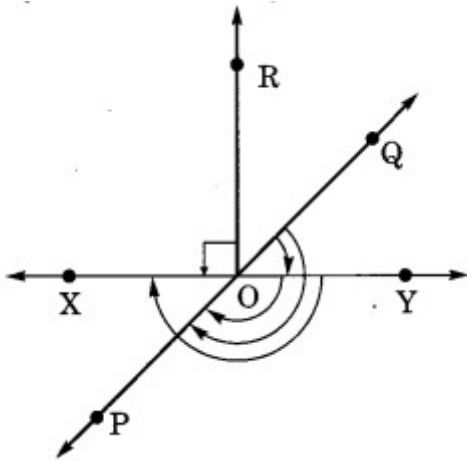


10. What is the measure of straight angle?

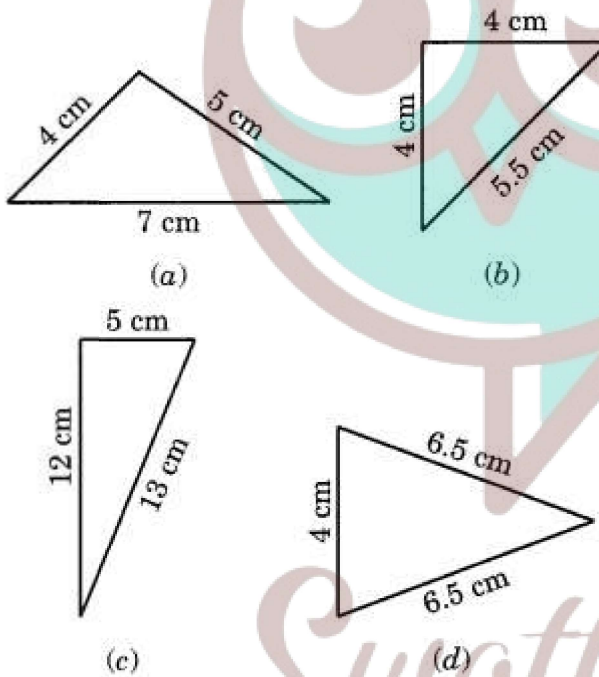
Short Questions:

1. In the given figure, name the following angles as acute, obtuse, right, straight or reflex.

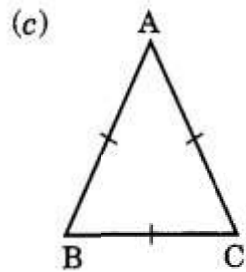
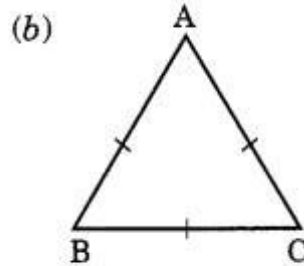
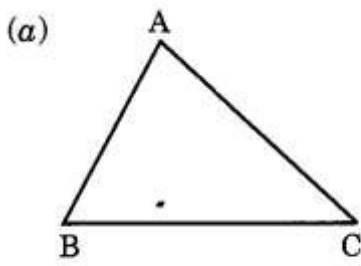
- (a) $\angle QOY$
- (b) $\angle YOP$
- (c) $\angle ROX$
- (d) $\angle QOX$
- (e) $\angle POQ$



2. In the given figure, find the measure of the angles marked with a, b, c, d, e and f.
3. Classify the given triangles whose sides are indicated on them.



4. What are the types of the following triangles on the basis of sides?



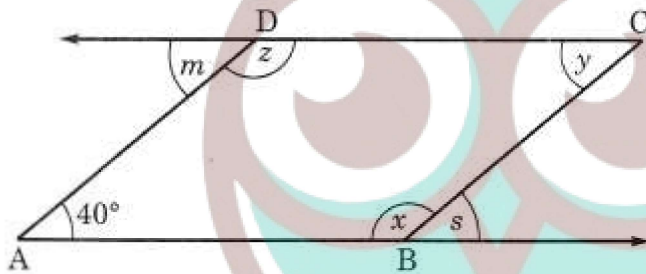
Long Questions:

1. Verify the 'Euler's formula' $V + F = E + 2$ for the given figures.
 - (a) A triangular prism having 5 faces, 9 edges and 6 vertices.
 - (b) A rectangular prism with 6 faces, 12 edges and 8 vertices.
 - (c) A pentagonal prism with 7 faces, 15 edges and 10 vertices.
 - (d) A tetrahedron -with 4 faces, 6 edges and 4 vertices.
2. Complete the given table for prisms:

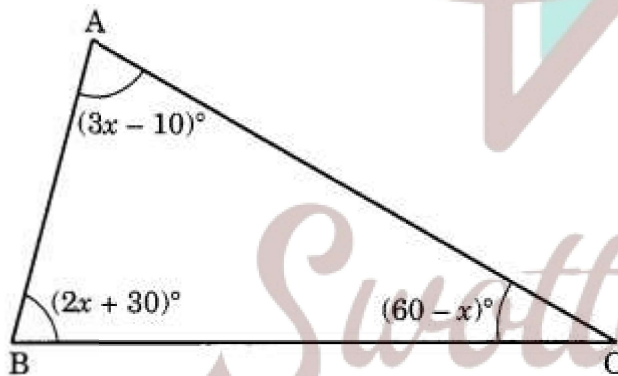
Prism	Number Of faces	Number Of edges	Number Of vertices
Triangular	-	-	-
Quadrilateral	-	-	-
Pentagonal	-	-	-

Hexagonal	-	-	-
Octagonal	-	-	-
Decagonal	-	-	-

3. In the given figure, find the values of x , y , z , s and m .



4. Find the value of x from the given figure and hence find the measure of each angle of the triangle.



Assertion and Reason Questions:

1.) **Assertion (A)** – A line segment is a fixed portion of a line

Reason (R) – We use this idea to compare line segments.

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is not the correct explanation of A
- c) A is true but R is false

d) A is false but R is true

2.) Assertion (A) – A triangle is made of three, a quadrilateral of four segments.

Reason (R) – The measure of each line segment is a unique number called its length.

a) Both A and R are true and R is the correct explanation of A

b) Both A and R are true but R is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true



ANSWER KEY -

Multiple Choice questions:

1. B. trapezium
2. D. 5 faces
3. B. 8
4. C. straight angle
5. C. parallelogram
6. A. square
7. B. 9
8. B. acute angle
9. B. 180°
10. C. straight angle
11. B. 12
12. C. 300
13. C. Remains the same
14. B. obtuse angled triangle
15. B. an obtuse angle



Match The Following:

	Column I		Column II
1.	Cube	B.	12
2.	Square pyramid	C.	8
3.	Triangular prism	D.	9
4.	Triangular pyramid	A.	6

Fill in the blanks:

1. Measure of a complete angle is **360** $^\circ$.
2. The triangle in which **two** sides are equal is called isosceles triangle.
3. Each of its angles rectangle measures **90** $^\circ$.

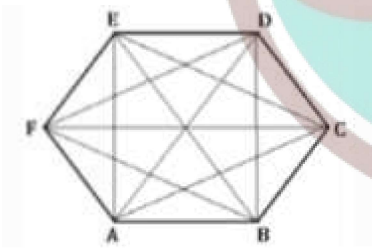
4. A cube has 8 vertices.

True /False:

1. True
2. False. in isosceles triangle only two sides are equal.
3. False. For a polygon to be regular, all sides as well as all angles have to be equal.
4. True.

Very Short Answer:

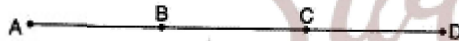
1. In geometry, a tetrahedron is a polyhedron composed of four triangular faces, three of which meet at each corner or vertex.
2. Straight Angle (180°)
3. Hexagon



Sides of hexagon: AB, BC, CD, DE, EF and FA.

Diagonals of hexagon: AC, AD, AE, BD, BE, BF, CE, CF, and DF

4.



\therefore B is the mid-point of \overline{AC}

\therefore AB = BC ...(1)

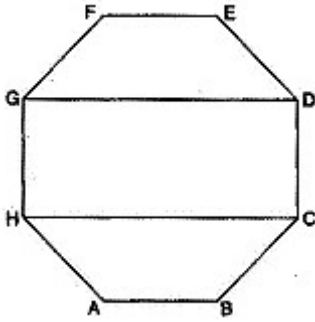
\therefore C is the mid-point of \overline{BD}

\therefore BC = CD ...(2)

In view of (1) and (2), we get

AB = CD.

5.



6. (a) 45°
 (b) 125°
 (c) 90°
 (d) $\angle 1 = 40^\circ$, $\angle 2 = 125^\circ$ and $\angle 3 = 95^\circ$.
7. An isosceles triangle is any triangle with 2 sides that are equal in length. So, every equilateral triangle is a special case of an isosceles triangle since not just 2 sides are equal, but all 3 are. But every isosceles triangle is not equilateral, because you can have 2 sides of equal length and a third side that is either longer or shorter than those 2 sides. For example, if the triangle is a right-angle triangle and the two sides that meet to make the right angle are the same length, then the 3rd side would be longer than those two.
8. By using divider, \overline{CD} seems to be longer than \overline{AB} .
9. Three line segments are used to make a triangle.
10. The measure of straight angle is 180° .

Short Answer:

1. (a) $\angle QOY$ = acute angle.
 (b) $\angle YOP$ = obtuse angle.
 (c) $\angle ROX$ = right angle.
 (d) $\angle QOX$ = reflex angle.
 (e) $\angle POQ$ = straight angle.
2. $\angle a = 180^\circ - 129^\circ = 51^\circ$
 $\angle b = 180^\circ - (51^\circ + 92^\circ)$
 $= 180^\circ - 143^\circ = 37^\circ$

1. (a) Here, $F = 5$, $E = 9$ and $V = 6$

$$\therefore V + F = E + 2$$

$$\Rightarrow 6 + 5 = 9 + 2$$

$$\Rightarrow 11 = 11$$

Hence, verified.

(b) Here, $F = 6$, $E = 12$ and $V = 8$

$$\therefore V + F = E + 2$$

$$\Rightarrow 8 + 6 = 12 + 2$$

$$\Rightarrow 14 = 14$$

Hence, verified.

(c) Here, $F = 7$, $E = 15$ and $V = 10$

$$\therefore V + F = E + 2$$

$$\Rightarrow 10 + 7 = 15 + 2$$

$$\Rightarrow 17 = 17$$

Hence, verified.

(d) Here, $F = 4$, $E = 6$ and $V = 4$

$$\therefore V + F = E + 2$$

$$\Rightarrow 4 + 4 = 6 + 2$$

$$\Rightarrow 8 = 8$$

Hence, verified.

2.

Prism	Number Of faces	Number Of edges	Number Of vertices
Triangular	5	9	6
Quadrilateral	6	12	8

Pentagonal	7	15	10
Hexagonal	8	18	12
Octagonal	10	24	16
Decagonal	12	30	20

3. Given that $\angle A = 40^\circ$

(i) $\angle DAB + \angle ABC = 180^\circ$ (adjacent angles)

$$\Rightarrow 40^\circ + \angle ABC = 180^\circ$$

$$\Rightarrow \angle ABC = 180^\circ - 40^\circ = 140^\circ$$

$$\text{Hence, } \angle x = 140^\circ$$

(ii) $\angle x + \angle y = 180^\circ$ (adjacent angles)

$$\Rightarrow 140^\circ + \angle y = 180^\circ$$

$$\Rightarrow \angle y = 180^\circ - 140^\circ = 40^\circ$$

$$\text{Hence, } \angle y = 40^\circ$$

(iii) $\angle y + \angle z = 180^\circ$ (adjacent angles)

$$\Rightarrow 40^\circ + \angle z = 180^\circ$$

$$\Rightarrow \angle z = 180^\circ - 40^\circ = 140^\circ$$

$$\text{Hence, } \angle z = 140^\circ$$

(iv) $\angle x + \angle s = 180^\circ$ (straight angles)

$$\Rightarrow 140^\circ + \angle s = 180^\circ$$

$$\Rightarrow \angle s = 180^\circ - 140^\circ = 40^\circ$$

$$\text{Hence, } \angle s = 40^\circ$$

(v) $\angle m + \angle z = 180^\circ$ (straight angles)

$$\Rightarrow \angle m + 140^\circ = 180^\circ$$

$$\Rightarrow \angle m = 180^\circ - 140^\circ = 40^\circ$$

4. (i) Sum of the three angles of a triangle = 180°

$$\therefore 2x + 30^\circ + 60^\circ - x + 3x - 10^\circ = 180^\circ$$

$$\Rightarrow (2x - x + 3x) + (30^\circ + 60^\circ - 10^\circ) = 180^\circ$$

$$\Rightarrow 4x + 80^\circ = 180^\circ$$

$$\Rightarrow 4x = 180^\circ - 80^\circ$$

$$\Rightarrow 4x = 100^\circ$$

$$\therefore x = 100 \div 4 = 25^\circ$$

\therefore Measure of the angles are:

$$(i) (2x + 30)^\circ = 2 \times 25^\circ + 30^\circ = 80^\circ$$

$$(ii) (60 - x)^\circ = 60^\circ - 25^\circ = 35^\circ$$

$$(iii) (3x - 10)^\circ = 3 \times 25^\circ - 10^\circ = 75^\circ - 10^\circ = 65^\circ$$

Hence, $x = 25^\circ$ and the angles of the triangles are: 80° , 35° and 65° .

Assertion and Reason Answers:

1) a) Both A and R are true and R is the correct explanation of A

2) b) Both A and R are true but R is not the correct explanation of A

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