INTEGRATED+

Class: VII, MATHEMATICS

6. SYMMETRY

JEE MAINS LEVEL (TEACHING TASK)

01. Regular Polygon.
No. of Lines of symmetry = No. of sides = 8 Ans. B

02. Angle of rotation $= \frac{360^\circ}{4} = 90^\circ$ Ans. B

03 order $= \frac{360^\circ}{120^\circ} = 3$ Ans: B

04. Angle of rotation $= \frac{360^\circ}{5} = 72^\circ$ Ans: C

05 4+4 = 8 Ans. C

06 No. of Sides $= \frac{360^\circ}{45^\circ} = 8$ Ans: B

07 A rectangle coincides with itself after rotation of 180°.
∴ Order of rotation = 2 Ans B

08 Regular decagon → No. of Sides = 10.
Angle of rotation $= \frac{360^\circ}{10} = 36^\circ$
108° is not a multiple of 36°.
So, it will not coincide with itself Ans. B

09. order $= \frac{360^\circ}{72^\circ} = 5$ Ans: C

10 Order of rotation = 6 (2)

First time → 60°

Second time = 2×60° = 120° Ans. B

11 Angle of rotation = $\frac{360^\circ}{n}$

$\therefore \frac{360^\circ}{n} = 40^\circ \Rightarrow n = 9$.

A) No. of sides $n = 9$ ✓

B) order of rotational symmetry = 9 ✓

C) Exterior angle = 40° ✓

D) Interior angle = 140° ✓ Ans. A, B, C, D

12 Angle of rotation $\frac{360^\circ}{6} = 60^\circ$

Possible rotations are multiples of 60°

B) 60° ✓ C) 120° ✓ D) 180° ✓ Ans. B, C, D

13 ~~S.I-I~~ ~~A~~ regular polygon has an angle of rotation of 60°

$n = \frac{360^\circ}{60^\circ} = 6$. (True)

Statement II: conceptual (True) Ans. A

14. Statement I:

Angle of rotation = $\frac{360^\circ}{n}$

Here $n = 15$ $= \frac{360^\circ}{15} = 24^\circ$ (True)

Statement II: For a regular polygon, the order of rotational symmetry equals the number of sides. Order of rotational symmetry = 15 (True)

Ans. A

15 Assertion:
A regular polygon has an angle of rotation $= 45^\circ$
$\Rightarrow$ order of rotation $= \frac{360^\circ}{45^\circ} = 8 \rightarrow$ octagon.
Reason: The polygon has 8 lines of symmetry.
Ans: A

16 Assertion: A regular polygon has order of rotation 5.
$\Rightarrow$ Angle of rotation $= \frac{360^\circ}{5} = 72^\circ$ (True)
Reason: Its Angle of rotation is 60 (False)
Ans: C

17 Sum of interior angles of polygon P is 1260°
$\therefore (n_p - 2) \times 180^\circ = 1260^\circ$
$\Rightarrow n_p = 9$. C
Ans: C

18 Angle of rotation of P
$= \frac{360^\circ}{n} = \frac{360^\circ}{9} = 40^\circ$
Angle of rotation of R = twice of P
$= 2 \times 40^\circ = 80^\circ$
Ans: A

19. Minimum positive angle of rotation $= 45^\circ$
Ans. B

20. Order of rotational symmetry $= \frac{360^\circ}{45^\circ} = 8$
Ans: C

21. Sum of the interior angles of a polygon (4)

$= (n-2)\times 180^\circ = 1260^\circ$

$\Rightarrow n = 9.$ Ans: 9

22. Angle of rotation of a regular polygon $= \frac{360^\circ}{n}$

for $n = 10$ $\therefore \frac{360^\circ}{10} = 36^\circ$ Ans: 36°

23. a) Angle of rotation of a regular octagon

$= \frac{360^\circ}{n} = \frac{360^\circ}{n} = 45^\circ$ (P)

b) Order of rotational symmetry of regular pentagon $= 5 = 4$ (Q)

c) Conceptual 2 (R)

d) $(10-2)\times 180^\circ = 1440^\circ$ (S) Ans: P, Q, R, S

24. a) $n = \frac{360^\circ}{30^\circ} = 12$ (P)

b) $\frac{360^\circ}{12} = 30^\circ$ (Q)

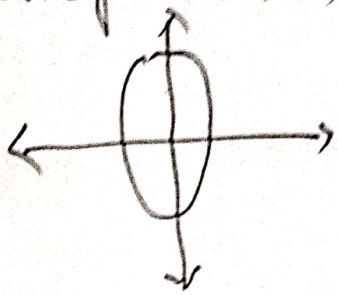
c) Regular hexagon (6) (R)

d) Order of rotational symmetry of a square (4) (S)

Ans: P, Q, R, S

LEARNERS TASK (CUE'S)

1. Conceptual Ans: B

2.	Conceptual (2) 	(5) Ans: B
03	Regular hexagon	Ans: C
04	It must be a regular polygon	Ans: D
05	Conceptual Reflection + rotation (non-trivial) = glide reflection.	Ans: A
06	Conceptual	Ans: D
07	Conceptual	Ans: D
08	Square	Ans: A
09	Regular hexagon	Ans: D
10	Regular pentagon	Ans: C
	JEE MAINS LEVEL	
01.	$\frac{360^\circ}{n} = 60^\circ \Rightarrow n = 6$	Ans: C
02	$\frac{360^\circ}{n} = \frac{360^\circ}{3} = 120^\circ$	Ans: B
03	Angle $= \frac{360^\circ}{9} = 40^\circ$	Ans: C
04	Regular hexagon. Lines of symmetry = 6 order of symmetry = 6	$\therefore$ Total = 6+6 = 12 Ans: C

05 $\frac{360^\circ}{180^\circ} = 2$ Ans: B

06 Angle $= \frac{360^\circ}{12} = 30^\circ$ Ans. D

07 Conceptual parallelogram Ans. B

08 $\frac{360^\circ}{5} = 72^\circ$, No. of sides $= 5$ Ans: B

09 $\frac{360^\circ}{30^\circ} = 12$ Ans. B

10 order $= \frac{360^\circ}{90^\circ} = 4$ Ans: C

JEE ADVANCED

11. A) $\frac{n(n-3)}{2} = 27 \Rightarrow n = 9$ ✓

B) order of rotational symmetry = No. of sides = 9

C) Angle of rotation $= \frac{360^\circ}{9} = 40^\circ$ ✓

D) Sum of interior Angle $= (n-2) \times 180^\circ$

$= (9-2) \times 180^\circ = 126^\circ$

Ans. A, B, C, D

12 Conceptual Ans. A, B, C, D

13 Statement I: Conceptual (True)

Statement II: Angle $= \frac{360^\circ}{10} = 36^\circ$ (False)

Ans: C

14 Statement I:
For pentagon angle $= 72^\circ$, order $= 5$ (False)

Statement II: $n = 12$
$(n-2) \times 180^\circ = 1800 \Rightarrow n = 12$ (True)

Ans: D

15 Assertion: Dodecagon = 12 sides
Angle $= \frac{360^\circ}{12} = 30^\circ$
Lines of symmetry $= 12$ (True)

Reason: Sum $= (12-2) \times 180^\circ = 1800^\circ$ (True)
Reason does not explains Assertion Ans: B

16 Assertion: Hendecagon = 11 sides
Angle $= \frac{360^\circ}{11} \neq 30$
Lines of symmetry $= 11$ (False)

Reason: Sum $= (11-2) \times 180^\circ = 1620^\circ$ (True)
Ans: D

17 Angle $= \frac{360^\circ}{9} = 40^\circ$ Ans: C

18 Nonagon symmetry $= 40^\circ$
Triangle symmetry $= 120^\circ$
Common rotation = L.C.M. of 40° and 120°
$= 120^\circ$ Ans: C

19. $n = \frac{360^\circ}{30^\circ} = 12$ Ans. B

20 S has twice the sides of R $\Rightarrow 2 \times 12 = 24$ sides
$\therefore \frac{360^\circ}{24} = 15^\circ$ Ans: A

21 Order $= \frac{360^\circ}{40} = 9$ Ans: 9

22 $(24-2) \times 180^\circ = 3960^\circ$ Ans 3960

23 a) Conceptual (P) $\frac{360^\circ}{n} = \frac{360^\circ}{n} = 30^\circ \Rightarrow n = 12$ (P)

b) Dodecagon $\Rightarrow \frac{360}{12} \Rightarrow 30^\circ$ (q)

c) Regular hexagon has 6 lines of symmetry $\rightarrow$ r

d) Square has rotational order 4 (S)

Ans.. P, q, r, S

24 a) Regular decagon $\rightarrow$ order $\rightarrow$ No. of sides = 10 (P)

b) Regular pentagon $= \frac{360^\circ}{5} = 72^\circ$ (q)

c) Regular octagon $\rightarrow$ 8 lines of symmetry (r)

d) $(n-2)180^\circ = 1260^\circ \Rightarrow n = 9$ (S)

Ans: P, q, r, S

$\Rightarrow$ THE END $\Leftarrow$