

FOUNDATION⁺

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Class: VII. MATHEMATICS

4. UNITS OF MEASUREMENT OF ANGLES

Teaching Task (JEE mains)

01. $40^{\circ} 20' = 40^{\circ} + 20'$

Now, $40^{\circ} = 40 \times \frac{\pi}{180} = \frac{2\pi}{9}$

$$20' = \left(20 \times \frac{1}{60}\right)^{\circ} = \frac{1}{3}^{\circ} = \frac{1}{3} \times \frac{\pi}{180} = \frac{\pi}{540}$$

$$\therefore 40^{\circ} 20' = \frac{2\pi}{9} + \frac{\pi}{540} = \frac{121\pi}{540}$$

Ans. A

02 One minute $\rightarrow$ 360 revolutions

i.e. 60 sec $\rightarrow$ 360 revolutions

$\Rightarrow$ 1 sec $\rightarrow$ 6 revolutions

1 revolution $\rightarrow$ 360° or 2π radians

6 revolutions $\rightarrow$ $6 \times 2\pi = 12\pi$ radians

Ans. A

03 $45^{\circ} 20' 10'' = 45^{\circ} + 20' + 10''$

$$= 45^{\circ} + \left(\frac{20}{60}\right)^{\circ} + \left(\frac{10}{3600}\right)^{\circ}$$
$$= \frac{16321}{360}^{\circ}$$

$$= \frac{16321}{360} \times \frac{10}{9} \text{ grades}$$

$$(\because 1^{\circ} = \frac{10}{9}^g)$$

$$= \frac{16321}{324} \text{ grades}$$

$$\approx 50.37345679^g$$



$$\approx 50^g + 0.37345679^g$$

(2)

We know, $1^g = 100 \text{ seconds}$
 $1 \text{ Second} = 100 \text{ minutes}$

$$\text{Now } 0.37345679^g \text{ grades} = 0.37345679 \times 100 \text{ minutes}$$

$$= 37.345679 \text{ minutes}$$

Now, $37 \text{ minutes} + 0.345679 \text{ minutes}$

$$\therefore 0.345679 \text{ minutes} = 0.345679 \times 100 \text{ seconds}$$

$$= 34.5679 \text{ seconds}$$

$$\therefore 45^\circ 20' 10'' = 50^g 37' 34'' \text{ (Approx)} \quad \text{Ans: B}$$

$$04 \left(\frac{16321}{360} \right)^\circ = \frac{16321}{360} \times \frac{\pi}{180}$$

$$= \frac{16321}{64800} \times \pi$$

$$= 0.251824 \times \pi$$

$$= 0.791057$$

$$= 0.79 \text{ radians (Approx)} \quad \text{Ans: B}$$

$$05 \quad 1.2 \text{ radians} = 1.2 \times \left(\frac{\pi}{180} \right) \frac{180}{\pi}$$

$$= 68.754^\circ$$

Ans: A

$$06 \quad \pi \text{ radians} = 180^\circ$$

Ans: D

$$07. \quad \frac{\pi}{180}$$

Ans: C

$$08 \quad l = r\theta$$

Ans: C



09. $\frac{180}{\pi}$ (3) Ans. A

10. 1 radian = 57.3° (Approx) Ans. A

JEE ADVANCED

11. $230^\circ = 230 \times \frac{\pi}{180}$
 $= 1.28\pi$ radians (OR)
 $= 4.01$ radians here $\pi = 3.14$
 Ans. A, B

12. $\frac{63\pi}{11} = \frac{63}{11} \times 180^\circ = 1031^\circ$ Ans. B

13. Statement I: $11 \times \frac{\pi}{6} \neq \frac{180}{\pi} = 11 \times 30^\circ \times 1^\circ$
 $= 330^\circ$ (True)
 Ans. A

Statement II: Conceptual (True)

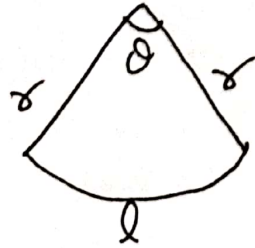
14. Statement I: $-270^\circ = -\frac{3\pi}{2}$ (False)

Statement II: Conceptual (True)

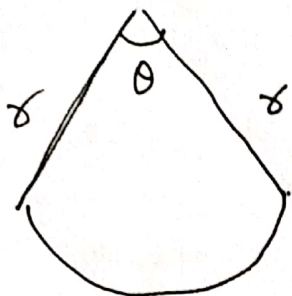
Ans. D

15. Assertion: 1 radian = 63.66 grades (False)
Reason: Conceptual (True)
 Ans. D

16. Assertion: Conceptual (True)
Reason: Conceptual (True)
 Ans. A

17.  Given $r = 9$ cm
 perimeter = 36.85
 $\therefore 2r + l = 36.85$
 $\Rightarrow 2r + r\theta = 36.85$
 $\Rightarrow 2 \times 9 + 9 \times \theta = 36.85$
 $\theta = 2.094$ radians
 Ans. B

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Given $r = 9\text{ cm}$

(4)

Perimeter = 36.250

$\theta = 2.094 \text{ radians}$

$= 2.094 \times \frac{180}{\pi} \text{ degrees}$

$= 119.78^\circ = 120^\circ \text{ (approx) Ans: C}$

19. $1 \text{ grad} = 100'$

Ans: B

20. 200 grades

Ans: B

21. $\frac{\pi}{12} \times \frac{180}{\pi} = 15^\circ$

Ans: 15°

22. $\frac{\pi}{5}^\circ = \frac{\pi}{5} \times 1^\circ = \frac{\pi}{5} \times \left(\frac{180}{\pi}\right) = 36^\circ$

Ans: 36

23 a) $1^\circ = 0.175 \text{ radians (s)}$

b) $\frac{D}{90} = \frac{G}{100}$

$\Rightarrow \frac{120}{90} = \frac{G}{100} \Rightarrow G = \left(\frac{2400}{3}\right)^\circ (P)$

c) $1 \text{ grade} = 100 \text{ minutes (q)}$

d) $100 \text{ grades} = 90^\circ (\gamma)$

Ans: s, P, q, γ

24 a) $\frac{\pi}{3} (q)$

c) $\frac{\pi}{4} (s)$

b) $\frac{\pi}{6} (P)$

d) $\frac{\pi}{2} (\gamma)$

Ans: q, P, s, γ

LEARNERS TASK (CUB'S)

01. Conceptual

Ans: A

02. $\frac{1}{2}$ right angle

Ans: C

03 $1195^\circ = 3 \times 360^\circ + 115^\circ$
 Since $115^\circ \in Q_2 \Rightarrow 1195^\circ \in Q_2$

Ans: B

04. Conceptual

Ans: A

05. Conceptual

Ans: B

06. Conceptual

Ans: C

07. Positive X-axis

Ans: D

08. Positive angle

Ans: C

09. obtuse angle

Ans: C

10. 360°

Ans: C

JEE MAINS

01. $\frac{9}{5}\pi = \frac{9}{5} \times 180^\circ = 324^\circ$

Ans: A

02 $-300^\circ = -300 \times 1^\circ = -300 \times \frac{\pi}{180} = -\frac{5\pi}{3}$

Ans: B

03 $43^\circ + 6' + 9''$
 $= 43^\circ + \left(\frac{6}{60}\right)^\circ + \left(\frac{9}{3600}\right)^\circ$
 $= 43^\circ + \frac{1}{10}^\circ + \frac{1}{400}^\circ$
 $= \frac{17200 + 40 + 1}{400}$

$= \frac{17241}{400}$
 $= 43.1025^\circ$
 $= 43.1025 \times \frac{\pi}{180}$
 $= 0.752 \text{ radians}$

Ans: A

04. $3\pi \text{ radians} = 3 \times 180^\circ = 540^\circ$

Ans: D

05 $\frac{7\pi}{6} + \frac{12\pi}{6} = \frac{19\pi}{6}$
 $\frac{C}{\left(\frac{\pi}{2}\right)} = \frac{G}{100}$
 $\Rightarrow \frac{19\pi}{6} / \frac{\pi}{2} = \frac{G}{100}$
 $G = \frac{19}{3} \times 100$
 $= 633.33$
 Ans: B



06. No angles are coterminal angles (6)

07. $130^\circ \in Q_2$

For angles in Quadrant II.

$$\therefore \text{Reference angle} = 180^\circ - \theta \\ = 180^\circ - 130^\circ = 50^\circ$$

Ans: B

08. clockwise

Ans: B

09. 360°

Ans: C

10. $1^\circ 10' 5''$ = one degree, 10 minutes and 5 seconds

Ans: C

11. $90^\circ = \frac{\pi}{2}$ radians $= \frac{22}{7 \times 2}$ radians $= 1.5708$ radians

Ans: C, D

12. Conceptual

Ans: A, B,

13. Statement I: $100^\circ = \frac{\pi}{2}$ (True)

Ans: A

Statement II: Conceptual (True)

14. Statement I: Conceptual (False)

Ans: D

Statement II: Conceptual (True)

15. Assertion: Conceptual (True)

Ans: A

Reason: Conceptual (True)

16. Assertion: Conceptual (True)

Ans: A

Reason: Conceptual (True)

Ans: D

17. $\pi^\circ = 180^\circ$

18. Length of the arc $= l = \frac{\theta}{360^\circ} \times 2\pi r$
 $= \frac{60^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 6 = 2\pi$

Ans: A



19.	$\pi \text{ radians} = 180^\circ$	① Ans: A
20.	57.3°	Ans: D
21.	100	Ans: 100
22.	$3 \times 2\pi = 6\pi$	Ans: 6
23	a) $144^\circ = 144 \times 1^\circ$ $= 144 \times \frac{10}{9} = 160 \text{ grades (S)}$ b) $\frac{\pi}{2}^c (P)$ c) $3^c = 3 \times 1^c = 3 \times \frac{180}{\pi} \approx \frac{540}{3.1416} \approx 171.8^\circ$ Right angles $= \frac{171.8^\circ}{90} \approx 1.91 \text{ right angles (Q)}$ d) $1 \text{ radian} = \frac{200}{\pi} \text{ grades}$ $= \frac{200}{3.1416} = 63.66 \text{ grades (R)}$ Ans: S, P, Q, R	
24	a) $57.3^\circ (R)$ b) 200 grades (P) c) 400 grades (Q) d) 100 grades (S)	Ans: R, P, Q, S

$\Rightarrow$ THE END $\Leftarrow$