MISCELLANEOUS EXERCISE –7

Q. 1 Multiple choice questions:
Four possible answers are given for the following questions. Tick ( ) the correct answer.

1. The union of two non–collinear rays, which have common end point is called
   (a) an angle (b) a degree
   (c) a minute (d) a radian
2. The system of measurement in which the angle is measured in radians is called
   (a) CGS system
   (b) sexagesimal system
   (c) MKS system
   (d) circular system
3. $\sec\theta \cot\theta =$
   (a) $\sin\theta$ (b) $\frac{1}{\cos\theta}$
   (c) $\frac{1}{\sin\theta}$ (d) $\frac{\sin\theta}{\cos\theta}$
4. $\operatorname{cosec}^2\theta - \cot^2\theta =$
   (a) -1 (b) 1
   (c) 0 (d) $\tan\theta$
5. If 'r' is the radius of a circle, then its circumference is:
   (a) $\frac{\pi}{2}r$ (b) πr
   (c) $2\pi r$ (d) $4\pi r$
6. $\sec^2\theta =$
   (a) $1 - \sin^2\theta$ (b) $1 + \tan^2\theta$
   (c) $1 + \cos^2\theta$ (d) $1 - \tan^2\theta$
7. $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta}$
   (a) $2\sec^2\theta$ (b) $2\cos^2\theta$
   (c) $\sec^2\theta$ (d) $\cos\theta$
8. How many right angles are there in 360 degrees?
   (a) two (b) four
   (c) six (d) eight
9. $20° =$ .....
   (a) $360'$ (b) $630'$
   (c) $1200'$ (d) $3600'$
10. $\frac{3\pi}{4}$ radians =
    (a) $115°$ (b) $135°$
    (c) $150°$ (d) $30°$
11. In degree measurement, 1° is equal to:
    (a) $1'$ (b) $60'$
    (c) $90'$ (d) $360'$
12. In degree measurement, $1'$ is equal to:
    (a) $1''$ (b) $60''$
    (c) $90''$ (d) $360''$
13. $\frac{1}{2}\operatorname{cosec}45°$
    (a) $\frac{1}{2\sqrt{2}}$ (b) $\frac{1}{\sqrt{2}}$
    (c) $\sqrt{2}$ (d) $\frac{\sqrt{3}}{2}$
14. If $\tan\theta = \sqrt{3}$, then θ is equal to
    (a) $90°$ (b) $45°$
    (c) $60°$ (d) $30°$
15. The radian measure of an angle that form a complete circle is:
    (a) $\frac{\pi}{2}$ (b) π
    (c) 2π (d) 4π
16. $\frac{\pi}{2}$ radians =
    (a) 30° (b) 45°
    (c) 60° (d) 90°
17. $\frac{\pi}{3}$ radians =
    (a) 30° (b) 45°
    (c) 60° (d) 90°
18. $1^\circ =$
    (a) 180π radian (b) π radian
    (c) $\frac{\pi}{180}$ radian (d) $\frac{180}{\pi}$ radian

19. Area of a circular sector =

(a) $r\theta$ (b) $r^2\theta$

(c) $\frac{1}{2}r\theta$ (d) $\frac{1}{2}r^2\theta$

20. 2π radians =

(a) 0^o (b) 90^o

(c) 180^o (d) 360^o

21. π radians =

(a) 0^o (b) 90^o

(c) 180^o (d) 360^o

22. $\frac{1}{\text{Cos}\theta} =$

(a) $\text{Sin}\theta$ (b) $\text{Sec}\theta$

(c) $\text{Cosec}\,\theta$ (d) $\text{Cot}\theta$

23. $\frac{\pi}{6}$ radians =

(a) 30^o (b) 45^o

(c) 60^o (d) 90^o

24. $\text{Sin}45^o$ =

(a) 1 (b) $\sqrt{2}$

(c) $\frac{1}{\sqrt{2}}$ (d) 0

25. 1^o =

(a) 0.0175 radians

(b) 0.175 radian

(c) 1.75 radians

(d) 175 radians

26. A part of circumference of a circle is called:

(a) radius (b) chord

(c) sector (d) arc

27. $\tan 45^o$ =

(a) 1 (b) $\sqrt{2}$

(c) $\frac{1}{\sqrt{2}}$ (d) 0

28. 1 radian =

(a) $(180\pi)^o$ (b) $(180)^o$

(c) $\frac{\pi}{180}^o$ (d) $\frac{180}{\pi}^o$

29. $\frac{1}{\text{Sin}\theta} =$

(a) $\text{Cos}\theta$ (b) $\text{Sec}\theta$

(c) $\text{Cosec}\,\theta$ (d) $\text{Cot}\,\theta$

30. $\frac{\pi}{4}$ radians =

(a) 30^o (b) 45^o

(c) 60^o (d) 90^o

31. $\frac{1}{\tan\theta} =$

(a) $\tan\theta$ (b) $\text{Sec}\theta$

(c) $\text{Cosec}\,\theta$ (d) $\text{Cot}\theta$

32. $\frac{3\pi}{2}$ radians=

(a) 90^o (b) 180^o

(c) 270^o (d) 360^o

33. $\text{Cos}45^o$ =

(a) 1 (b) $\sqrt{2}$

(c) $\frac{1}{\sqrt{2}}$ (d) 0

34. Formula for arc length is:

(a) $= r\theta$ (b) $r = \theta$

(c) $\theta = r$ (d) $= \frac{r}{\theta}$

35. $\text{Cosec}\,45^o$ =

(a) 1 (b) $\sqrt{2}$

(c) $\frac{1}{\sqrt{2}}$ (d) 0

36. $\text{Sin}60^o$ =

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) 2 (d) $\frac{2}{\sqrt{3}}$

37. $\text{Cot}45^o$ =

(a) 1 (b) $\sqrt{2}$

(c) $\frac{1}{\sqrt{2}}$ (d) 0

38. $\text{Cos}60^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) 2 (d) $\frac{2}{\sqrt{3}}$

39. $\text{Cos}30^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) 2 (d) $\frac{2}{\sqrt{3}}$

40. $\tan 30^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

41. $\text{Cot}30^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

42. In which quadrant only $\text{Cos}\theta$ and $\text{Sec}\theta$ are positive?

(a) I (b) II

(c) III (d) IV

43. $\text{Co sec}\, 30^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) 2 (d) $\frac{2}{\sqrt{3}}$

44. $\text{Sec}45^\circ =$

(a) 1 (b) $\sqrt{2}$

$\frac{1}{\sqrt{2}}$

45. $\text{Sin}30^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) 2 (d) $\frac{2}{\sqrt{3}}$

46. In which quadrant θ lie when $\text{Cos}\theta < 0, \text{Sin}\theta < 0$?

(a) I (b) II

(c) III (d) IV

47. In which quadrant θ lie when $\text{Sec}\theta > 0, \text{Sin}\theta < 0$?

(a) I (b) II

(c) III (d) IV

48. $\text{Sec}60^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) 2 (d) $\frac{2}{\sqrt{3}}$

49. $\text{Co sec}\, 60^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) 2 (d) $\frac{2}{\sqrt{3}}$

50. In which quadrant only $\text{Sin}\theta$ and $\text{Co sec}\,\theta$ are positive?

(a) I (b) II

(c) III (d) IV

51. $\text{Sec}30^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) 2 (d) $\frac{2}{\sqrt{3}}$

52. In which quadrant only $\tan\theta$ and $\text{Cot}\theta$ are positive?

(a) I (b) II

(c) III (d) IV

53. In which quadrant θ lie when $\text{Sin}\theta > 0, \tan\theta < 0$?

(a) I (b) II

(c) III (d) IV

54. $\tan 60^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

55. $\text{Cot}60^\circ =$

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$

(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

56. In which quadrant θ lie when $\text{Cos}\theta < 0, \tan\theta < 0$?

(a) I (b) II

(c) III (d) IV

57. Cos . Sec=

(a) 1 (b) tan

(c) 0 (d) Cot

58. In which quadrant θ lie when $\text{Sin}\theta < 0, \text{Sec}\theta < 0$?

(a) I (b) II

(c) III (d) IV

59. $\text{Sin}^2\theta + \text{Cos}^2\theta =$

(a) $\tan^2\theta$ (b) $\text{Cot}^2\theta$

(c) 1 (d) 0

60. $1 + \tan^2\theta =$

(a) $\text{Sin}^2\theta$ (b) $\text{Cos}^2\theta$

(c) $\text{Cosec}^2\theta$ (d) $\text{Sec}^2\theta$

61. Angles between 180° and 270° are in which quadrant?

(a) I (b) II

(c) III (d) IV

62. Angles between 0° and 90° are in which quadrant?

(a) I (b) II

(c) III (d) IV

63. Fundamental trigonometric ratios are

(a) 3 (b) 4

(c) 5 (d) 6

64. Which one is a quadrantal angle?

(a) 30° (b) 45°

(c) 60° (d) 90°

65. Sin .cosec=

(a) 1 (b) 0

(c) Sin (d) Cos

66. In which quadrant θ lie when $\text{Cosec}\theta > 0, \text{Cos}\theta > 0$?

(a) I (b) II

(c) III (d) IV

67. $\tan\theta\cot\theta =$

(a) $\sin\theta$ (b) $\text{Sec}\theta$

(c) 1 (d) 0

68. $1 + \text{Cot}^2\theta =$

(a) $\text{Sin}^2\theta$ (b) $\text{Cos}^2\theta$

(c) $\text{Cosec}^2\theta$ (d) $\text{Sec}^2\theta$

69. In which quadrate all trigonometric ratios are positive?

(a) I (b) II

(c) III (d) IV

70. Sin (-310°)=.....

(a) $\text{Sin}310^\circ$ (b) $-\text{Sin}310^\circ$

(c) $\text{Cos}310^\circ$ (d) $\tan 310^\circ$

71. Sec (-60°).....

(a) $-\text{Sec}60^\circ$ (b) $\text{Sec}60^\circ$

(c) $\text{Cos}60^\circ$ (d) $\text{Cot}60^\circ$

ANSWER KEY

1	a	**2**	d	**3**	c	**4**	b	**5**	c	**6**	b	**7**	a	**8**	b
9	c	**10**	b	**11**	b	**12**	b	**13**	b	**14**	c	**15**	c	**16**	d
17	c	**18**	c	**19**	d	**20**	d	**21**	c	**22**	b	**23**	a	**24**	c
25	a	**26**	d	**27**	a	**28**	d	**29**	c	**30**	b	**31**	d	**32**	c
33	c	**34**	a	**35**	b	**36**	b	**37**	a	**38**	a	**39**	b	**40**	d
41	c	**42**	d	**43**	c	**44**	b	**45**	a	**46**	c	**47**	d	**48**	c
49	d	**50**	b	**51**	d	**52**	c	**53**	b	**54**	c	**55**	d	**56**	b
57	a	**58**	c	**59**	c	**60**	d	**61**	c	**62**	a	**63**	d	**64**	d
65	a	**66**	a	**67**	c	**68**	c	**69**	a	**70**	b	**71**	b		

Q.1. Write short answers of the following question:

(i) Define an angle.

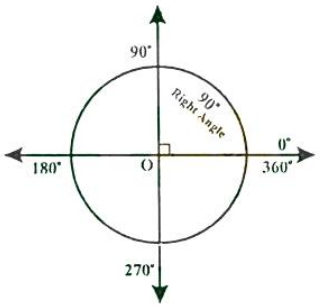
Ans: Angle:

An angle is defined as the union of two non–collinear rays with some common end point. The rays are called arms of the angle and the common end point is known as vertex of the angle

(ii) What is sexagesimal system of measurement of angles?

Ans: Measurement of an angle in sexagesimal system (degree, minute and second)

Degree: We divide the circumferènce of a circle into 360 equal arcs. The angle subtended at the centre of the circle by one arc is called one degree and is denoted by 1°.



The symbols 1°, 1′ and 1″ are used to denote a degree, a minute and a second respectively.

Thus 60 seconds (60″) make one minute (1′)
60 minutes (60′) make one degree (1°)
90 degrees (90°) make one right angle.
360 degrees (360°) make 4 right angles.
An angle of 360° denotes a complete

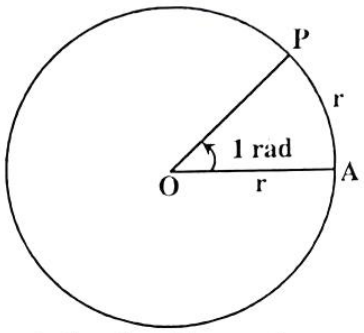
(iii) How many minutes are in two right angles?

Ans: As we know that one right angle = 90°
Two right angles = 180°
Minutes in 1° = 60′
Minutes in 180° = 180×60
Minutes in two right angles = 10800′

(iv) Define radian measure of an angle.

Ans:

Radian: The angle subtended at the centre of the circle by an arc, whose length is equal to the radius of the circle is called one Radian.



Consider a circle of radius r whose centre is O. From any point A on the circle cut off an arc AP whose length is equal to the radius of the circle. Join O with A and O with P. The ∠AOP is one radian. This means that when

Length of arc AP = length of radius $\overline{OA}$ then m∠AOP = 1 radian

(v) Convert $\frac{\pi}{4}$ radian to degree measure.

Ans: $\frac{\pi}{4}$ radian $= \frac{\pi}{4}\frac{180}{\pi}$ degrees

$= \frac{\cancel{\pi}}{\cancel{4}}\frac{\cancel{4}\times 45}{\cancel{\pi}}$ degrees

$= 45°$

(vi) Convert 15° to radians

Ans: $15° = 15\ \frac{\pi}{180}$ radian

$= \cancel{15}\ \frac{\pi}{\cancel{15}\times 12}$ radian

$= \frac{\pi}{12}$ radian

(vii) What is the radian measure of the central angle of an arc 50m long on the circle of radius 25m.

Solution: Central angle = θ ? =
Arc length = l = 50m
Radius = r = 25m
Using formula

$L = r\theta$

$\theta = \frac{}{r}$

$= \frac{50}{25}$

$\theta = 2$ radian

(viii) Find r when l = 56cm and θ = 45°

Solution:

$r = ?$

$L = 56$ cm

$\theta = 45°$

$= 45 \frac{\pi}{180}$ radian

$= \frac{\pi}{4}$ radian

Using formula

$L = r\theta$

$56 = r \frac{\pi}{4}$

$r = \frac{56 \times 4}{\pi}$

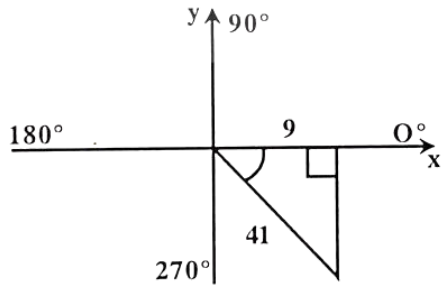
$r = 71.3$ cm

(ix) Find tanθ when $\cos\theta = \frac{9}{41}$ and terminal side of the angle θ is in fourth quadrant.

Solution: $\tan\theta = ?$

As $\cos\theta = \frac{9}{41}$ i.e Base= 9 and hypotenuse = 41

and terminal side of θ is in quadrant IV.



By Pythagorean theorem.

$(\text{Base})^2 + (\text{Perpendicular})^2 = (\text{Hypotenuse})^2$

$(9)^2 + (\text{Per.})^2 = (41)^2$

$(\text{Per.})^2 = 1681 - 81$

$(\text{Per.})^2 = 1600$

$\text{Per.} = \sqrt{1600}$

$\text{Per.} = \pm 40$

So $\tan\theta = \frac{\text{Per.}}{\text{Base}}$

$= \frac{-40}{9}$

–ve sign shows tanθ is –ve in quadrant IV.

(x) Prove that $(1-\sin^2\theta)(1+\tan^2\theta) = 1$

Solution: Let

L.H.S $= (1-\sin^2\theta)(1 + \tan^2\theta)$

$= \cos^2\theta.\sec^2\theta$

$= \cancel{\cos^2\theta}.\frac{1}{\cancel{\cos^2\theta}}$

$= 1$

L.H.S = R.H.S

Q.2. Fill in the blanks:

(i) π radians =_____ degree.

(ii) The terminal side of angle 235° lies in _____quadrant.

(iii) Terminal side of the angle – 30° lies in _____quadrant.

(iv) Area of a circular sector is _____.

(v) If r = 2cm and θ = 3 radian, then area of the circular sector is_____.

(vi) The general form of the angle 480° is _____

(vii) If $\sin\theta = \frac{1}{2}$, then θ _____=

(viii) If θ = 300°, then see (–300)° = _____

(ix) $1 + \cot^2\theta$ _____=

(x) $\sec\theta - \tan\theta$ _____ =

ANSWER KEY

(i)	180°	**(ii)**	III	**(iii)**	IV	**(iv)**	$\frac{1}{2}r^2\theta$	**(v)**	6cm²
(vi)	$2k\pi + 120°$, where k = 1	**(vii)**	30° or $\frac{\pi}{6}$ *radian*	**(viii)**	2	**(ix)**	$\text{cosec}^2\theta$	**(x)**	$\frac{1-\sin\theta}{\cos\theta}$