

Unit Circle Worksheet

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Exact values only. No calculator. Use your completed unit circle if you need it.

Name _____ Date _____ Score _____ / 38

PART A Coordinates from angles

Write the exact coordinates ($\cos \theta$, $\sin \theta$) of the point on the unit circle at each angle.

- | | |
|---|--|
| 1 $30^\circ \rightarrow (\quad , \quad)$ | 6 $7\pi/4 \rightarrow (\quad , \quad)$ |
| 2 $135^\circ \rightarrow (\quad , \quad)$ | 7 $4\pi/3 \rightarrow (\quad , \quad)$ |
| 3 $210^\circ \rightarrow (\quad , \quad)$ | 8 $3\pi/2 \rightarrow (\quad , \quad)$ |
| 4 $300^\circ \rightarrow (\quad , \quad)$ | 9 $\pi/3 \rightarrow (\quad , \quad)$ |
| 5 $5\pi/6 \rightarrow (\quad , \quad)$ | 10 $11\pi/6 \rightarrow (\quad , \quad)$ |

PART B Angles from coordinates

Each point is on the unit circle. Find θ ($0^\circ \leq \theta < 360^\circ$) in degrees and in radians.

- 11 $(1/2, \sqrt{3}/2)$ $\theta = \quad^\circ = \quad \text{rad}$
- 12 $(-\sqrt{2}/2, \sqrt{2}/2)$ $\theta = \quad^\circ = \quad \text{rad}$
- 13 $(-\sqrt{3}/2, -1/2)$ $\theta = \quad^\circ = \quad \text{rad}$
- 14 $(\sqrt{2}/2, -\sqrt{2}/2)$ $\theta = \quad^\circ = \quad \text{rad}$
- 15 $(-1, 0)$ $\theta = \quad^\circ = \quad \text{rad}$
- 16 $(1/2, -\sqrt{3}/2)$ $\theta = \quad^\circ = \quad \text{rad}$
- 17 $(0, 1)$ $\theta = \quad^\circ = \quad \text{rad}$
- 18 $(-1/2, \sqrt{3}/2)$ $\theta = \quad^\circ = \quad \text{rad}$

Practise free online: [► Unit Circle Game](#) [► Practice Game](#) [► Circle Calculator](#)

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PART C Exact trigonometric values

Find the exact value. Write “undefined” where the function does not exist.

- | | |
|-----------------------------|--------------------------|
| 19 $\sin 150^\circ =$ _____ | 25 $\sin 5\pi/3 =$ _____ |
| 20 $\cos 225^\circ =$ _____ | 26 $\cos 2\pi/3 =$ _____ |
| 21 $\tan 300^\circ =$ _____ | 27 $\tan 7\pi/6 =$ _____ |
| 22 $\csc 210^\circ =$ _____ | 28 $\sin 3\pi/2 =$ _____ |
| 23 $\sec 330^\circ =$ _____ | 29 $\cos \pi =$ _____ |
| 24 $\cot 135^\circ =$ _____ | 30 $\tan \pi/2 =$ _____ |

PART D Degrees and radians

Convert. Leave radian answers in terms of π .

- | | |
|-----------------------------------|---------------------------------|
| 31 45° in radians = _____ | 35 $\pi/6$ in degrees = _____ |
| 32 150° in radians = _____ | 36 $5\pi/4$ in degrees = _____ |
| 33 240° in radians = _____ | 37 $2\pi/3$ in degrees = _____ |
| 34 330° in radians = _____ | 38 $11\pi/6$ in degrees = _____ |

*Check your work against the answer key, then try the Unit Circle Game to see how fast you can get.*Practise free online: [► Unit Circle Game](#) [► Practice Game](#) [► Circle Calculator](#)

Worksheet Answer Key

All 38 answers, each checked against sin, cos and tan.

PART A

Coordinates ($\cos \theta$, $\sin \theta$)

- | | |
|--|---|
| 1. $30^\circ = (\sqrt{3}/2, 1/2)$ | 6. $7\pi/4 = (\sqrt{2}/2, -\sqrt{2}/2)$ |
| 2. $135^\circ = (-\sqrt{2}/2, \sqrt{2}/2)$ | 7. $4\pi/3 = (-1/2, -\sqrt{3}/2)$ |
| 3. $210^\circ = (-\sqrt{3}/2, -1/2)$ | 8. $3\pi/2 = (0, -1)$ |
| 4. $300^\circ = (1/2, -\sqrt{3}/2)$ | 9. $\pi/3 = (1/2, \sqrt{3}/2)$ |
| 5. $5\pi/6 = (-\sqrt{3}/2, 1/2)$ | 10. $11\pi/6 = (\sqrt{3}/2, -1/2)$ |

PART B

Angle θ in degrees and radians

- | | |
|--|---|
| 11. $(1/2, \sqrt{3}/2) \rightarrow 60^\circ = \pi/3 \text{ rad}$ | 15. $(-1, 0) \rightarrow 180^\circ = \pi \text{ rad}$ |
| 12. $(-\sqrt{2}/2, \sqrt{2}/2) \rightarrow 135^\circ = 3\pi/4 \text{ rad}$ | 16. $(1/2, -\sqrt{3}/2) \rightarrow 300^\circ = 5\pi/3 \text{ rad}$ |
| 13. $(-\sqrt{3}/2, -1/2) \rightarrow 210^\circ = 7\pi/6 \text{ rad}$ | 17. $(0, 1) \rightarrow 90^\circ = \pi/2 \text{ rad}$ |
| 14. $(\sqrt{2}/2, -\sqrt{2}/2) \rightarrow 315^\circ = 7\pi/4 \text{ rad}$ | 18. $(-1/2, \sqrt{3}/2) \rightarrow 120^\circ = 2\pi/3 \text{ rad}$ |

PART C

Exact values

- | | | |
|------------------------------------|------------------------------------|-------------------------------------|
| 19. $\sin 150^\circ = 1/2$ | 23. $\sec 330^\circ = 2\sqrt{3}/3$ | 27. $\tan 7\pi/6 = \sqrt{3}/3$ |
| 20. $\cos 225^\circ = -\sqrt{2}/2$ | 24. $\cot 135^\circ = -1$ | 28. $\sin 3\pi/2 = -1$ |
| 21. $\tan 300^\circ = -\sqrt{3}$ | 25. $\sin 5\pi/3 = -\sqrt{3}/2$ | 29. $\cos \pi = -1$ |
| 22. $\csc 210^\circ = -2$ | 26. $\cos 2\pi/3 = -1/2$ | 30. $\tan \pi/2 = \text{undefined}$ |

PART D

Conversions

- | | |
|---------------------------|---------------------------|
| 31. $45^\circ = \pi/4$ | 35. $\pi/6 = 30^\circ$ |
| 32. $150^\circ = 5\pi/6$ | 36. $5\pi/4 = 225^\circ$ |
| 33. $240^\circ = 4\pi/3$ | 37. $2\pi/3 = 120^\circ$ |
| 34. $330^\circ = 11\pi/6$ | 38. $11\pi/6 = 330^\circ$ |

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