

Brett Robbins Academic Consulting

Math 30-1 Practice Test

Trigonometry

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

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Question 1

The exact value of $\cos\left(\frac{7\pi}{6}\right) + \sin\left(\frac{2\pi}{3}\right)$ is

- A) 0
B) $\frac{\sqrt{3}}{2}$
C) $-\frac{\sqrt{3}}{2}$
D) 1

Question 2

An arc of a circle with radius 12 cm is subtended by a central angle of $\frac{5\pi}{3}$ radians.

The length of the arc is

- A) 10π cm
B) 20π cm
C) 40π cm
D) 60π cm

Question 3

The point $(-5, 12)$ lies on the terminal arm of an angle θ in standard position.

The exact value of $\sin\theta + \cos\theta$ is

- A) $\frac{17}{13}$
B) $-\frac{7}{13}$
C) $\frac{7}{13}$
D) $\frac{5}{13}$

Question 4

The measure of an angle of $\frac{7\pi}{5}$ radians, in degrees, is

- A) 126°
B) 252°
C) 504°
D) 140°

Question 5

The number of solutions to the equation $2\sin^2 x - \sin x - 1 = 0$ on the interval $0 \leq x < 2\pi$ is

- A) 1
- B) 2
- C) 3
- D) 4

Question 6

An expression equivalent to $\sin^2 x(1 + \cot^2 x)$ is

- A) $\tan^2 x$
- B) $\sin^2 x$
- C) $\sec^2 x$
- D) 1

Question 7

For the function $y = 3\cos(2(x - \frac{\pi}{4})) + 1$, the maximum value and period are

- A) Maximum: 4

Period: π

- B) Maximum: 3

Period: π

- C) Maximum: 4

Period: 2π

- D) Maximum: 2

Period: $\frac{\pi}{2}$

Question 8

The exact value of $\csc\left(\frac{4\pi}{3}\right)$ is

A) $\frac{2\sqrt{3}}{3}$

B) $-\frac{2\sqrt{3}}{3}$

C) $-\frac{\sqrt{3}}{2}$

D) -2

Question 9

If $\sin\theta = \frac{3}{5}$ and θ is in Quadrant II, then the exact value of $\cos\theta$ is

A) $\frac{4}{5}$

B) $-\frac{3}{4}$

C) $\frac{4}{3}$

D) $-\frac{4}{5}$

Question 10

If $\cos\theta = -\frac{7}{25}$ and θ is in Quadrant III, then $\tan\theta = \frac{a}{b}$ in lowest terms.

The value of $a + b$ is

Question 11

The solutions to the equation $\sin\left(x - \frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$ on the interval $0 \leq x < 2\pi$ are

A) $x = \frac{\pi}{3}, \frac{2\pi}{3}$

B) $x = \frac{2\pi}{3}, \pi$

C) $x = \frac{\pi}{6}, \frac{\pi}{2}$

D) $x = \pi, \frac{4\pi}{3}$

Question 12

An expression equivalent to $\frac{1 - \cos^2 x}{\cos^2 x}$ is

A) $\cot^2 x$

B) $\sin^2 x$

C) $\tan^2 x$

D) 1

Question 13

A sinusoidal function has a maximum value of 7 and a minimum value of -3 .

The amplitude of the function is

- A) 2
- B) 4
- C) 5
- D) 10

Question 14

The graph of $y = \sin(kx)$, where $k > 0$, completes exactly 3 cycles on the interval $0 \leq x \leq 2\pi$.

The period of the function is

- A) 6π
- B) 3π
- C) $\frac{\pi}{3}$
- D) $\frac{2\pi}{3}$

Question 15

A sector of a circle with radius 10 cm has a central angle of 1.2 radians.

The area of the sector is

- A) 30 cm^2
- B) 60 cm^2
- C) 120 cm^2
- D) 50 cm^2

Question 16

If $\csc \theta = -\frac{5}{3}$ and θ is in Quadrant IV, then the exact value of $\cos \theta$ is

- A) $\frac{4}{5}$
- B) $-\frac{4}{5}$
- C) $\frac{3}{5}$
- D) $-\frac{3}{5}$

Question 17

The sum of all solutions to the equation $\tan^2 x = 3$ on the interval $0 \leq x < 2\pi$ is

- A) 3π
B) 4π
C) 2π
D) 5π

Question 18

The graph of a function of the form $y = a\sin(bx) + d$ has a maximum value of 9 and a minimum value of 1. The value of $a + d$ is

Question 19

An angle with a measure of -470° is coterminal with an angle with a measure of

- A) 110°
B) -110°
C) 290°
D) 250°

Question 20

A sine function has an amplitude of 2, a period of π , no phase shift, a vertical displacement of -1 , and is reflected in the x -axis. Its equation is

- A) $y = -2\sin(2x) - 1$
B) $y = 2\sin(2x) - 1$
C) $y = -2\sin(\frac{x}{2}) - 1$
D) $y = -2\sin(2x) + 1$

Question 21

The exact value of $\sin\left(\frac{11\pi}{6}\right)\cos\left(\frac{11\pi}{6}\right)$ is

- A) $\frac{\sqrt{3}}{4}$ B) $-\frac{\sqrt{3}}{2}$
C) $-\frac{\sqrt{3}}{4}$ D) $\frac{1}{4}$

Question 22

Each of the following angles is a solution to the equation $2\cos^2 x - \cos x = 0$ on the interval $0 \leq x < 2\pi$, except

A) $\frac{\pi}{2}$

B) $\frac{\pi}{3}$

C) $\frac{5\pi}{6}$

D) $\frac{3\pi}{2}$

Question 23

A bicycle wheel with a radius of 0.40 m rotates through an angle of 15 radians.

The distance, in metres, that the bicycle travels is

Question 24

An expression equivalent to $\frac{\cos^2 x}{1 - \sin x}$ is

A) $1 - \sin x$

B) $1 + \sin x$

C) $\sec x$

D) $\tan x$

Question 25

A Ferris wheel with a diameter of 26 m has its lowest point 2 m above the ground.

A rider boards at the lowest point, and the wheel completes one revolution in 4 minutes.

The height of the rider, $h(t)$, after t minutes is modelled by

A) $h(t) = -13\cos\left(\frac{\pi}{2}t\right) + 15$

B) $h(t) = 13\cos\left(\frac{\pi}{2}t\right) + 15$

C) $h(t) = -13\cos(2\pi t) + 15$

D) $h(t) = -13\sin\left(\frac{\pi}{2}t\right) + 15$

Answer Key

- | | | |
|------|--------|-------|
| 1. A | 10. 31 | 19. D |
| 2. B | 11. B | 20. A |
| 3. C | 12. C | 21. C |
| 4. B | 13. C | 22. C |
| 5. C | 14. D | 23. 6 |
| 6. D | 15. B | 24. B |
| 7. A | 16. A | 25. A |
| 8. B | 17. B | |
| 9. D | 18. 9 | |

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