

Watch. Practice. Understand. | Lesson 175

2021 Trigonometry Sample Final Analysis

Watch the matching video: <https://www.youtube.com/watch?v=aUXONAhIF6g>

Practice focus: Unit circle and exact values

Related course review; confirm topics with your teacher.

Name: _____ Date: _____ Show your reasoning and check units.

01 Evaluate $\sin(\pi/6)$, $\cos(\pi/3)$ and $\tan(\pi/4)$.

02 Evaluate $\sin(4\pi/3)$ and $\cos(4\pi/3)$.

03 If $\cos \theta = -3/5$ and θ is in quadrant II, find $\sin \theta$ and $\tan \theta$.

04 Explain why $\sin^2 \theta + \cos^2 \theta = 1$.

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Practice focus: Sine and cosine graphs

Related course review; confirm topics with your teacher.

Name: _____ Date: _____ Show your reasoning and check units.

05 Find amplitude, period and midline of $y = 3\sin(2x) - 1$.

06 For $y = 2\cos(x - \pi/3)$, identify the horizontal shift and range.

07 List five key points of one cycle of $y = \sin x$ on $[0, 2\pi]$.

08 A wheel's rider height is $h(t) = 12 - 10\cos(\pi t/15)$ meters. Find minimum, maximum and period.

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Watch the matching video: <https://www.youtube.com/watch?v=aUXONAhIF6g>

Practice focus: Trigonometric equations

Related course review; confirm topics with your teacher.

Name: _____ Date: _____ Show your reasoning and check units.

09 Solve $2\cos x - 1 = 0$ on $0 \leq x < 2\pi$.

10 Solve $2\sin^2 x - \sin x = 0$ on $0 \leq x < 2\pi$.

11 Solve $\tan x = -1$ for all real x .

12 Solve $\cos 2x = \cos x$ on $0 \leq x < 2\pi$.

Worked answers | Lesson 175

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Practice focus: Unit circle and exact values

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01 Evaluate $\sin(\pi/6)$, $\cos(\pi/3)$ and $\tan(\pi/4)$.

Each follows from special triangles: $1/2$, $1/2$, 1 .

02 Evaluate $\sin(4\pi/3)$ and $\cos(4\pi/3)$.

Quadrant III with reference angle $\pi/3$: $-\sqrt{3}/2$ and $-1/2$.

03 If $\cos \theta = -3/5$ and θ is in quadrant II, find $\sin \theta$ and $\tan \theta$.

$\sin^2 \theta = 1 - 9/25 = 16/25$; positive in quadrant II, so $\sin \theta = 4/5$ and $\tan \theta = -4/3$.

04 Explain why $\sin^2 \theta + \cos^2 \theta = 1$.

On the unit circle $(x, y) = (\cos \theta, \sin \theta)$ and $x^2 + y^2 = 1$ by the distance formula.

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Practice focus: Sine and cosine graphs

Related course review; confirm topics with your teacher.

05 Find amplitude, period and midline of $y = 3\sin(2x) - 1$.

Amplitude 3; period $2\pi/2 = \pi$; midline $y = -1$.

06 For $y = 2\cos(x - \pi/3)$, identify the horizontal shift and range.

Shift right $\pi/3$; range $[-2, 2]$.

07 List five key points of one cycle of $y = \sin x$ on $[0, 2\pi]$.

$(0,0)$, $(\pi/2,1)$, $(\pi,0)$, $(3\pi/2,-1)$, $(2\pi,0)$. Join smoothly.

08 A wheel's rider height is $h(t) = 12 - 10\cos(\pi t/15)$ meters. Find minimum, maximum and period.

Minimum 2 m; maximum 22 m; period $2\pi/(\pi/15) = 30$ seconds if t is in seconds.

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09 Solve $2\cos x - 1 = 0$ on $0 \leq x < 2\pi$.

$\cos x = 1/2$, so $x = \pi/3$ or $5\pi/3$.

10 Solve $2\sin^2 x - \sin x = 0$ on $0 \leq x < 2\pi$.

$\sin x(2\sin x - 1) = 0$. Solutions: $0, \pi, \pi/6, 5\pi/6$.

11 Solve $\tan x = -1$ for all real x .

Tangent has period π : $x = -\pi/4 + k\pi$ for any integer k .

12 Solve $\cos 2x = \cos x$ on $0 \leq x < 2\pi$.

$2\cos^2 x - 1 = \cos x$ gives $(2\cos x + 1)(\cos x - 1) = 0$. Solutions: $0, 2\pi/3, 4\pi/3$.