

Watch. Practice. Understand. | Lesson 162

The Secret of Studying Algebra II and Trigonometry Final Study Packet Part III

Watch the matching video: <https://www.youtube.com/watch?v=XFz9Qaew4eU>

Practice focus: Rational expressions and graphs

Related course review; confirm topics with your teacher.

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

01 Simplify $(x^2 - 9)/(x^2 - x - 6)$, retaining restrictions.

02 Find asymptotes of $f(x) = (2x + 1)/(x - 3)$.

03 Find the hole in $f(x) = (x^2 - 4)/(x - 2)$.

04 Solve $1/x + 1/(x + 1) = 3/2$.

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Watch the matching video: <https://www.youtube.com/watch?v=XFz9Qaew4eU>

Practice focus: Trigonometric equations

Related course review; confirm topics with your teacher.

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

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

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

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

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

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Watch the matching video: <https://www.youtube.com/watch?v=XFz9Qaew4eU>

Practice focus: Sine and cosine graphs

Related course review; confirm topics with your teacher.

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

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

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

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

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

Worked answers | Lesson 162

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Practice focus: Rational expressions and graphs

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01 Simplify $(x^2 - 9)/(x^2 - x - 6)$, retaining restrictions.

Factor and cancel $x - 3$: $(x + 3)/(x + 2)$, with $x \neq 3$ and $x \neq -2$.

02 Find asymptotes of $f(x) = (2x + 1)/(x - 3)$.

Denominator zero gives vertical asymptote $x = 3$. Equal degrees give horizontal asymptote $y = 2$.

03 Find the hole in $f(x) = (x^2 - 4)/(x - 2)$.

For $x \neq 2$, $f(x) = x + 2$. Missing point: $(2, 4)$.

04 Solve $1/x + 1/(x + 1) = 3/2$.

Exclude 0, -1. Multiply by $2x(x + 1)$: $2(2x + 1) = 3x(x + 1)$. Roots: $x = 1$ or $-2/3$; both check.

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

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

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

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

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

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

08 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: $0, 2\pi/3, 4\pi/3$.

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Practice focus: Sine and cosine graphs

Related course review; confirm topics with your teacher.

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

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

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

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

11 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.

12 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.