

Watch. Practice. Understand. | Lesson 198

Review for Pre Calculus Final in Less Than 40 Minutes(Are you Kidding Me?)

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

Practice focus: Functions, composition and piecewise rules

Related course review; confirm topics with your teacher.

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

01 For $f(x) = x^2 - 3x$, find $f(-2)$.

02 If $f(x) = 2x + 1$ and $g(x) = x^2$, find $f(g(3))$ and $g(f(3))$.

03 For $f(x) = x + 2$ when $x < 1$, and $f(x) = x^2$ when $x \geq 1$, find $f(0)$, $f(1)$, $f(2)$.

04 Find the domain of $f(x) = \sqrt{(x - 2)/(x - 5)}$.

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Practice focus: Trigonometric equations

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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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Practice focus: Conic sections

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

09 Find center, vertices and foci of $x^2/25 + y^2/9 = 1$.

10 Find the vertices and asymptotes of $x^2/9 - y^2/16 = 1$.

11 For $y^2 = 8x$, find vertex, focus and directrix.

12 Classify $x^2 + 4y^2 = 16$ and $x^2 - y^2 = 9$.

Worked answers | Lesson 198

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01 For $f(x) = x^2 - 3x$, find $f(-2)$.

$$f(-2) = 4 + 6 = 10.$$

02 If $f(x) = 2x + 1$ and $g(x) = x^2$, find $f(g(3))$ and $g(f(3))$.

$$g(3) = 9, \text{ so } f(9) = 19. \quad f(3) = 7, \text{ so } g(7) = 49.$$

03 For $f(x) = x + 2$ when $x < 1$, and $f(x) = x^2$ when $x \geq 1$, find $f(0)$, $f(1)$, $f(2)$.

Use the first rule at 0 and the second at 1 and 2: 2, 1, 4.

04 Find the domain of $f(x) = \sqrt{(x - 2)/(x - 5)}$.

Require $x \geq 2$ for the radical and $x \neq 5$ for the denominator. Domain: $[2, 5)$ union $(5, \text{infinity})$.

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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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09 Find center, vertices and foci of $x^2/25 + y^2/9 = 1$.

Center (0,0); vertices $(\pm 5, 0)$; $c^2 = 25 - 9 = 16$, so foci $(\pm 4, 0)$.

10 Find the vertices and asymptotes of $x^2/9 - y^2/16 = 1$.

Vertices $(\pm 3, 0)$; asymptotes $y = \pm(4/3)x$.

11 For $y^2 = 8x$, find vertex, focus and directrix.

$4p = 8$, so $p = 2$. Vertex (0,0), focus (2,0), directrix $x = -2$.

12 Classify $x^2 + 4y^2 = 16$ and $x^2 - y^2 = 9$.

The first has two positive squared terms with unequal coefficients: ellipse. The second has opposite signs: hyperbola.