Pre-Calc AB

Lesson 56

11/12/15

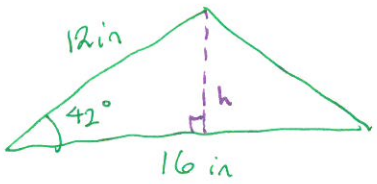
Agenda: 11/12/15

lesson 56

Triangular Areas

System of Inequalities

Ex. 56.1 Find the area of the triangle

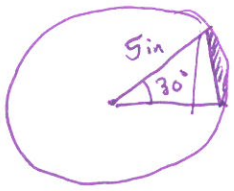


$$\text{Area} = \frac{1}{2}(16)h$$

$$= \frac{1}{2}16(12\sin 42°)$$

$$\approx \boxed{64.24\ in^2}$$

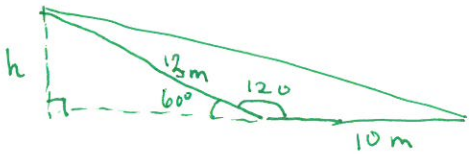
Ex. Find the area of the segment shown



$$\pi(5)^2 \cdot \frac{30°}{360°} - \frac{5}{2} \cdot 5 \cdot \sin 30°$$

$$=$$

Ex. Find the area of the triangle



$$\text{Area} = \frac{1}{2}(10)\sin(60°)\cdot 13$$

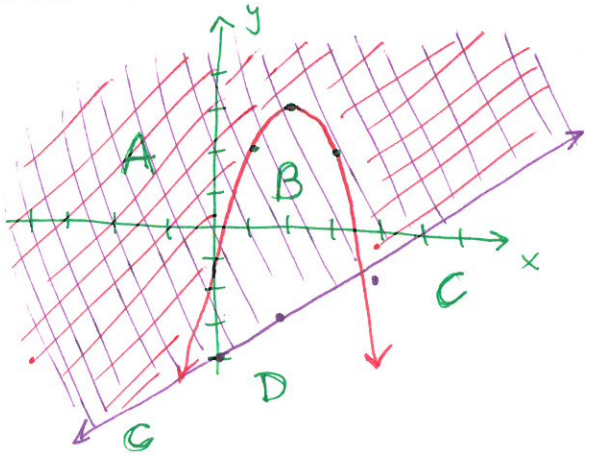
$$= 5 \cdot 13 \cdot \frac{\sqrt{3}}{2}$$

$$= \boxed{\frac{65\sqrt{3}}{2}\ m^2}$$

System of Inequalities

Ex. 56.5 Find the region ▨ containing all points that satisfy the given system of

$$\begin{cases} y \geq \frac{1}{2}x - 4 & \text{(line)} \\ y \geq -x^2 + 4x - 1 = -(x-2)^2 + 3 \end{cases}$$



Pre-Calc AB

Lesson 57

11/13/15

Agenda: 11/13/15

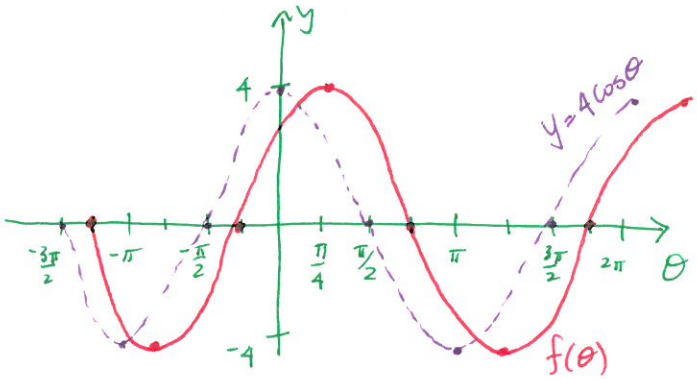
Lesson 57

Phase shifts

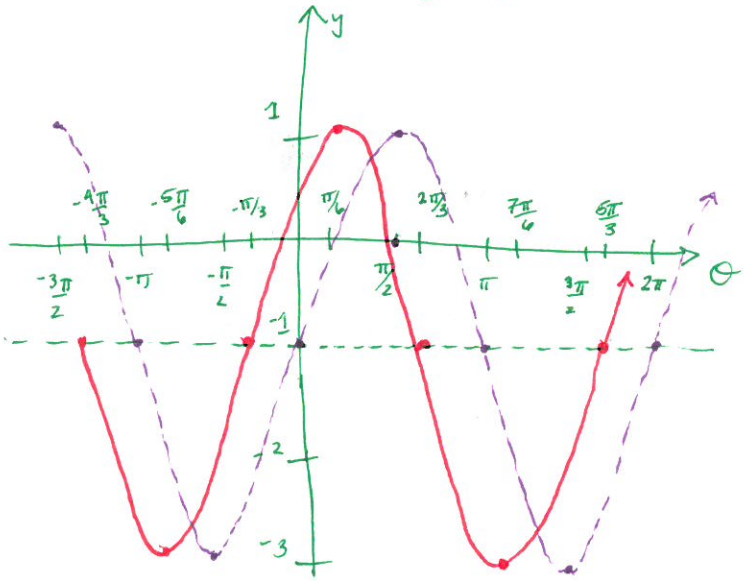
Period of a Sinusoid

• **Phase shift** – horizontal shift of a sinusoid.

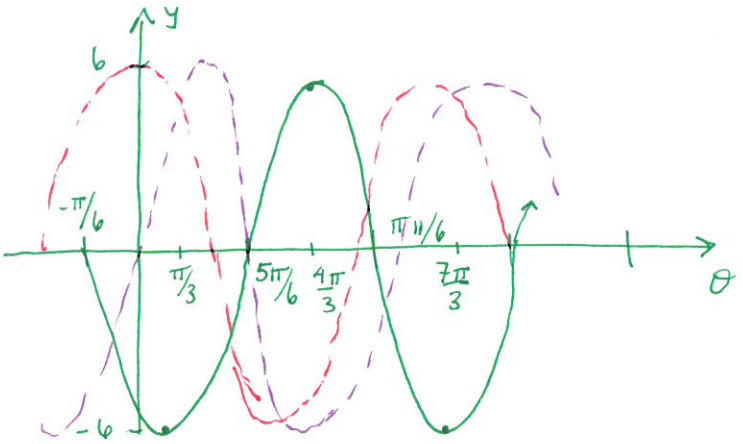
Ex. Sketch a graph of $f(\theta) = 4\cos(\theta - \pi/4)$



$g(\theta) = 2\sin(\theta + \pi/3) - 1$



Ex. Write an equation of the sinusoid below using cosine and then using sine.



$f(\theta) = 6\sin\left(\theta - \frac{5\pi}{6}\right)$

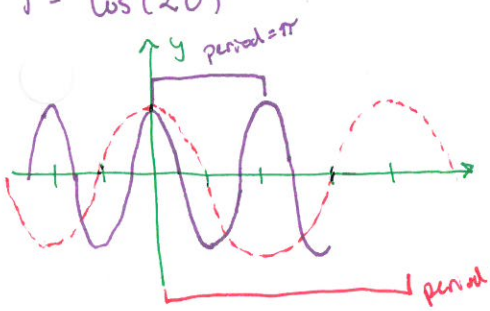
or $f(\theta) = -6\sin\left(\theta + \frac{\pi}{6}\right)$

$g(\theta) = 6\cos\left(\theta - \frac{4\pi}{3}\right)$

or $g(\theta) = -6\cos\left(\theta - \frac{\pi}{3}\right)$

Period of a Sinusoid – horizontal shift / shrink

$y = \cos(2\theta)$

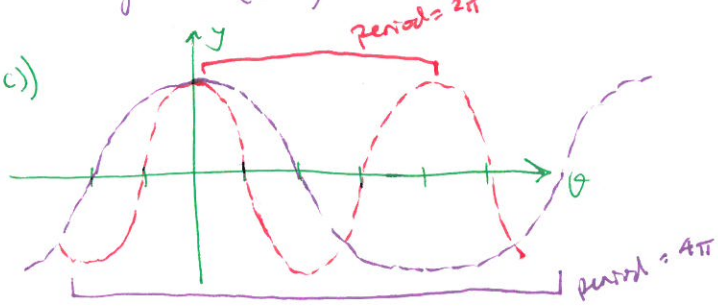


In general:

$f(\theta) = A + \sin(B(\theta + C))$

Period = $\frac{2\pi}{B}$

$y = \cos\left(\frac{1}{2}\theta\right)$



Pre-Calc AB

Lesson 58

11/16/15

Agenda: 11/16/15

lesson 58

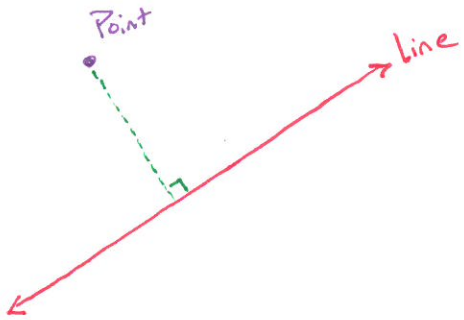
Distance from a Point to a line

More Parabolas

Test 7 on Wednesday

Distance from a Point to a line:

Ex Find the distance between $(2,-7)$ and the line $y = -2x+3$.



① Find line perpendicular to $y=-2x+3$ that goes through $(2,-7)$

$$y+7 = \frac{1}{2}(x-2)$$

$$y = \frac{1}{2}x - 8$$

② Find the intersection point of the Lines

$$-2x+3 = \frac{1}{2}x - 8$$

$$11 = \frac{5}{2}x$$

$$x = \frac{22}{5}$$

$$y = \frac{1}{2}\left(\frac{22}{5}\right) - \frac{80}{10} = \frac{-58}{10} = -\frac{29}{5}$$

③ Find the distance between $(2,-7)$ and the intersection point.

$$\text{Distance} = \sqrt{\left(2-\frac{22}{5}\right)^2 + \left(-7+\frac{29}{5}\right)^2}$$

$$= \sqrt{\left(\frac{-12}{5}\right)^2 + \left(\frac{-6}{5}\right)^2}$$

$$= \sqrt{\frac{144}{25} + \frac{36}{25}}$$

$$= \frac{\sqrt{180}}{5}$$

$$= \boxed{\frac{6\sqrt{5}}{5}}$$

Ex. 58.3 Complete the square to graph $3y - x^2 + 2x + 5 = 0$

$$5 + 3y = x^2 - 2x$$

$$1 + 5 + 3y = (x-1)^2$$

$$y = \frac{1}{3}(x-1)^2 - 2$$

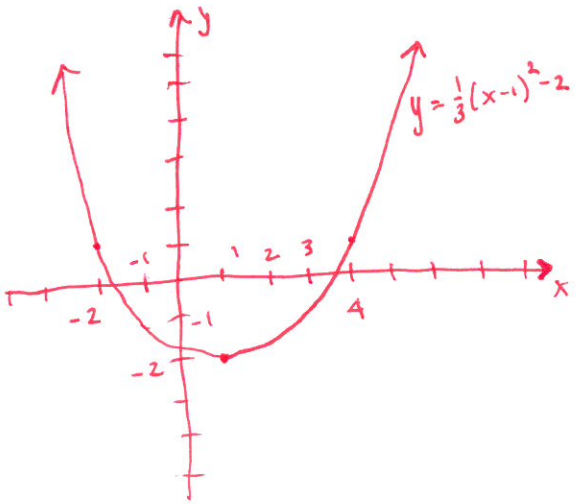
Vertex: $(1,-2)$

...is of sym: $x = 1$

Min: $y = -2$ $\quad a > 0$

Wide parabola: $\frac{1}{3} = a$

Points: $(4,1)$ and $(-2,1)$



Pre-Calc AB

Lesson 59

11/17/15

Agenda: 11/17/15

Lesson 59

Advanced log Problems

The Color of the White House

] Last Lesson on Pre-Comp/Midterm

★ Test 7 tomorrow ★ Handout WS 20

Reduce to one of two forms:

$$\log_b a = c \quad \text{or} \quad \log_b a = \log_b c$$

$$\Downarrow \qquad\qquad \Downarrow$$

$$a = b^c \text{ (Exp. Form)} \qquad a = c$$

Ex 59.1 Solve $3\log_{10} x = \log_{10} 16 - \log_{10} 2$

$$\log_{10} x^3 = \log_{10} \frac{16}{2}$$

$$x^3 = 8 \Rightarrow \boxed{x = 2}$$

Ex. $2\log_3 x = 1 + \log_3(-3+2x)$

$$\log_3 \frac{x^2}{-3+2x} = 1 \qquad \frac{x^2}{-3+2x} = 3 \qquad x^2 - 6x + 9 = 0$$

$$\boxed{x = 3}$$

The Color of the White House is white $\Leftrightarrow$ $5^{\log_5 14} = 14$ "5 raised to the power 5 must be raised to in order to get 14"

$$y^{\log_y 5x^2} = 5x^2 \qquad (abc)^{\log_{(abc)} \theta} = \theta$$

Logarithm means power or exponent!

$\log_c e^6$ "the power e must be raised to in order to get e^6"

Ex. 59.5 Simplify $9^{\log_3 5}$

$$= 3^{2\log_3 5}$$

$$= 3^{\log_3 (5^2)}$$

$$= \boxed{25}$$

Ex. 59.7 Simplify $3^{\log_3 4 + \log_3 5}$

$$= 3^{\log_3 4} \cdot 3^{\log_3 5}$$

$$= 4 \cdot 5 = \boxed{20}$$

Pre-Calc AB

Lesson 60

11/19/15

Agenda: 11/19/15

lesson 60

Factorable Trig Equations

Loss of Solutions Caused by Division] Comprehensive Topics

★ Test 7 back after lesson ★ Handout WS 21

Factor: $x^2 - 1 = 0$ $x^2 + x = 0$

$(x-1)(x+1) = 0$ $x(x+1) = 0$

Trig Factoring: $\sin^2 x - 1 = 0$ $\tan^2\theta + \tan\theta = 0$

$(\sin x - 1)(\sin x + 1) = 0$ $\tan\theta(\tan\theta + 1) = 0$

Ex. Solve $3\tan^2\theta - 1 = 0$ given $0 \le \theta < 2\pi$

$\tan^2\theta = \frac{1}{3}$ $\tan\theta = \pm\frac{\sqrt{3}}{3}$

$\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

Ex. Solve $\sin^2(2\theta) - \sin(2\theta) = 0$ given $0 \le \theta < 2\pi$

$\sin(2\theta)(\sin(2\theta) - 1) = 0$

$\sin(2\theta) = 0$ or $\sin(2\theta) = 1$

$2\theta = 0 + \pi k$ $2\theta = \frac{\pi}{2} + 2\pi k$

$\theta = \frac{\pi k}{2}$ $\theta = \frac{\pi}{4} + \pi k$

$\theta = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$

$\theta = \frac{\pi}{4}, \frac{5\pi}{4},$

Ex 60.4 Solve $2\sin x\cos x = \sin x$ given that $0 \le x < 2\pi$

$2\sin x\cos x - \sin x = 0$ $\sin x = 0$ or $2\cos x - 1 = 0$

$\sin x(2\cos x - 1) = 0$ $x = \pi k$ or $\cos x = \frac{1}{2}$

$x = 0, \pi$ $x = \frac{\pi}{3}, \frac{5\pi}{3}$