Pre-Calc AB

Lesson 46

10/27/15

Agenda: 10/27/15

HW leader:

Lesson 46

Complex roots

Factoring over the complex numbers

• Recall roots of a quadratic equation are the zeros or solutions. Can get complex solutions called complex roots.

★ For quadratic equations with real number coefficients with complex roots always occur in conjugate pairs.

Ex. Factor $3x^2 + 6x + 15$ over the set of complex numbers

$$= 3(x^2+2x+5) = 3(x-(-1+2i))(x-(-1-2i)) = \boxed{3(x+1-2i)(x+1+2i)}$$

$$x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(5)}}{2(1)} = \frac{-2 \pm \sqrt{-16}}{2} = -1 \pm 2i$$

Ex. Write the quadratic equation with lead coefficient -2 and roots $1+\sqrt{6}i$ and $1-\sqrt{6}i$.

$$-2(x-(1+\sqrt{6}i))(x-(1-\sqrt{6}i)) = 0$$

$$-2(x^2 - (1+\sqrt{6}i)x - (1-\sqrt{6}i)x + (1+6)) = 0$$

$$-2(x^2 - 2x + 7) = 0$$

$$\boxed{-2x^2 + 4x - 14 = 0}$$

12 on WS15 ~~[illegible]~~ ~~[illegible]~~ HAPPY

Pre-Calc AB

Lesson 47

10/29/15

Agenda: 10/29/15

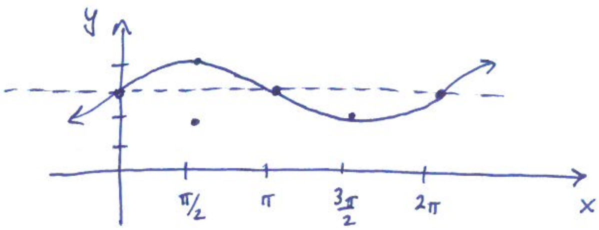
Lesson 47

Vertical Sinusoid Translations

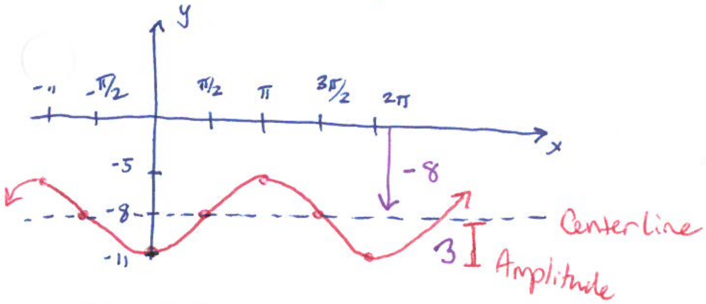
Arctan

* Quiz back after lesson
* WS 16

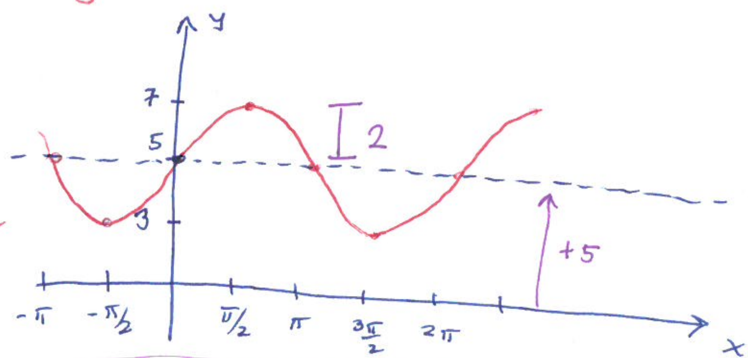
Sketch $f(x) = 3 + \sin(x)$



Ex: Write the equation of the following sinusoids



$\boxed{f(x) = -3\cos(x) - 8}$



$\boxed{g(x) = 2\sin(x) + 5}$

Recall: $\text{Arctan}(x) = \theta$ where θ is between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ $\left(-\frac{\pi}{2} < \theta < \frac{\pi}{2}\right)$

$\Updownarrow$

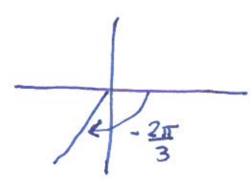
$\tan\theta = x$

Ex: Evaluate $\text{Arctan}\left(\tan\left(-\frac{2\pi}{3}\right)\right)$

$= \text{Arctan}(\sqrt{3})$

$= \theta$ with $-\pi/2 < \theta < \pi/2$

$= \boxed{\frac{\pi}{3}}$ such that $\tan\theta = \sqrt{3}$



$\tan\left(-\frac{2\pi}{3}\right) = \frac{\sin(\pi/3)}{\cos(\pi/3)} = \frac{\sqrt{3}/2}{1/2} = \sqrt{3}$

Pre-Calc AB

Lesson 48

10/30/15

Agenda: 10/30/15

- HW leader
- Lesson 48
  - Powers of Trig Functions
  - Perpendicular Bisector

Notation:

- $\sin \theta^2 = \sin(\theta^2)$
- $\sin^2\theta = (\sin\theta)^2$ ← Very Important!

Ex. Evaluate $\csc^2\left(-\frac{9\pi}{4}\right) - \cot^2\left(\frac{-\pi}{6}\right)$

$$= \left(\csc\left(-\frac{9\pi}{4}\right)\right)^2 - \left(\cot\left(-\frac{\pi}{6}\right)\right)^2$$

$$= \left(\csc\left(\frac{\pi}{4}\right)\right)^2 - \left(\cot\left(\frac{\pi}{6}\right)\right)^2$$

$$= \left(\frac{1}{\sin(\pi/4)}\right)^2 - \left(\frac{\cos(\pi/6)}{\sin(\pi/6)}\right)^2$$

$$= (\sqrt{2})^2 - (\sqrt{3})^2$$

$$= \boxed{-1}$$

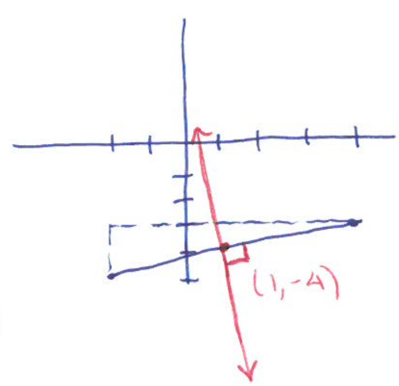
Ex. 48.4 Write the general form of the perpendicular bisector of the line segment whose endpoints are (4, -3) and (-2, -5). Use the midpoint formula method.

Point: midpoint formula:

$$\left(\frac{4+(-2)}{2}, \frac{-3+(-5)}{2}\right) = (1, -4)$$

Slope: Of blue line: $\frac{-5-(-3)}{-2-(4)} = \frac{-2}{-6} = \frac{1}{3}$

Perpendicular slope: -3



For a line need:
- point
- slope

general form of perpendicular bisector:

$$y + 4 = -3(x-1) = -3x + 3$$

$$\boxed{y + 3x + 1 = 0}$$

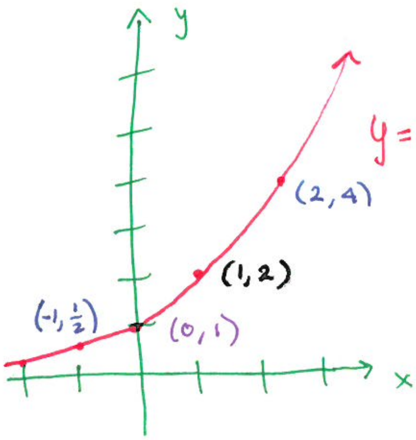
Pre-Calc AB

Lesson 49 + 50

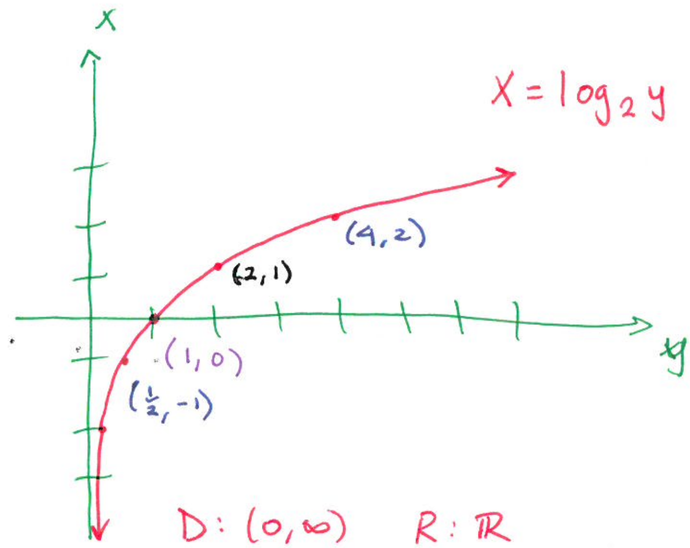
11/2/15

Agenda: 11/2/15
HW leader
Lesson 49 + 50
Log function
Trig Equations

* Handout Test 6 study Guide
* Handout WS 17



D: $\mathbb{R}$ R: $(0, \infty)$



D: $(0, \infty)$ R: $\mathbb{R}$

Ex. Show $x \log_b(a) = \log_b(a^x)$

$a = b^c$ then $c = \log_b a$

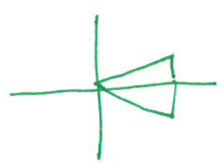
$x \log_b(a) = x \cdot c$

$\log_b(a^x) = \log_b((b^c)^x) = \log_b(b^{cx}) = cx$ ✓

Ex. Solve $2 - \csc\theta = 0$ given $0 \le \theta \le 2\pi$

$\csc\theta = 2$ so $\sin\theta = \frac{1}{2}$

when $\boxed{\theta = \frac{\pi}{6} \text{ and } \frac{11\pi}{6}}$



Ex. $2 + \sqrt{3}\tan\theta = -1$ $\tan\theta = \frac{-3}{\sqrt{3}} = -\sqrt{3}$

$\frac{\sin\theta}{\cos\theta} = \frac{-\sqrt{3}/2}{1/2}$ or $\frac{\sin\theta}{\cos\theta} = \frac{\sqrt{3}/2}{-1/2}$

$\boxed{\theta = \frac{2\pi}{3} \text{ and } \theta = \frac{5\pi}{3}}$