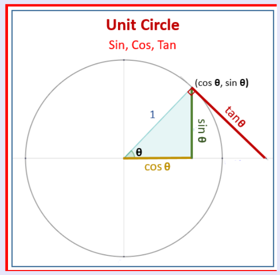
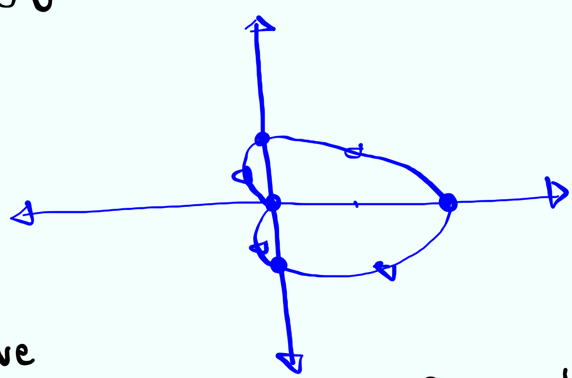
Trigonometry Final Exam Review



Feb 19-8:47 AM

Graph $r = 1 + \cos\theta$

θ	r
$0°$	2
$90°$	1
$180°$	0
$270°$	1
$360°$	2



Solve

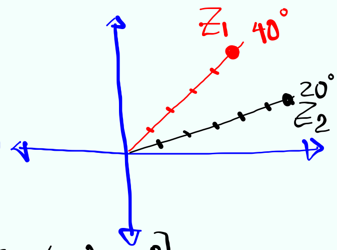
$r = 0 \qquad 1 + \cos\theta = 0 \qquad \cos\theta = -1$

$\theta = 180°$

Dec 9-10:33 AM

$$Z_1 = 5(\cos 40^\circ + i \sin 40^\circ)$$

$$Z_2 = 6(\cos 20^\circ + i \sin 20^\circ)$$



$$Z_1 \cdot Z_2 = 5 \cdot 6 [\cos(40^\circ + 20^\circ) + i \sin(40^\circ + 20^\circ)]$$

$$= 30 [\cos 60^\circ + i \sin 60^\circ]$$

$$\frac{Z_1}{Z_2} = \frac{5}{6} [\cos(40^\circ - 20^\circ) + i \sin(40^\circ - 20^\circ)]$$

$$= \frac{5}{6} [\cos 20^\circ + i \sin 20^\circ]$$

$$Z_1^3 = 5^3 [\cos(3 \cdot 40^\circ) + i \sin(3 \cdot 40^\circ)]$$

$$= 125 [\cos 120^\circ + i \sin 120^\circ]$$

Dec 9-10:36 AM

Find all cube roots of 8 Cis 60°

3 Ans.

$n = 3$

$K = 0, 1, 2$

$$8 [\cos 60^\circ + i \sin 60^\circ]$$

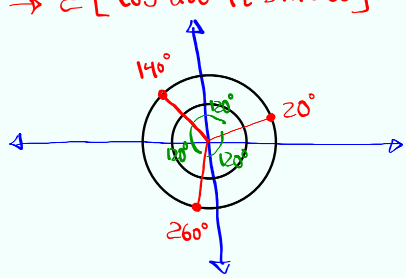
$$\sqrt[3]{8} \left[\cos \frac{60^\circ + K \cdot 360^\circ}{3} + i \sin \frac{60^\circ + K \cdot 360^\circ}{3}\right]$$

$$= 2 [\cos(20^\circ + K \cdot 120^\circ) + i \sin(20^\circ + K \cdot 120^\circ)]$$

$K = 0 \rightarrow 2 [\cos 20^\circ + i \sin 20^\circ]$

$K = 1 \rightarrow 2 [\cos 140^\circ + i \sin 140^\circ]$

$K = 2 \rightarrow 2 [\cos 260^\circ + i \sin 260^\circ]$

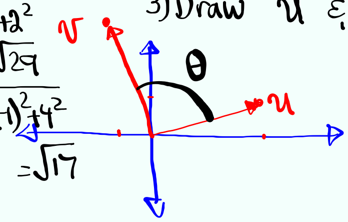


Dec 9-10:42 AM

$u = \langle 5, 2 \rangle$ $|u| = \sqrt{5^2 + 2^2} = \sqrt{29}$

$v = \langle -1, 4 \rangle$ $|v| = \sqrt{(-1)^2 + 4^2} = \sqrt{17}$

3) Draw u & v



1) $u + v = \langle 4, 6 \rangle$

2) $u - v = \langle 6, -2 \rangle$

4) $u \cdot v = 5(-1) + 2(4) = -5 + 8 = 3$

5) Find the angle between them.

$$\cos\theta = \frac{u \cdot v}{|u||v|}$$

$$\cos\theta = \frac{3}{\sqrt{29} \cdot \sqrt{17}}$$

$$\cos\theta \approx .135$$

$$\theta = \cos^{-1}(.135)$$

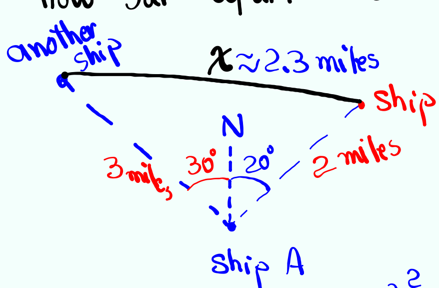
$$\theta \approx 82^\circ$$

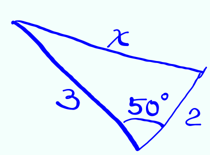
Dec 9-10:48 AM

Ship A is 2 miles from another ship with bearing N 20° E.

Ship A is 3 miles from a third ship with bearing of N 30° W.

How far apart are those ships?





$$x^2 = 2^2 + 3^2 - 2 \cdot 2 \cdot 3 \cdot \cos 50^\circ$$

$$x^2 = 5.287 \quad \boxed{x \approx 2.3}$$

Dec 9-10:55 AM

Graph $y = 1 + 2\sin(3x - \pi)$

shift up

stretch

shift horizontally

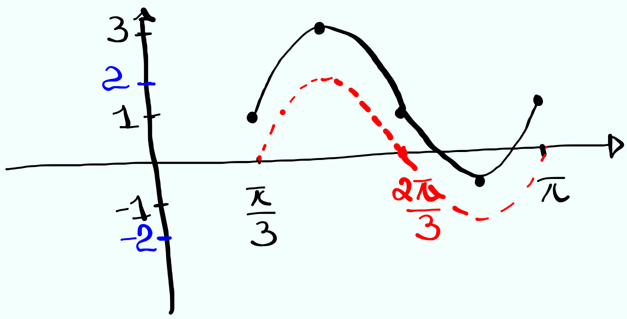
$0 \le 3x - \pi \le 2\pi$

$\pi \le 3x \le 3\pi$

$\frac{\pi}{3} \le x \le \pi$

$60^\circ \qquad 180^\circ$

$\frac{60^\circ + 180^\circ}{2} = 120^\circ$



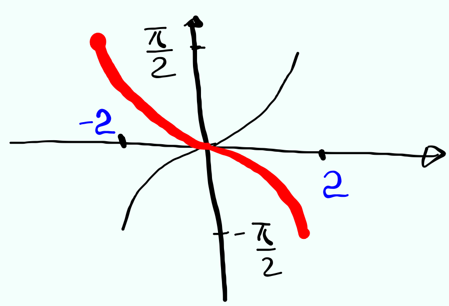
Dec 9-11:00 AM

Graph $y = -\sin^{-1}\frac{1}{2}x$

Reflection about x-axis

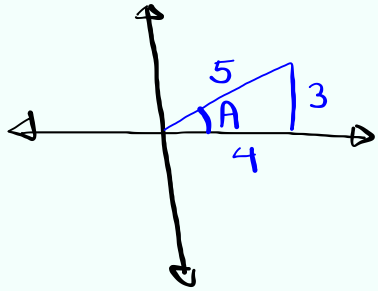
$-1 \le \frac{1}{2}x \le 1$

$-2 \le x \le 2$

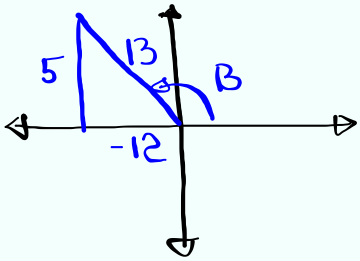


Dec 9-11:06 AM

$\sin A = \frac{3}{5}$, A is in QI



$\tan B = \frac{-5}{12}$, B is in QII.



$$\sin(A+B) = \sin A\cos B + \cos A \sin B$$

$$= \frac{3}{5}\cdot\frac{-12}{13} + \frac{4}{5}\cdot\frac{5}{13}$$

$$= \boxed{\frac{-16}{65}}$$

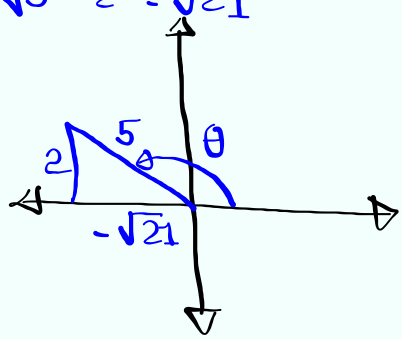
$$\tan 2A = \frac{2\tan A}{1-\tan^2 A} = \frac{2\cdot\frac{3}{4}}{1-\left(\frac{3}{4}\right)^2} = \frac{\frac{3}{2}}{1-\frac{9}{16}} = \frac{24}{7}$$

LCD=16

Dec 9-11:09 AM

$\sqrt{5^2-2^2} = \sqrt{21}$

$\sin\theta = \frac{2}{5}$, θ is in QII

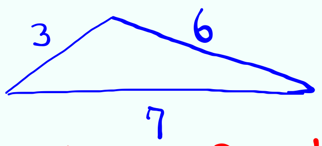


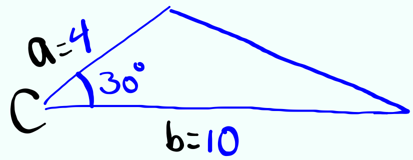
$\sin\theta = \frac{2}{5}$	$\csc\theta = \frac{5}{2}$
$\cos\theta = -\frac{\sqrt{21}}{5}$	$\sec\theta = -\frac{5}{\sqrt{21}}$
$\tan\theta = -\frac{2}{\sqrt{21}}$	$\cot\theta = -\frac{\sqrt{21}}{2}$

Rationalize $\frac{-2}{\sqrt{21}}\cdot\frac{\sqrt{21}}{\sqrt{21}} = \frac{-2\sqrt{21}}{21}$

Dec 9-11:15 AM

Find the area





Heron's formula

$$\text{Area} = \sqrt{S(S-a)(S-b)(S-c)}$$

$$S = \frac{3+6+7}{2} = 8$$

$$= \sqrt{8(8-3)(8-7)(8-6)}$$

$$= \sqrt{8\cdot 5\cdot 1\cdot 2} = \sqrt{80} \approx 9$$

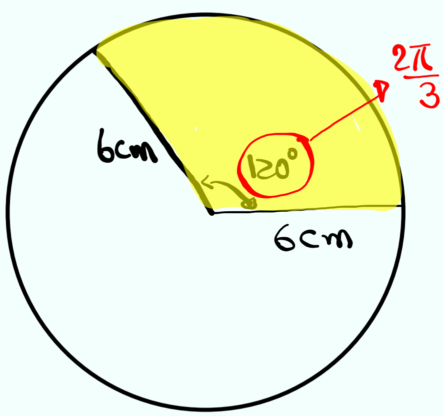
$$\text{Area} = \frac{1}{2}ab\sin C$$

$$= \frac{1}{2}\cdot 4\cdot 10\cdot \sin 30^\circ$$

$$= \frac{1}{2}\cdot 4\cdot 10\cdot \frac{1}{2} = 10$$

units^2

Dec 9-11:20 AM



1) Find area of the Sector

$$A = \frac{1}{2}r^2\theta = \frac{1}{2}(6)^2\cdot\frac{2\pi}{3}$$

$$= \frac{36\cdot 2\pi}{6} = \boxed{12\pi\ cm^2}$$

2) Find the arc length.

$$S = r\theta$$

$$= 6\cdot\frac{2\pi}{3} = 4\pi\ cm$$

Dec 9-11:25 AM

Find all exact solution of

$2\cos^2 x + \cos x - 1 = 0$ over $[0, 2\pi)$.

$(2\cos x - 1)(\cos x + 1) = 0$

$2\cos x - 1 = 0$ OR $\cos x + 1 = 0$

$\cos x = \frac{1}{2}$ $\quad$ $\cos x = -1$

QI, QIV $\quad$ $\boxed{x = \pi}$

RA $\frac{\pi}{3}$

QI $\quad x = \boxed{\pi/3}$

QIV $\quad x = 2\pi - \frac{\pi}{3} = \boxed{\frac{5\pi}{3}}$

$\left\{\frac{\pi}{3}, \pi, \frac{5\pi}{3}\right\}$

Dec 9-11:30 AM

exact Value of $\tan\frac{x}{2}$ when $\sin x = \frac{-4}{5}$

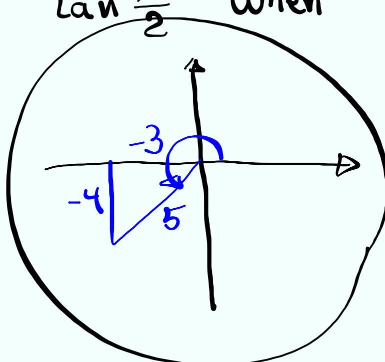
$\pi < x < \frac{3\pi}{2}$

$180° < x < 270°$

$90° < \frac{x}{2} < 135°$

QII

tan is −



$\tan\frac{x}{2} = \dfrac{\sin x}{1 + \cos x}$

$= \dfrac{\frac{-4}{5}}{1 + \frac{-3}{5}}$

LCD=5 $\quad = \dfrac{-4}{5 + (-3)} = \dfrac{-4}{2} = \boxed{-2}$

Dec 9-11:35 AM

$Z = 3\,\text{cis}\,15^\circ$

$Z^4 = 3^4\,\text{cis}\,4\cdot 15^\circ$

$= \boxed{81\,\text{cis}\,60^\circ}$

Find all $\boxed{\text{cube roots}}$ of $64i$

$n=3$

3 – Ans

$K = 0, 1, 2$

$64i = 0 + 64i$

$= 64(\cos 90^\circ + i\sin 90^\circ)$

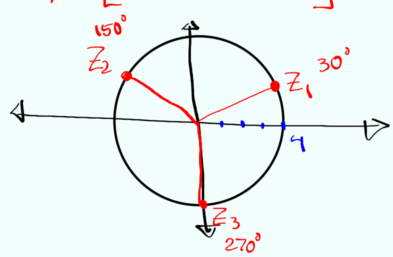
$$\sqrt[3]{64}\left[\cos\left(\frac{90^\circ + K\cdot 360^\circ}{3}\right) + i\sin\left(\frac{90^\circ + K\cdot 360^\circ}{3}\right)\right]$$

$$= 4\left[\cos(30^\circ + K\cdot 120^\circ) + i\sin(30^\circ + K\cdot 120^\circ)\right]$$

$K=0 \rightarrow 4[\cos 30^\circ + i\sin 30^\circ] = Z_1$

$K=1 \rightarrow 4[\cos 150^\circ + i\sin 150^\circ] = Z_2$

$K=2 \rightarrow 4[\cos 270^\circ + i\sin 270^\circ] = Z_3$



Dec 9-11:41 AM