

Assignments for the week of Oct 24:

- 45 minutes of Khan Academy
- Textbook problems due Wed(2nd)/Thurs(1st)
 - 7.3 #1-23 odd, 33,35 vector operations
 - #45-51 odd dot product

Final Exams

1st period: Wed. 11/2 9am-11am

2nd period: Fri. 10/28 9am-11am

Bring your textbooks to class on the last day: Wed(2nd)/Thurs(1st)

It will be up to you to turn them in to the library.

Find the exact value of $\cos \frac{\pi}{12} \cos \frac{\pi}{4} - \sin \frac{\pi}{12} \sin \frac{\pi}{4}$.

$$\begin{aligned} &= \cos \left(\frac{\pi}{12} + \frac{\pi}{4} \right) \\ &= \cos \left(\frac{\pi}{12} + \frac{3\pi}{12} \right) = \cos \left(\frac{4\pi}{12} \right) \\ &= \cos \left(\frac{\pi}{3} \right) = \boxed{\frac{1}{2}} \end{aligned}$$

Given $\vec{v} = \langle 3, -2 \rangle$, $\vec{w} = \langle -7, 1 \rangle$

1. Find $\vec{v} - \vec{w}$. $\approx \langle 3 - (-7), -2 - 1 \rangle = \langle 10, -3 \rangle$

2. Find $|\vec{v}|$. $= \sqrt{a^2 + b^2} = \sqrt{(3)^2 + (-2)^2} = \boxed{\sqrt{13}}$

3. Find $\vec{v} \cdot \vec{w}$. $3(-7) + (-2)(1)$
 $= -21 - 2 = \boxed{-23}$

4. Find a unit vector \vec{u} in the same direction as \vec{v} .

$$\left\langle \frac{3}{\sqrt{13}}, \frac{-2}{\sqrt{13}} \right\rangle = \left\langle \frac{3\sqrt{13}}{13}, \frac{-2\sqrt{13}}{13} \right\rangle$$

Review:

10. Find the length of an arc that subtends an angle of 120° on a circle whose diameter is 12 cm.

arc length = $s = ?$
 angle = $\theta = 120^\circ$
 radius = $r = 6 \text{ cm}$

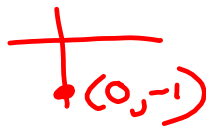
$$s = r\theta$$

$$= \cancel{6 \text{ cm}}^4 (\cancel{120^\circ}) \cdot \frac{\pi}{\cancel{180^\circ}_3}$$

$$= \boxed{4\pi \text{ cm}}$$

Evaluate the following trigonometric expressions:

11. $\sec \frac{\pi}{4} = \sqrt{2}$



13. $\tan(-90^\circ) = \frac{\sin(-90^\circ)}{\cos(-90^\circ)}$
 $= \frac{-1}{0}$ undefined

12. $\cos(-420^\circ) = \frac{1}{2}$

14. $\sin 135^\circ = \frac{1}{\sqrt{2}}$

Evaluate the inverse trig function. Give your answer in radians.

15. $\sin^{-1}\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$

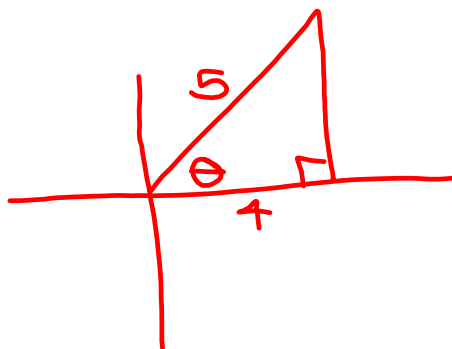
16. $\cos^{-1}\frac{1}{\sqrt{2}} = \frac{\pi}{4}$

17. Simplify. $\cos 125^\circ \cos 55^\circ - \sin 125^\circ \sin 55^\circ$

$\cos(125 + 55) = \cos 180^\circ = \boxed{-1}$

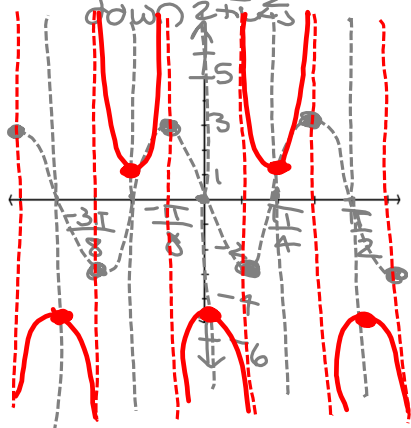
18. Evaluate. $\sin\left[\cos^{-1}\left(\frac{4}{5}\right)\right]$

$= \boxed{\frac{3}{5}}$



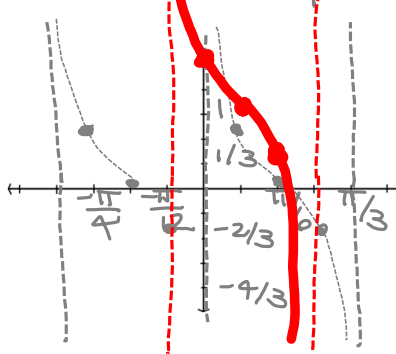
$$f(x) = -3 \csc\left(4x + \frac{\pi}{2}\right) - 2$$

- a. "amplitude" 3
- b. period $\frac{2\pi}{4} = \frac{\pi}{2}$
- c. horizontal shift left 1 tick $\frac{-\pi/2}{4} = -\frac{\pi}{8}$
- d. vertical shift down 2 ticks



$$f(x) = \frac{2}{3} \cot\left(3x - \frac{3\pi}{4}\right) + 1$$

- e. "amplitude" 2/3
- f. period $\frac{\pi}{3}$
- g. horizontal shift right 3 ticks $\frac{3\pi/4}{3} = \frac{\pi}{4}$
- h. vertical shift up 3 ticks

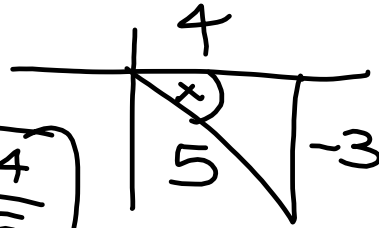


Angle	Quadrant (I, II, III, or IV)	Reference angle (in degrees)
-240°	II	60°
310°	IV	50°
$\frac{7\pi}{6}$	III	30°
$\frac{9\pi}{4}$	I	45°
$\frac{2\pi}{5}$ $\frac{180^\circ}{\pi}$	I	35°

Given that $\sin x = \frac{-3}{5}$ and x is in quadrant IV, find $\sin 2x$, $\cos 2x$, and $\tan 2x$.

$$\sin 2x = 2 \sin x \cos x$$

$$= 2 \left(\frac{-3}{5} \right) \left(\frac{4}{5} \right) = \boxed{\frac{-24}{25}}$$



$$\cos 2x = \cos^2 x - \sin^2 x = \left(\frac{4}{5} \right)^2 - \left(\frac{-3}{5} \right)^2 = \boxed{\frac{7}{25}}$$

$$\tan 2x = \frac{-24/25}{7/25} = \boxed{-\frac{24}{7}}$$

