Given $\vec{v} = \langle -1,6 \rangle$, $\vec{w} = \langle 6,\cancel{-}1 \rangle$

1. Find $2\vec{v} - 3\vec{w}$.

$= 2\langle -1,6\rangle - 3\langle 6,1\rangle = \langle -2,12\rangle - \langle 18,3\rangle = \boxed{\langle -20,9\rangle}$

2. Find $|\vec{v}|$.

$\sqrt{(-1)^2+6^2} = \boxed{\sqrt{37}}$

$-1^2 \neq (-1)^2$

3. Find $|\vec{w}|$.

$\sqrt{6^2+1^2} = \boxed{\sqrt{37}}$

$-x^2 \neq (-x)^2$

4. Find $\vec{v} \cdot \vec{w}$.

$(-1)(6) + 6(1) = \boxed{0}$

5. Find the angle θ between $\vec{v}$ and $\vec{w}$.

$\cos^{-1}\left(\frac{\vec{v}\cdot\vec{w}}{|\vec{v}||\vec{w}|}\right) = \cos^{-1}\left(\frac{0}{\sqrt{37}\sqrt{37}}\right) = \cos^{-1}(0) = \boxed{90^\circ}$

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

$\vec{u} = \left\langle \frac{-1}{\sqrt{37}}, \frac{6}{\sqrt{37}} \right\rangle = \left\langle \frac{-\sqrt{37}}{37}, \frac{6\sqrt{37}}{37} \right\rangle$

7.6

37. $\vec{r} = \langle -2,-8 \rangle$

$|\vec{r}| = \sqrt{(-2)^2+(-8)^2} = \sqrt{4+64} = \sqrt{68} = 2\sqrt{17}$

$\vec{u} = \left\langle \frac{-\cancel{2}}{\cancel{2}\sqrt{17}}, \frac{-\overset{4}{\cancel{8}}}{\cancel{2}\sqrt{17}} \right\rangle = \left\langle \frac{-\sqrt{17}}{17}, \frac{-4\sqrt{17}}{17} \right\rangle$

Find the radius (in cm) of a circle that contains an arc of length 8m, subtending a 100° angle.

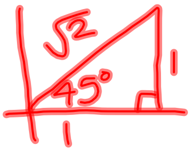
$s = 8m\ ;\ \theta = 100°\ ;\ r = ?cm$

$\frac{s}{\theta} = \frac{r\theta}{\theta} \qquad r = \frac{s}{\theta}$

$r = \frac{8\cancel{m}}{\cancel{100}°} \cdot \frac{\cancel{100}cm}{1\cancel{m}} \cdot \frac{180°}{\pi} = \boxed{\frac{1440}{\pi}\ cm}$

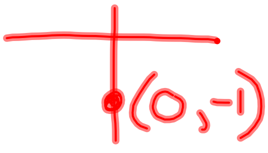
Evaluate the following trigonometric expressions:

1. $\sec\frac{\pi}{4}$ 2. $\cos(-420°)$ 3. $\tan(-90°)$ 4. $\sin 135°$



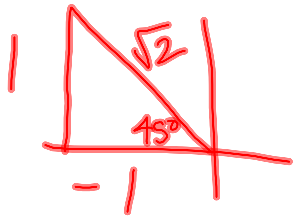
$\boxed{\sqrt{2}}$

$\boxed{\frac{1}{2}}$



$\frac{-1}{0}$

$\boxed{\text{undefined}}$



$\boxed{\frac{1}{\sqrt{2}}}$

Solve for x. (all solutions, no restrictions)

$\sin(2x) - \sin(x) = 0$

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

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

$\sin x = 0 \qquad \cos x = \frac{1}{2}$

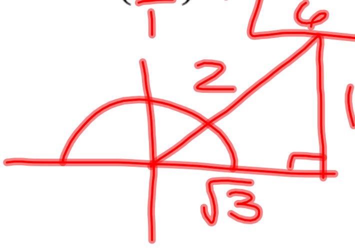
$\left.\begin{array}{l} x = 0 + 2\pi k \\ x = \pi + 2\pi k \end{array}\right\} x = \boxed{\pi k}$

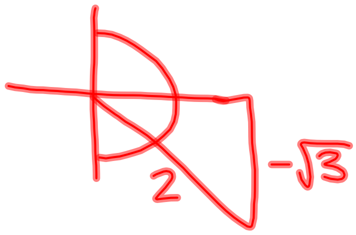
$\boxed{\begin{array}{l} x = \frac{\pi}{3} + 2\pi k \\ x = \frac{5\pi}{3} + 2\pi k \end{array}}$

Evaluate the inverse functions. Give your answers in radians.

1. $\csc^{-1}\left(-\frac{2}{\sqrt{3}}\right) = \boxed{-\frac{\pi}{3}}$

2. $\cot^{-1}(\sqrt{3}) = \boxed{\frac{\pi}{6}}$





$\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$: sin, csc, tan

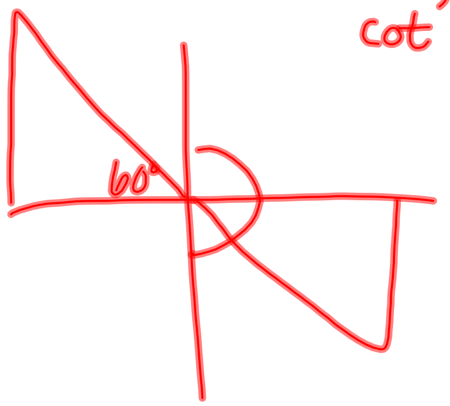
$(0, \pi)$: cos, sec, cot

Evaluate.

1. $\sin^{-1}\left(\sin\frac{\pi}{5}\right) = \boxed{\frac{\pi}{5}}$

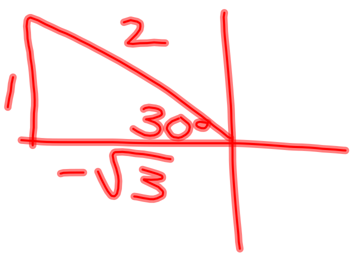
$\frac{\pi}{5} \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

2. $\tan^{-1}\left(\tan\frac{2\pi}{3}\right) = \boxed{-\frac{\pi}{3}}$



Given that $\tan\frac{x}{2} = \frac{1-\cos x}{\sin x}$, evaluate $\tan\frac{5\pi}{12}$.

$$\tan\frac{5\pi/6}{2} = \frac{1-\cos\frac{5\pi}{6}}{\sin\frac{5\pi}{6}} = \frac{1-\left(\frac{-\sqrt{3}}{2}\right)}{\frac{1}{2}}$$



$$= \left(1+\frac{\sqrt{3}}{2}\right)\left(\frac{2}{1}\right)$$

$$= \boxed{2+\sqrt{3}}$$

Prove.

$\sin 3x = 3\sin x - 4\sin^3 x$

$LHS = \sin(2x + x) =$

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

$= (2\sin x \cos x)\cos x + (\cos^2 x - \sin^2 x)\sin x =$

$= 2\sin x \cos^2 x + \sin x \cos^2 x - \sin^3 x =$

$= 3\sin x \cos^2 x - \sin^3 x =$

$= 3\sin x(1 - \sin^2 x) - \sin^3 x =$

$= 3\sin x - 3\sin^3 x - \sin^3 x =$

$= 3\sin x - 4\sin^3 x = RHS$ ▫

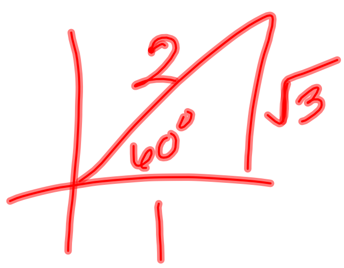
Find the exact value of $\cos\frac{\pi}{12}\cos\frac{\pi}{4} - \sin\frac{\pi}{12}\sin\frac{\pi}{4}$.

$\cos(a+b) = \cos a \cos b - \sin a \sin b$

$= \cos\left(\frac{\pi}{12} + \frac{\pi}{4}\right)$

$= \cos\left(\frac{\pi}{12} + \frac{3\pi}{12}\right) = \cos\frac{4\pi}{12} = \cos\frac{\pi}{3}$

$= \boxed{\frac{1}{2}}$



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

a. "amplitude"

b. period

c. horizontal shift

d. vertical shift

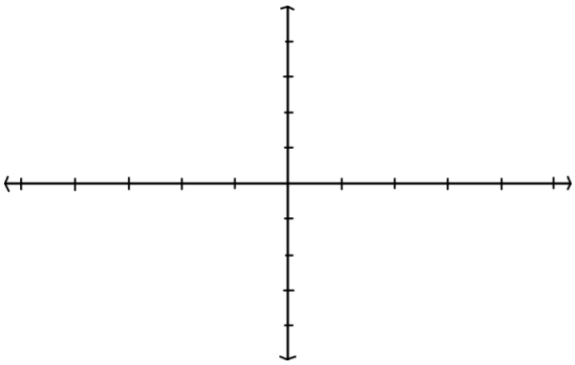
$f(x) = \frac{2}{3}\cot\left(3x - \frac{3\pi}{4}\right) + 1$

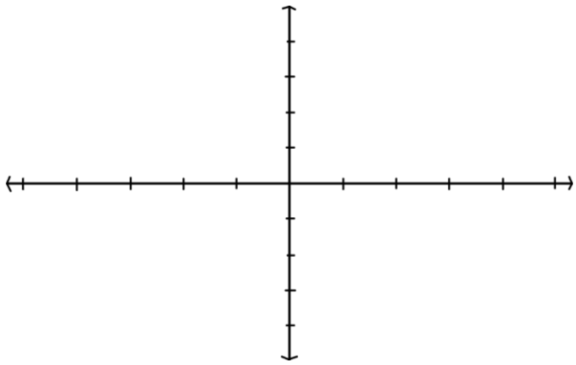
e. "amplitude"

f. period

g. horizontal shift

h. vertical shift





<u>Homework due Friday</u>:

7.6 #9-26 all

7.6 #33-47odd, 53-57odd, 63-67odd