Math 112, section _____   _____   NAME: _____
Test 2, version A, Spring 2011   100
Sections 7.6-7.8 & 8.1-8.5   Seat Location: _____
Show all your work. Full credit is based on your work shown!
    6 pts
1. a. Use a sum or difference identity to write the expression as a function of a single angle, then find
        the **<u>exact value</u>** of the expression. $\cos 165° \cos 15° - \sin 165° \sin 15° =$ _____

                                                                        $=$ _____ $=$ _____
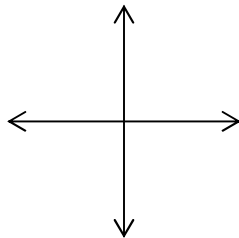
    10 pts

    b. Use a sum or difference identity to find the **<u>exact value</u>** of $\cos \dfrac{7\pi}{12}$.

2. Given that $\sin \alpha = \dfrac{4}{5}$ with $\dfrac{\pi}{2} < \alpha < \pi,$ and $\sin \beta = -\dfrac{2}{\sqrt{5}} = -\dfrac{2\sqrt{5}}{5},$ with $\pi < \beta < \dfrac{3\pi}{2}$,

    find the **exact value** of each of the following: *(Sketch a reference triangle and label its sides.)*
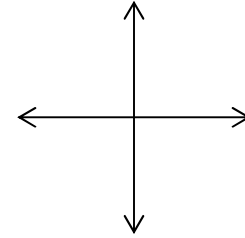   5 pts   5 pts
    a. $\cos \alpha =$ b. $\cos \beta =$

    6 pts
    c. $\sin(\alpha + \beta) =$

    6 pts   6 pts

    d. $\sin(2\alpha) =$ e. $\cos\left(\dfrac{\beta}{2}\right) =$

                                                                                        _____
                                                                                         44

3. Establish each identity. Show all your steps to indicate which identities you used.

5 pts   7 pts

a. $\cos\theta(\tan^2\theta+1)=\sec\theta$ b. $(\sin\theta+\cos\theta)^2+(\sin\theta-\cos\theta)^2=2$

8 pts

c. $\csc x-\sin x=\cos x\cot x$

12 pts

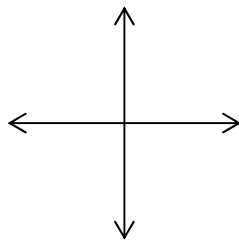4. Evaluate without a calculator giving **exact values**. Draw and label a sketch to illustrate each one.
    [Note: Your sketch should show the angle and a labeled triangle or a point on the unit circle.]
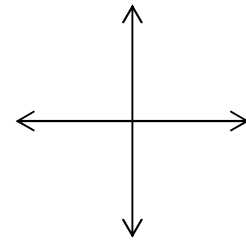
a. $\sin^{-1}\left(-\dfrac{1}{2}\right)=$ _____   b. $\tan\left[\cos^{-1}\left(-\dfrac{1}{2}\right)\right]=\tan[$ _____ $]=$ _____

reference $\angle$ = _____   reference $\angle$ = _____
    (in radians)   (in radians)

8pts
5. Write the equation of the cosine function that satisfies the following information.

Amplitude = 1.5, period = 4π, phase shift = $\dfrac{\pi}{4}$ units to the right, and vertical shift = up 2 unit.

16pts
6. For each of the following functions, <u>graph at least two periods</u> (one period in the positive x direction and one period in the negative x direction.) Find the pertinent information (amplitude, period, divisions of period, etc.) **Label the axes with appropriate values**. Asymptotes should be dashed lines. Plot at least 5 points in each period.
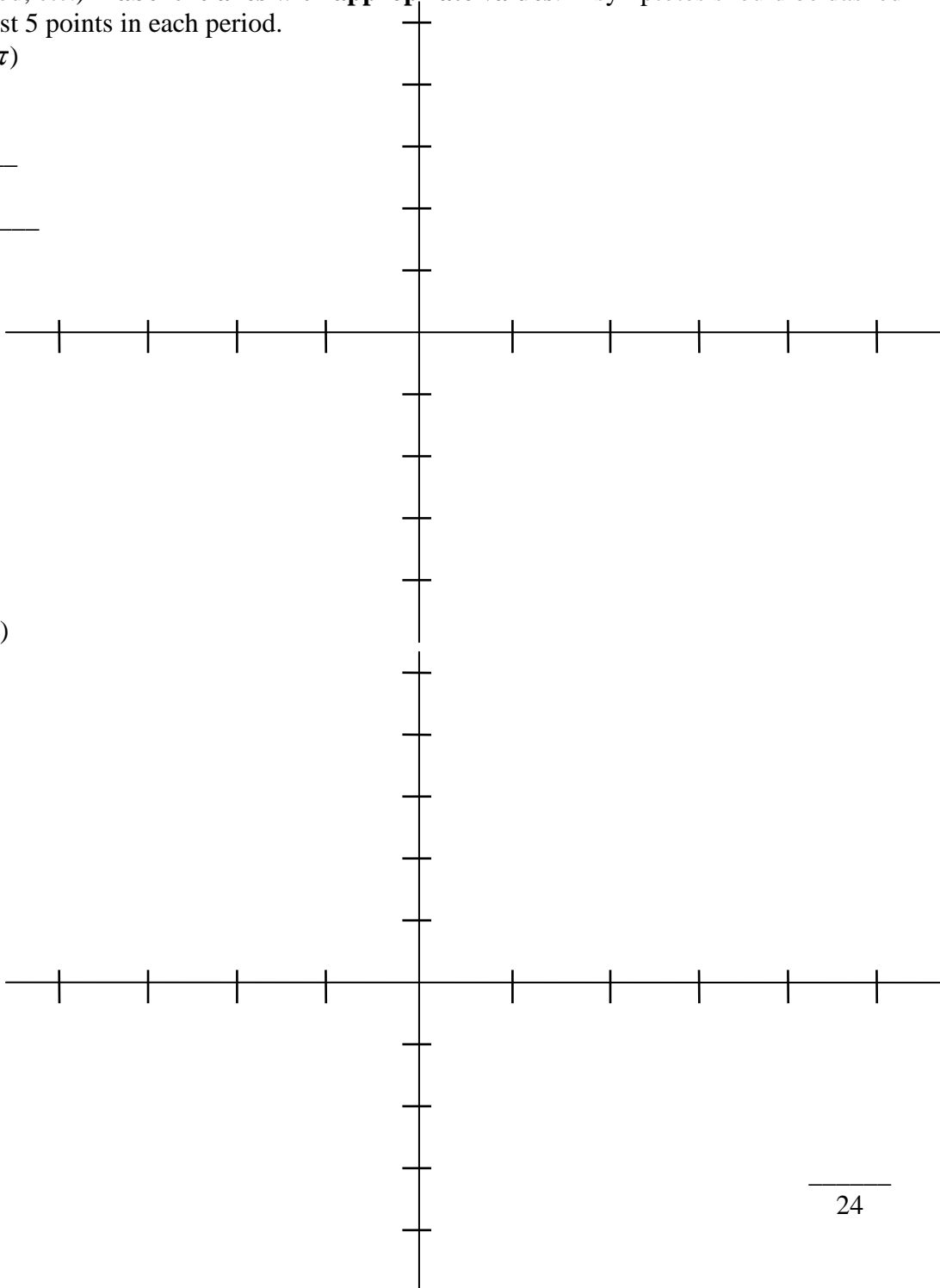
a. $y = -3\sin(2x - \pi)$

period: _____

amplitude: _____

phase shift : _____

x | y

b. $y = -3\csc(2x - \pi)$

x | y

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