$x = \cos\theta \quad y = \sin\theta$

Math 112 $\frac{y}{x} = \tan\theta$ Name: Skit-KEY

MTH 112 Exam 1 Review

Non-Calculator Portion

For questions 1 – 10, find the exact value of each expression.

1. $\sin(60°) = \frac{\sqrt{3}}{2}$

2. $\cos\left(\frac{3\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

3. $\sin\left(\frac{-5\pi}{6}\right) = -\frac{1}{2}$

4. $6\cos\left(\frac{3\pi}{4}\right) - 2\tan\left(-\frac{\pi}{3}\right)$

$= 6 \cdot \frac{-\sqrt{2}}{2} - 2 \cdot (-\sqrt{3})$

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

5. $4\csc\left(\frac{3\pi}{4}\right) - \cot\left(-\frac{\pi}{4}\right)$

$= 4 \cdot \frac{2}{\sqrt{2}} + 1$

$= \frac{8\sqrt{2}}{2} + 1$

$= 4\sqrt{2} + 1$

6. $\sin^2(135°) + \cos^2(135°)$

$= 1$

7. $\csc\left(\frac{\pi}{3}\right)\tan\left(\frac{\pi}{3}\right)$

$= \frac{2}{\sqrt{3}} \cdot \sqrt{3}$

$= 2$

8. $\sec(\pi) - \csc\left(\frac{\pi}{2}\right)$

$-1 - 1$

$= -2$

9. $1 - \sin^2 30° - \sin^2 60°$

$= \cos^2 30 - \sin^2 60$

$= \frac{3}{4} - \frac{3}{4} = 0$

10. $\cos(540°) - \tan(-405°)$

$= -1 + 1$

$= 0$

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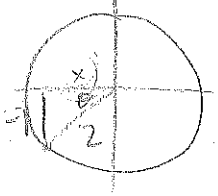
11. Find the exact values of the remaining trigonometric functions if $\csc(\theta) = -2$ and $\pi < \theta < \frac{3\pi}{2}$



$x = \sqrt{4 - 1}$

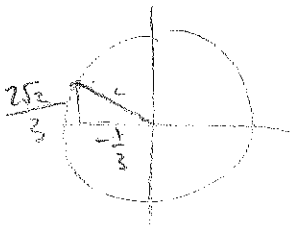
$x = \sqrt{3}$

$\sin\theta = \frac{-1}{2}$ $\quad \csc\theta = -2$

$\cos\theta = \frac{-\sqrt{3}}{2}$ $\quad \sec\theta = \frac{-2\sqrt{3}}{3}$

$\tan\theta = \frac{\sqrt{3}}{3}$ $\quad \cot\theta = \sqrt{3}$

12. Name the exact values of the 6 trigonometric functions of t if $P = (-\frac{1}{3}, \frac{2\sqrt{2}}{3})$



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

$c = \sqrt{\frac{1}{9} + \frac{4 \cdot 2}{9}}$

$c = 1$

$\frac{3}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{4}$

$\sin\theta =$ $\frac{2\sqrt{2}}{3}$ $\qquad$ $\csc\theta =$ $\frac{3\sqrt{2}}{4}$

$\cos\theta =$ $-\frac{1}{3}$ $\qquad$ $\sec\theta =$ -3

$\tan\theta =$ $-2\sqrt{2}$ $\qquad$ $\cot\theta =$ $\frac{-\sqrt{2}}{4}$

$\frac{2\sqrt{2}}{3} \cdot \left(\frac{-3}{1}\right)$

$-\frac{1}{3} \cdot \frac{3}{2\sqrt{2}} = -\frac{1\sqrt{2}}{2\sqrt{2}\sqrt{2}} \quad -\frac{\sqrt{2}}{4}$

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13. Graph $y = 3\sin(2x - 2\pi)) - 1$ after first stating the amplitude, period, midline, phase shift, and horizontal shift. Show at least two periods, at least 5 specific points, and make sure you clearly mark and label your axis.

$y = 3\sin[2(x - \pi)] - 1$

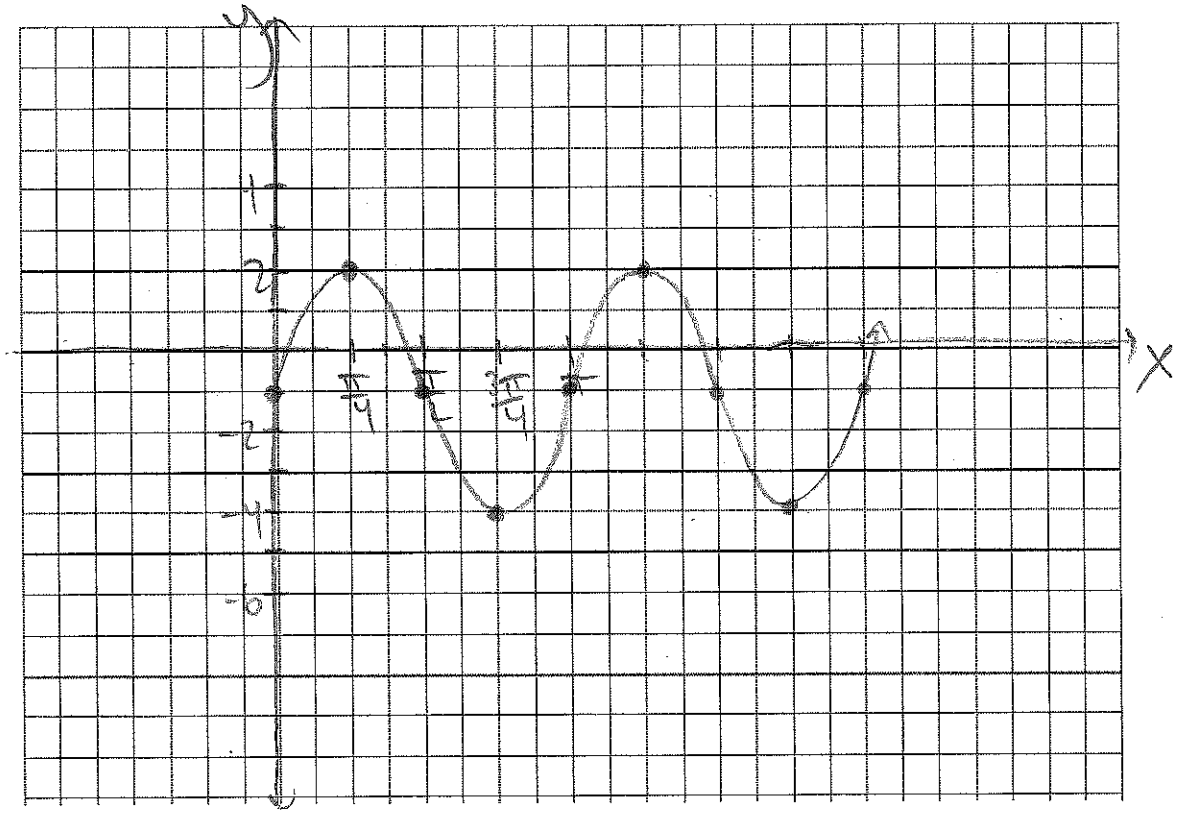
Amplitude: 3

Period: π

Midline: $y = -1$

Phase Shift: π

Horizontal Shift: Right π



Math 112 Name: Split-KEY

MTH 112 Exam 1 Review
Calculator Portion

For statements 1-6, state if the statement is true or false. Write out the word "true" or "false". **If the statement is false explain why or correct the statement to make it true.**

1. The function, y = cos (2x) is an odd function.

$\cos(-2x) = -\cos(2x)$

1. False, it's even
$\cos(-2x) = \cos(2x)$

2. Since $\sin 45° = \cos 45°$, we can always assume that $\sin\theta = \cos\theta$.

2. False.
$\sin 60° \neq \cos 60°$

3. Sine has a range of all real numbers.

3. False $R \in [-1, 1]$

4. The graphs of $f(x) = \sin x$ and $g(x) = \cos x$ are identical graphs except for a horizontal shift.

4. True

5. When $\csc\theta > 0$ and $\cos\theta < 0$, the angle is in Quadrant III.

5. False, QII

6. Radians and degrees measure the same things.

6. _____

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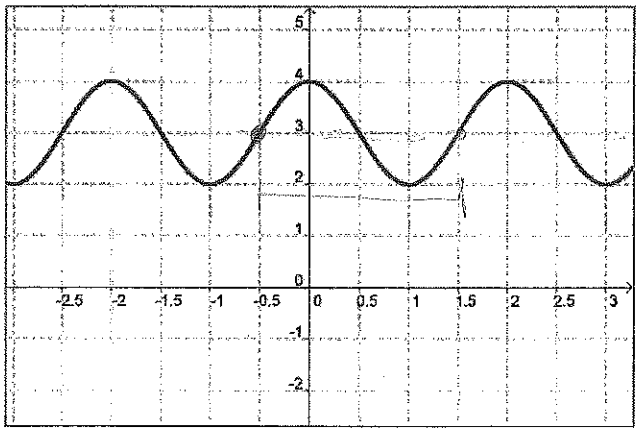
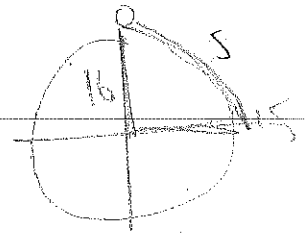
7. Find a sine and cosine function that models the given graph.



Sine Function: $y = \sin[\pi(x + 0.5)] + 3$ Cosine Function: $y = \cos(\pi x) + 3$

8. How far does the tip of a 16 centimeter long minute hand on a clock move in 15 minutes? Round your answer to two decimal places if necessary and show all work.



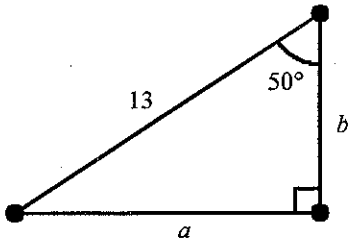
$C = 32\pi$

$s = \frac{32\pi}{4}$

$s = 8\pi$ cm

9. Find the values of the missing lengths, a and b. Picture not drawn to scale. Round your final answers to 4 digits behind the decimal place.

$\sin(50) = \frac{a}{13}$ $\cos(50) = \frac{b}{13}$

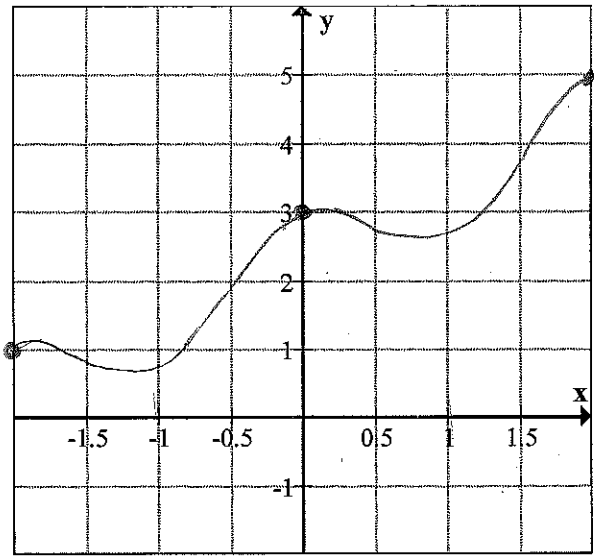


$a = 13 \cdot \sin(50)$ $b = 13\cos(50)$

$a \approx 9.9586$ $b \approx 8.3562$

10. Let $f(x) = 3\cos\left(\sin\left(\frac{\pi x}{2}\right)\right) + x$.

a.) Using your calculator, make an accurate graph of $y = f(x)$ on the grid shown, where x is in radians.



b.) Use your calculator to solve the equation $f(x) = 2$. Write your answer(s) accurate to two digits behind the decimal place in a solution set.

$f(x) = 2$

$x = -0.43$

c.) f has a local maximum somewhere on the interval $(-1,1)$. Name the maximum **point** where both coordinates are accurate to two digits behind the decimal place.

$(0.14, 3.07)$

d.) Is f periodic? **Briefly** explain why or why not.

No, f does not repeat it's values, it keeps increasing