Review Test 2
Math 1113

Name
Id
Section

Read each problem carefully. Show all your work. Credits will be given mainly depending on your work, not just an answer. Avoid simple mistakes! Put a box around the final answer to a question. Use the back of the page if necessary.

(1) Convert the angle in radian form to degree form. **2.87**
a).1° b).05° c)164.44° d)163.83°

(2) Convert the angle in DMS to radian form. **242°16′15″**
a)242.2° b)242.5° c)4.228 d)4.229

(3) Let the point $(-\frac{1}{3}, -\frac{1}{2})$ be on the terminal side of an angle θ. Find $\sin\theta$.
$a)\frac{13}{3}$ $b)\frac{-3\sqrt{13}}{13}$ $c)\frac{-13}{2}$ $d)\frac{2\sqrt{13}}{13}$

(4) Find the approximate value of the following. Round each answer to three decimal places (Check MODE).
$a)\csc(\frac{\pi}{4})$ $b)\cot(\sqrt{3})$ $c)\tan(-24°)$
$d)\sin^{-1}(\frac{\sqrt{3}}{3})$ $e)\tan^{-1}(-7)$ $f)\cos^{-1}(0.866)$

(5) Find the exact value of
- $\sin 25°/\cos 65°$.
- $\cos 75°$
- (*optional) $\sin 108°$
- $\tan(\frac{7\pi}{8})$
- $\sin^{-1}\left(\sin(\frac{7\pi}{6})\right)$
- $\tan^{-1}(\tan(\frac{5\pi}{2} - 1))$
- $\sin(\tan^{-1}(5))$

(6) For what values of $0 \le x \le 4\pi$ does the graph of $h(x) = \sec(x)$ have vertical asymptote. Give exact values.

(7) Given $\tan\theta = 3/4$, $\pi < \theta < \frac{3\pi}{2}$, find $\sin\theta + \sin 2\theta + \sin\frac{\theta}{2}$

(8) Let $f(x) = 3\cos 2x$. State the period and amplitude of $f(x)$ and sketch $f(x)$ for $0 \le x \le 2\pi$ label all of the x-intercepts and high and low points of the graph. All values should be exact.
Period _____
Amplitude _____
X-intercepts _____

High point _____
Low point _____

(9) Verify the following identities. a) $\dfrac{1+\cos x}{\sin x}+\dfrac{\sin x}{1+\cos x}=2\csc x$

b) $\dfrac{\cos 2x}{1+\sin 2x}=\dfrac{\cot x-1}{\cot x+1}$

c) $\dfrac{1-2\cos^2 x}{1-2\sin x\cos x}=\dfrac{\sin x+\cos x}{\sin x-\cos x}$

d) $[\sin\omega-\cos\theta]^2-[\sin\omega+\cos\theta][\sin\omega-\cos\theta]$
$=-2\cos\theta[\sin\omega-\cos\theta]$

(10) Prove that $\cos x+\sin(x-\frac{\pi}{2})=0$

(11) Solve the equation

- $\cos^2 x=2\sin x+2$
- $\cos^2 x=\sin x-1$.
- $\sin x\cos x=\frac{1}{4}$
- $\sin 3x=-1$, $-\pi\le x\le\pi$.

(12) Evaluate $\sin\left(\sin^{-1}(1/3)+\sin^{-1}(1/4)\right)$

(13) A railroad curve is laid out on a circle. What radius should be used if the track is to change direction by 20° in a distance of 100 miles (Round your answer to the nearest mile).

(14) In certain time of the day, the angle of elevation of the sun is 40°. To the nearest foot, find the height of a tree whose shadow is 35 feet long.

(15) Use the information given to find the exact trigonometric value.

- If $\sin x=\sqrt{5}/3$ and x is an acute angle, find $\tan x$
  x is in Quadrant _____ $\tan x=$ _____
- If $\cos\theta=-2/9$ and $\tan\theta<0$, find $\csc\theta$.
  θ is in Quadrant _____ $\csc\theta=$ _____

(16) a) Find the reference angle for $\theta=-585^\circ$ b) Use the reference angle to evaluate $\tan 210^\circ\cos(-585^\circ)$.

(17) Calculate the period, amplitude, and vertical and/or horizontal (phase) shift for the graph of each equation.
a) $y=-6\sin(2x-\pi)$ Period_____ Amplitude _____
Vertical shift _____ Phase shift _____
b) $y=-3\cot(\frac{x}{3})-4$ Period_____ Amplitude _____
Vertical shift _____ Phase shift _____

(18) Sketch the graph of the following functions. Show at least one full period. Label the axes to identify a total of '5 Key Points' and/or asymptotes. Be sure to include all information.
a) $y=-3\cot(\frac{x}{3})$ Period_____ Amplitude _____
Graph

b) $y = -20\sin(\frac{\pi}{2}x)$ Period_____ Amplitude _____

Graph

(19) A plane leaves city A and flies straight north for 300 miles. The pilot then flies at a bearing of $N30°W$ for 200 miles to city B. What is the distance between city A and city B?

(20) The eyes of a basketball player are 6 feet above the floor. The player is at the free-throw line, which is 15 feet from the center of the basket rim. What is the angle of elevation from the players eyes to the center of the rim? (Hint: The rim is 10 feet above the floor).

(21) Solve the triangle $\triangle ABC$. State the case and the Law first.
- $a = 8, b = 10, c = 3$.
- $a = 9, b = 2, B = 15°$.
- $a = 21, B = 18°, A = 72°$.

(22) Two ships leave a port at 12 noon one travels with a bearing $N53°W$ at 10 miles per hour, the other ship travels with a bearing of $S67°W$ at 20 miles per hour. How far apart are the ships at 3PM? (Hint: Draw the picture).

(23) The parallelogram parcel of land shown in the figure is being sold for \$105 per square foot. Calculate the cost of this parcel. (Hint: Heron' formula for area of $\triangle ABC = \sqrt{s(s-a)(s-b)(s-c)}$ where s equals one-half of the perimeter $(a+b+c)/2$)