

Math 131 Trigonometry - Exam 1 Review Sheet - Spring 2020

Name _____

The following is a selection of practice problems for test 1. This is not the complete list of problems that are possible to appear in the test. Please see MML HW and the suggested exercises list on your syllabus for the complete list.

All answers must be left in exact and simplified form unless otherwise stated.

1. Draw each angle.

a) 240° b) 570° c) $-\frac{2\pi}{3}$ d) $\frac{17\pi}{6}$

2. Convert to radians. Express your answer as a multiple of π .

a) 210° b) -300°

3. Convert from radians to degrees.

a) $-\frac{7\pi}{8}$ b) $\frac{9\pi}{5}$

4. Let s denotes the length of the arc of a circle of radius r subtended by the central angle θ and A denotes the area of the sector of the circle with the same central angle. Find the following.

(a) $\theta = 120^\circ$, $s = 8$ ft, $r = ?$, $A = ?$ (b) $A = 30$ sq ft, $r = 10$ ft, $\theta = ?$, $s = ?$.

5. The point $\left(-\frac{4}{9}, \frac{\sqrt{65}}{9}\right)$ is a point on the unit circle that corresponds to a real number t . Find the exact values of the six trigonometric functions of t .

6. The point $\left(-\frac{\sqrt{5}}{3}, \frac{2}{3}\right)$ is a point on the unit circle that corresponds to a real number t . Find the exact values of the six trigonometric functions of t .

7. Find the exact value.

a) $\sin 30^\circ + \cos 45^\circ$ b) $4\sin \frac{\pi}{3} - 6\tan \frac{\pi}{6}$ c) $\sin 30^\circ \cos 45^\circ$ d) $\csc 45^\circ \tan 60^\circ$

e) $\sec \frac{\pi}{6} \cot \frac{\pi}{4}$ f) $\cos 26^\circ \sec 26^\circ$ g) $\sin 19^\circ - \cos 71^\circ$ h) $\sin^2 \theta + \cos^2 \theta$

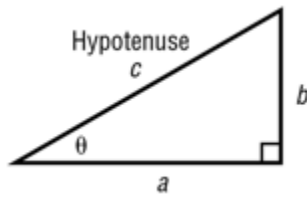
8. A point on the terminal side of an angle θ in standard position is given. Find the exact values of the six trigonometric functions of θ .

a) $(-6, 7)$ b) $\left(-\frac{1}{6}, -\frac{1}{8}\right)$

9. Find the exact value of the following angles. If any are not defined, say "not defined". Do not use a calculator.

a) $\csc \frac{7\pi}{3}$ b) $\sec\left(-\frac{5\pi}{6}\right)$ c) $\tan \frac{9\pi}{2}$ d) $\cot\left(-\frac{11\pi}{4}\right)$

10. Find the **exact value** of the six trigonometric functions of the angle θ in the right triangle, where hypotenuse $c = \sqrt{61}$ and side $b = 5$.



11. Use the fact that the trigonometric functions are periodic to find the exact value of the given expression. Do not use a calculator.

- a) $\sin \frac{9\pi}{4}$ b) $\tan 390^\circ$ c) $\sec 750^\circ$ d) $\cot \frac{10\pi}{3}$

12. Name the quadrant in which the angle θ lies.

- a) $\sin \theta < 0$ and $\cot \theta > 0$ b) $\sin \theta > 0$ and $\sec \theta < 0$

13. Find the exact value of each of the remaining trigonometric functions of θ .

- a) $\cos \theta = -\frac{24}{25}, \pi < \theta < \frac{3\pi}{2}$ b) $\sin \theta = \frac{2}{5}, \cot \theta < 0$

14. Use the even-odd properties of the trigonometric functions to find the exact value of the given expression. Do not use a calculator.

- a) $\sin (-60^\circ)$ b) $\cos (-45^\circ)$ c) $\cot \left(-\frac{\pi}{4}\right)$

15. What is the domain and range of the following?

- a) sine function b) cosine function c) tangent function

16. Determine the amplitude and period of the following function then graph two cycles or periods. State the domain and range.

- a) $y = -\frac{3}{7} \cos \left(\frac{9}{5}x\right)$ b) $y = \frac{4}{5} \sin \left(-\frac{2\pi}{8}x\right)$

17. Write the equation of a sine function with Amplitude = 5 and Period=8.

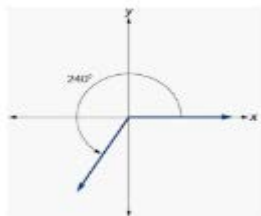
18. Graph two cycles or periods of the following.

- a) $y = \tan \left(\frac{1}{4}x\right)$ b) $y = \cot \left(\frac{1}{4}x\right)$

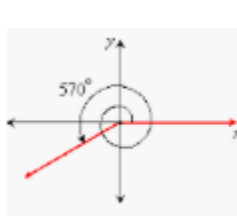
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Answers

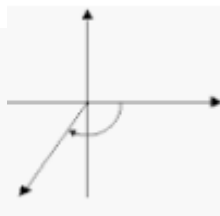
1a)



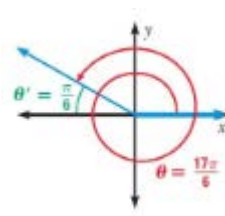
b)



c)



d)



2a) $\frac{7\pi}{6}$

b) $-\frac{5\pi}{3}$

3a) -157.5°

b) 324°

4a) $r = 12/\pi$ feet or 3.82 feet and $A = 15.28$ square feet

4b) $\theta = \frac{3}{5}$ radians and $s = 6$ feet

5) $\sin\theta = \frac{\sqrt{65}}{9}$

$\csc\theta = \frac{9}{\sqrt{65}} = \frac{9\sqrt{65}}{65}$

$\cos\theta = -\frac{4}{9}$

$\sec\theta = -\frac{9}{4}$

$\tan\theta = -\frac{\sqrt{65}}{4}$

$\cot\theta = -\frac{4}{\sqrt{65}} = -\frac{4\sqrt{65}}{65}$

6) $\sin\theta = \frac{2}{3}$

$\csc\theta = \frac{3}{2}$

$\cos\theta = -\frac{\sqrt{5}}{3}$

$\sec\theta = -\frac{3}{\sqrt{5}} = -\frac{3\sqrt{5}}{5}$

$\tan\theta = -\frac{2}{\sqrt{5}} = -\frac{2\sqrt{5}}{5}$

$\cot\theta = -\frac{\sqrt{5}}{2}$

7a) $\frac{1}{2} + \frac{\sqrt{2}}{2}$ or $\frac{1+\sqrt{2}}{2}$

b) 0

c) $\frac{\sqrt{2}}{4}$

d) $\frac{2}{\sqrt{2}} \cdot \sqrt{3}$ or $\sqrt{6}$

e) $\frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

f) 1

g) 0

h) 1

8a) $\sin\theta = \frac{7}{\sqrt{85}} = \frac{7\sqrt{85}}{85}$

$\csc\theta = \frac{\sqrt{85}}{7}$

Note; $r = \sqrt{85}$

$\cos\theta = -\frac{6}{\sqrt{85}} = -\frac{6\sqrt{85}}{85}$

$\sec\theta = -\frac{\sqrt{85}}{6}$

$\tan\theta = -\frac{7}{6}$

$\cot\theta = -\frac{6}{7}$

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$$\begin{array}{lll} 8b) \sin\theta = -\frac{3}{5} & \csc\theta = -\frac{5}{3} & \text{Note; } r = \frac{5}{24} \\ \cos\theta = -\frac{4}{5} & \sec\theta = -\frac{5}{4} & \\ \tan\theta = \frac{3}{4} & \cot\theta = \frac{4}{3} & \end{array}$$

$$9a) \frac{2\sqrt{3}}{3} \quad b) -\frac{2\sqrt{3}}{3} \quad c) \text{ Und} \quad d) 1$$

$$10) \sin\theta = \frac{5}{\sqrt{61}} = \frac{5\sqrt{61}}{61} \quad \csc\theta = \frac{\sqrt{61}}{5} \quad \text{Note; } a = 6$$

$$\cos\theta = \frac{6}{\sqrt{61}} = \frac{6\sqrt{61}}{61} \quad \sec\theta = \frac{\sqrt{61}}{6}$$

$$\tan\theta = \frac{5}{6} \quad \cot\theta = \frac{6}{5}$$

$$11a) \frac{\sqrt{2}}{2} \quad b) \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} \quad c) \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3} \quad d) \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$12a) \text{ Q III or Q 3} \quad b) \text{ QII or Q 2}$$

$$13a) \sin\theta = \frac{-7}{25} \quad \csc\theta = \frac{-25}{7} \quad \text{Note; } y = -7$$

$$\cos\theta = \frac{-24}{25} \quad \sec\theta = \frac{-25}{24}$$

$$\tan\theta = \frac{7}{24} \quad \cot\theta = \frac{24}{7}$$

$$13b) \sin\theta = \frac{2}{5} \quad \csc\theta = \frac{5}{2} \quad \text{Note; } x = -\sqrt{21}$$

$$\cos\theta = \frac{-\sqrt{21}}{5} \quad \sec\theta = \frac{-5}{\sqrt{21}} = \frac{-5\sqrt{21}}{21}$$

$$\tan\theta = \frac{-2}{\sqrt{21}} = \frac{-2\sqrt{21}}{21} \quad \cot\theta = \frac{-\sqrt{21}}{2}$$

$$14a) \frac{-\sqrt{3}}{2} \quad b) \frac{\sqrt{2}}{2} \quad c) -1$$

$$15a) D = (-\infty, \infty), R = [-1, 1] \quad b) D = (-\infty, \infty), R = [-1, 1]$$

$$15c) D = \{x \mid x \neq \frac{k\pi}{2}, k \text{ is an odd integer}\}, R = (-\infty, \infty)$$

$$16a) \text{ Amp} = \frac{3}{7}, \text{ period} = \frac{10\pi}{9}, D = (-\infty, \infty), R = [-\frac{3}{7}, \frac{3}{7}] \text{ and graph}$$

$$16b) \text{ Amp} = \frac{4}{5}, \text{ period} = 8, D = (-\infty, \infty), R = [-\frac{4}{5}, \frac{4}{5}] \text{ and graph}$$

$$17) y = \sin\left(\frac{\pi}{4}x\right)$$

$$18a) \text{ Period} = 4\pi, \text{ Asymptotes at } -2\pi, 2\pi, 6\pi, \text{ etc. and graph}$$

$$18b) \text{ Period} = 4\pi, \text{ Asymptotes at } 0, 4\pi, 8\pi, \text{ etc. and graph.}$$