

Chap 5, 6, 7 & 8

NAME: _____

NO SCRATCH PAPER – TIME LIMIT **ONE HOUR**¹

The point value of each problem is in the left-hand margin. You must show your work to receive any credit for your answers, except on problems 1&2. Work neatly.

(10) 1. True or False.

() (a) The graph of the polar function $r = 2 \cos \theta$ is a circle.

() (b) $\sin^2 \theta + \cos^2 \theta = 1$ is a fundamental (or Pythagorean) identity.

() (c) In a right triangle, sine of an acute angle is the length of the adjacent side over the length of the hypotenuse.

() (d) The *exact* value of $\sin(330^\circ)$ is $-\frac{\sqrt{3}}{2}$.

() (e) The phase shift of the function $f(x) = 3 \cos(2x - \pi)$ is π .

(10) 2. Fill in the blanks.

(a) 2.1 radians is degrees.

(b) The magnitude of the vector $\vec{v} = 2 \vec{i} - 3 \vec{j}$ is .

(c) According to the Law of Cosines, in any standard triangle, $a^2 = b^2 + c^2 - 2bc \cos A$.

(d) The point $(r, \theta) = (-2, 30^\circ)$ can be represented using a positive r value as $(2, \quad)$.

(e) The *exact* value the angle $\sin^{-1}(\sin \frac{3\pi}{4})$ is radians.

(5) 3. Write each of the following points in the corresponding polar or rectangular coordinates. Use $r > 0$ and $0 \leq \theta < 2\pi$.

(a) $(x, y) = (-3, 4)$

(b) $(r, \theta) = (5, 250^\circ)$

¹If you exceed the time limit you will receive a grade of zero. However, you are allotted an extra 5 minutes for checking in and out.

(10) 4. Given that $\cos 75^\circ = \frac{\sqrt{2-\sqrt{3}}}{2}$, find the *exact* value of $\cos 195^\circ$. (Show your work!)

(10) 5. Find the *exact* value of $\sin\left(2\cos^{-1}\left(\frac{2}{7}\right)\right)$. (Show your work!)

(10) 6. Find all possible standard triangles that satisfy $a = 30$, $b = 45$ and $\alpha = 33^\circ$.

(10) 7. Prove the identity $\frac{1}{\tan x} + \frac{1}{\cot x} = \frac{1}{\sin x \cos x}$.

(10) 8. Draw the graph of $f(x) = 2 \sin(x + \pi/4)$ by plotting at least 5 points. State its amplitude, period, and phase shift.

- (10) 9. Solve the equation $\sin \theta \cos 2\theta - \sin \theta = 0$. List all answers between 0° and 360° in degrees (decimal notation).
- (10) 10. The angle of elevation from point A to the top of a building is 45° . Point B is on the same side of the building as A but it is 50 ft further back from the building on the line connecting point A and the bottom of the building. The angle of elevation from point B to the top of this building is 40° . How tall is this building?
- (5) 11. Two forces \mathbf{F}_1 and \mathbf{F}_2 act on a point. If $|\mathbf{F}_1| = 54$ Newtons and $|\mathbf{F}_2| = 30$ Newtons, and the angle between them is 50° , find the magnitude of the resultant force.