

Florida International University

Final Exam MAC1114

FORM 1

Kathleen Guy
Summer C 2015

MULTIPLE CHOICE

This portion of the exam contains 17 multiple choice questions, each worth 3 points.

Choose the correct answer from five available choices. Circle the correct answer in this booklet and bubble in correct choice on the scantron form. Use available space to work out the problems. Your work in this part will NOT be graded.

Only use a #2 PENCIL on the scantron.

Name _____

Panther ID _____

Class Days/Time _____

1. Find the reference angle of 580°

- A. 180°
- B. 0°
- C. 40°
- D. 50°
- E. None of the above

2. Convert $\frac{5\pi}{12}$ to degrees.

- A. 75°
- B. 150°
- C. 60°
- D. 50°
- E. None of the above

3. Find the area of the sector of radius 6 meters formed by the central angle of 30° .

- A. 120 meters
- B. $\frac{\pi}{2}$ meters
- C. 360 meters
- D. 3π meters
- E. None of the above

4. Find the exact value of

$$\cot 40^\circ - \frac{\sin 50^\circ}{\sin 40^\circ}$$

- A. 0
- B. 1
- C. -1
- D. 2
- E. None of the above

5. Given $\cot \theta = 2$, θ acute, find $\sin \theta$

- A. $1/2$
- B. $\sqrt{5}$
- C. $\sqrt{5}/2$
- D. $2/\sqrt{5}$
- E. None of the above

6. State the domain of the cotangent function.

- A. All real numbers
- B. $[-1,1]$
- C. All real numbers except multiples of π
- D. All real numbers except odd multiples of $\pi/2$
- E. None of the above

7. Find the phase shift of the function $f(x) = 2 \cos(2\pi x + 4) + 4$

- A. -4
- B. 2
- C. 2π
- D. $-2/\pi$
- E. None of the above

8. Find the $\cos^{-1}(\cos(\frac{4\pi}{3}))$

- A. Undefined
- B. $4\pi/3$
- C. $\pi/3$
- D. $2\pi/3$
- E. None of the above

9. Find the $\cos(\sin^{-1}(-\frac{1}{3}))$

- A. $2\sqrt{2}/3$
- B. -3
- C. $-\sqrt{2}$
- D. $1/2\sqrt{2}$
- E. None of the above

10. How many triangles exist given $b=3$, $c=5$, $C=30^\circ$

- A. 0
- B. 1
- C. 2
- D. 3
- E. None of the above

11. Identify the polar graph $r = 3 - 4\cos\theta$

- A. Circle
- B. Limacon with inner loop
- C. Limacon without inner loop
- D. Cardioid
- E. None of the above

12. Change (-3,3) to polar.

- A. $(3\sqrt{2}, -\pi/4)$
- B. $(1, \pi/4)$
- C. $(-3\sqrt{2}, \pi/4)$
- D. $(3\sqrt{2}, 3\pi/4)$
- E. None of the above

13. Write the expression in a+bi form: $[3(\cos 80^\circ + i \sin 80^\circ)]^3$

- A. $-27/2 - 27\sqrt{3}/2 i$
- B. $-9/2 - 9\sqrt{3}/2 i$
- C. $-27\sqrt{3}/2 + 27/2 i$
- D. $9/2 - 9\sqrt{3}/2 i$
- E. None of the above

14. Find the position vector with initial point $P = (-3, 2)$ and terminal point $Q = (6, 5)$.

- A. $\langle -9, -3 \rangle$
- B. $\langle 9, 3 \rangle$
- C. $\langle 3, 7 \rangle$
- D. $\langle -3, 7 \rangle$
- E. None of the above

15. Write the vector \mathbf{v} in $a\mathbf{i} + b\mathbf{j}$ form given $\|\mathbf{v}\| = 26$ and its direction angle is 330°

- A. $-13\sqrt{3}\mathbf{i} + 13\mathbf{j}$
- B. $13\mathbf{i} - 13\sqrt{3}\mathbf{j}$
- C. $-13\mathbf{i} + 13\sqrt{3}\mathbf{j}$
- D. $13\sqrt{3}\mathbf{i} - 13\mathbf{j}$
- E. None of the above

16. Find the exact value of $\cos(\sin^{-1}(-\frac{4}{5}) + \cos^{-1} 1)$

- A. $1/5$
- B. $12/25$
- C. $3/5$
- D. -1
- E. None of the above

17. State the double angle formula for sine.

- A. $1 - 2\sin^2\theta$
- B. $\sin^2\theta + \cos^2\theta$
- C. $2\sin\theta\cos\theta$
- D. $\sin^2\theta - \cos^2\theta$
- E. None of the above

SHORT ANSWER

This portion of the exam contains 7 short answer questions, each worth 8 points.

Show your work to earn full credit. Organize your solution, so it is clear what you do and why. Partial credit will be awarded but an answer alone will get no credit. No work, no points.

Name_____

Panther ID_____

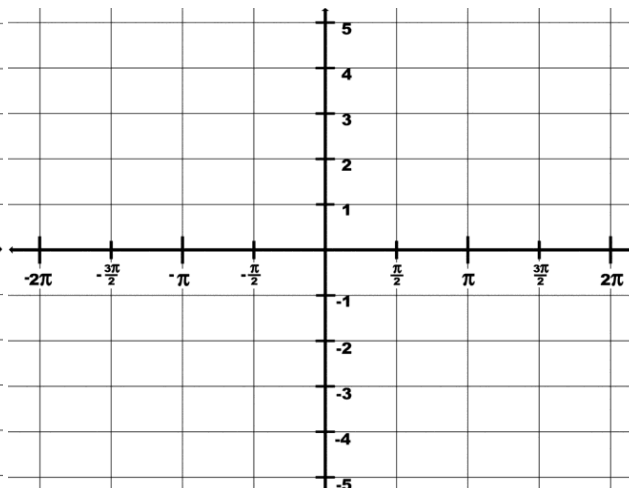
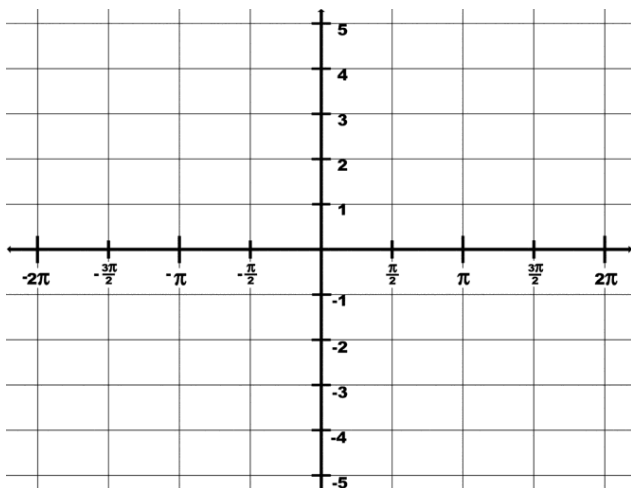
Class Days/Time_____

1. Use transformations to graph $f(x) = 4 \cos\left(2x - \frac{\pi}{2}\right)$. Start with the basic function. Plot **key points** and use them to perform transformations. Show one transformation at a time in a correct order (clearly labeled). Write the equation of each graph. Show one cycle for a, b, c and at least 2 cycles for d.

a) Basic function: $y =$ _____

b) Transformation: _____

$y =$ _____

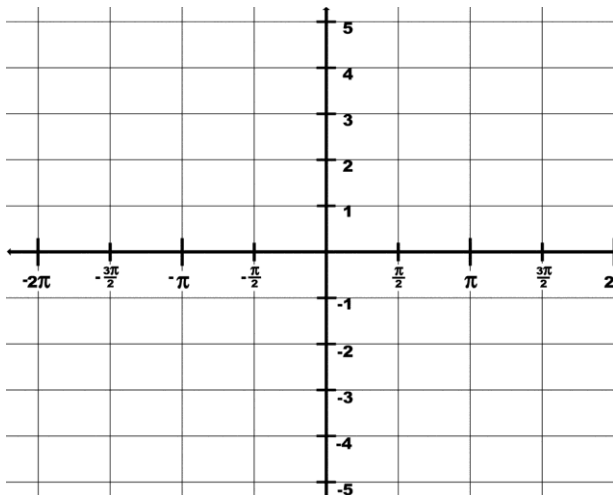
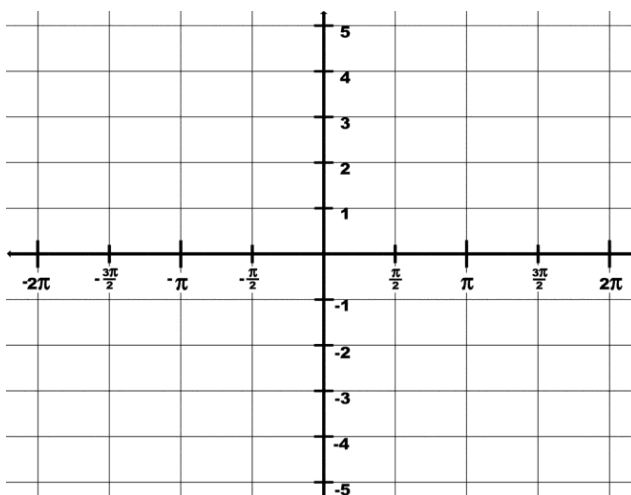


c) Transformation : _____

d) Transformation : _____

$y =$ _____

$y =$ _____



2. Prove the identity.

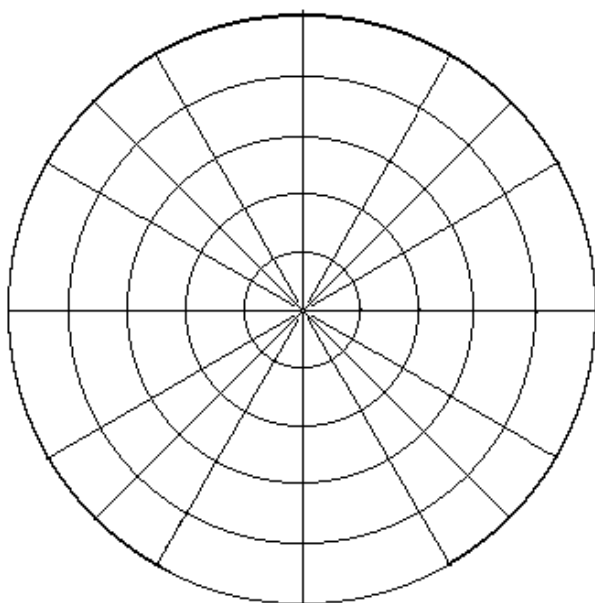
$$\tan\theta + \cot\theta = \sec\theta\csc\theta$$

3. Let $r = 2 - 2\sin\theta$

a. Identify :

b. Symmetry :

c. Graph :



4. At exactly the same time, two tracking stations on Earth, 20 km apart, measures the angle of elevation of a rocket that was launched with a weather satellite. From station A, the angle of elevation to the rocket is 41 degrees and from station B it is 75 degrees. Both are on the same side of the rocket. What is the height of the rocket from Earth ?

5. Solve the equation and give the general formula(s).

$$\sqrt{2} \cos(4\theta) + 4 = 3$$

6. Given $\sin\theta = -\frac{2}{3}$, $\sec < 0$, find the remaining trig functions.

7. Solve the triangle given $a=5$, $b=2$, $c=4$.