

Name: \_\_\_\_\_

ID #: \_\_\_\_\_

Instructor: \_\_\_\_\_

Section: \_\_\_\_\_

Directions: Use a #2 pencil. Choose only one answer for each question. Put your work on this paper and circle your answers. Mark your answers on the scantron sheet. Fill in your name, ID number and section number. Use the first 3 columns of the Special Code for your section.

1) Convert  $6n$  degrees to radians

- A)  $\frac{n\pi}{60}$       B)  $\frac{30n}{\pi}$       C)  $\frac{30\pi}{n}$       D)  $\frac{n\pi}{30}$       E)  $\frac{30}{n\pi}$

2) If  $u = -5i + 12j$ , then which of the following is a unit vector that is orthogonal (perpendicular) to vector  $u$ ?

- A)  $\frac{5}{13}i + \frac{12}{13}j$       B)  $\frac{5}{13}i - \frac{12}{13}j$       C)  $\frac{12}{17}i + \frac{5}{17}j$       D)  $\frac{12}{13}i + \frac{5}{13}j$       E)  $\frac{12}{13}i - \frac{5}{13}j$

3) What is the sum of this infinite geometric series:  $8 - 2 + \frac{1}{2} - \frac{1}{8} + \frac{1}{32} - \dots$ ?

- A)  $\frac{33}{4}$       B)  $\frac{32}{3}$       C) 6      D)  $\frac{32}{5}$       E)  $\frac{205}{32}$

4) Which of the following is a false statement?

- A)  $\cot x = \frac{\cos x}{\sin x}$       B)  $1 + \tan^2 x = \sec^2 x$       C)  $\frac{\sec x}{\csc x} = \tan x$   
D)  $\cos x = \frac{1}{\sec x}$       E)  $\sin x = 1 - \cos x$

5) Simplify:  $(1 - 2 \sin^2 x)^2 + (2 \sin x \cos x)^2$

- A)  $\sin 4x$     B)  $\sin^2 2x$     C)  $\tan 4x$     D) 0    E) 1

6) What is the 400<sup>th</sup> term of the sequence: 25, 29, 33, 37, 41, 45, ... ?

- A) 500    B) 2000    C) 2001    D) 1621    E) 1625

7) Which of the following is a focus for the ellipse:  $\frac{x^2}{225} + \frac{(y+7)^2}{289} = 1$  ?

- A) (0, 7)    B) (0, 1)    C) (0, -7)    D) (8, -7)    E) (8, -15)

8) What is the period of the curve with equation:  $y = 10 - 5 \sin\left(\frac{4\pi x}{11}\right)$  ?

- A) 5.5    B) 0.73    C) 2.75    D) 1.75    E) 0.045

9) Which of the following is equal to  $\cot x$  ?

- A)  $1 - \sec x$     B)  $\sin x \sec x$     C)  $\frac{\sin x}{\cos x}$     D)  $\frac{\csc x}{\sec x}$     E)  $\frac{1 - \sin x}{1 - \cos x}$

10) Find the following sum:  $23 + 29 + 35 + 41 + 47 + \dots + 257$

- A) 560    B) 5600    C) 717    D) 11200    E) 4860

11) Which of the following angles has the same reference angle as  $290^\circ$  ?

- A)  $100^\circ$     B)  $-250^\circ$     C)  $-280^\circ$     D)  $-190^\circ$     E)  $170^\circ$

12) Find this sum:  $\sum_{n=0}^4 (7n - n^2 + 1)$

- A) 43      B) 44      C) 28      D) 45      E) 56

13) Convert  $r = \frac{7}{3 \sin \theta - 4 \cos \theta}$  into an equation in rectangular form.

- A)  $x^2 + y^2 = \frac{7}{3y - 4x}$       B)  $7x^2 + 7y^2 = 3y - 4x$       C)  $3y - 4x = 7$   
D)  $xy = 7$       E)  $4x - 3y = 7$

14) Simplify:  $\sin \left( \tan^{-1} \left( \frac{2}{x} \right) \right)$

- A)  $\frac{x}{2}$       B)  $\frac{\sqrt{4 + x^2}}{x}$       C)  $\frac{2}{\sqrt{4 + x^2}}$       D)  $\frac{2}{\sqrt{x^2 - 4}}$       E)  $\frac{2}{4 + x^2}$

15) If the sides of a triangle measure 84 and 187 and 205, what is the area of this triangle, to the nearest whole number?

- A) 7854      B) 3919      C) 7042      D) 5692      E) 6810

16) Which of the following hyperbolas have asymptotes of

$$y = \frac{3}{2}x \quad \text{and} \quad y = -\frac{3}{2}x ?$$

- A)  $\frac{x^2}{9} - \frac{y^2}{4} = 1$       B)  $\frac{x^2}{2} - \frac{y^2}{3} = 1$       C)  $\frac{y^2}{81} - \frac{x^2}{16} = 1$   
D)  $\frac{y^2}{4} - \frac{x^2}{9} = 1$       E)  $\frac{x^2}{4} - \frac{y^2}{9} = 1$

17) Which of the following is a solution to  $\frac{\sin 2x}{5} = \frac{1}{10}$  ?

- A)  $\frac{\pi}{3}$       B)  $\frac{\pi}{6}$       C)  $\frac{\pi}{8}$       D)  $\frac{\pi}{24}$       E)  $\frac{\pi}{12}$

18) Which of the following parabolas has a focus at  $(4, 0)$  ?

- A)  $y^2 = -16x$       B)  $y^2 = 16(x-1)$       C)  $x^2 = 16y$   
D)  $y^2 = 20(x+1)$       E)  $y^2 = 20(x-1)$

19) In which quadrant does angle  $X$  terminate if  $\cos X < 0$  and  $\cot X < 0$  ?

- A) first      B) second      C) third      D) fourth      E) none of these

20) What is the solution set in the interval  $0 < x < 2\pi$  for the equation:

$$2 \cos^2 x - \cos x = 1$$

- A)  $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}$       B)  $\frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$       C)  $\pi, \frac{2\pi}{3}, \frac{4\pi}{3}$       D)  $\frac{2\pi}{3}, \frac{4\pi}{3}$   
E)  $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

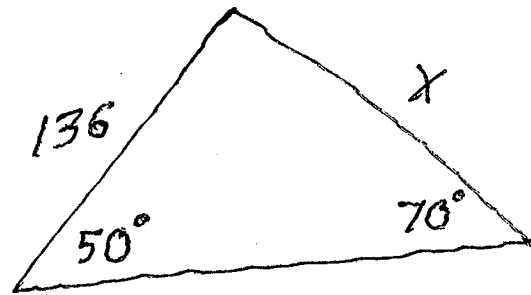
21) If  $\sin x = \frac{95}{193}$  and  $0 < x < \frac{\pi}{2}$ , then  $\cos 2x = ??$

- A)  $\frac{190}{193}$       B)  $\frac{31920}{37249}$       C)  $\frac{15960}{37249}$       D)  $\frac{19199}{37249}$       E)  $\frac{336}{193}$

22) Please mark choice C on your scantron for this question

Part Two. Remember to show all work and place answer in box.

- 1) Given the triangle pictured to the right, find the length of X [ to the nearest whole number ]

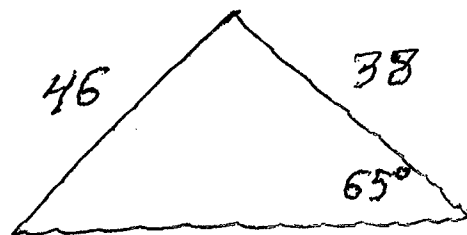


- 2) Find the equation of the ellipse whose vertices are  $(-10, -5)$  and  $(-10, 9)$  and whose foci are  $(-10, -3)$  and  $(-10, 7)$ .

- 3) Find all solutions in the interval  $0 < x < 2\pi$ , for the equation:

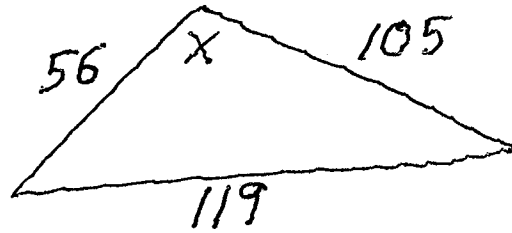
$$2 \cos^3 x = \cos x$$

- 4) Find the area of the triangle pictured [ to the nearest whole number ]



- 5) If angles  $X$  and  $Y$  are both in the first quadrant and  $\tan X = \frac{15}{8}$  and  $\sec Y = \frac{13}{5}$ , then find the value of  $\sin(Y - X)$   
[ in fraction form, not decimal ]

- 6) Find the measure of the angle marked with an  $X$  in the triangle to the right to the nearest degree.



- 7) If angle  $X$  terminates in the second quadrant and  $\sin X = \frac{112}{113}$ , then find the value of  $\tan X$  in fraction form.

- 8) Find the angle between these two vectors: ( to the nearest degree )

$$u = 12i - 4j \quad \text{and} \quad v = -5i + 18j$$