GSE Pre-Calculus Name: _____

Final Exam Review Date: _____Per: ___

Conics - Unit 6

1. Find the center, vertices, foci and co-vertices of the ellipse.
$16x^2+9y^2-32x+72y+16=0$.

2. Find the standard form of the equation of the ellipse with vertices (- 3, 0), (7, 0) and foci (0, 0), (4, 0).

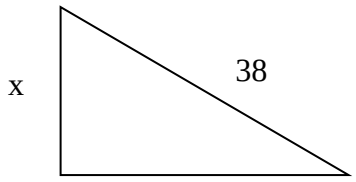
3. Find the center, vertices, foci, and equations of the asymptotes of the hyperbola
$9x^2-16y^2-18x-32y-151=0.$

4. Find the standard form of the equation of the hyperbola with vertices (- 10, 3), (6, 3) and foci (- 12, 3), (8, 3).

5. For a science project you plan to demonstrate the elliptical orbit of a planet with the sun at one of the foci. If the center of the ellipse is (0, 0), and the length of the major axis is 120 cm and the sun is located at the point (1, 0), what is the equation of the ellipse in standard form?

Introduction to Trigonometry - Unit 1 & 2

6. Find the missing side of the right triangle.



7. Find two values of $\theta(0^\circ \le \theta < 360^\circ)$ that satisfy the equation $\sec\theta = -1.2241$. Round your answers to two decimal places if necessary.

8. Sketch the angle in standard position, determine the quadrant in which the angle lies, and find one positive and one negative co-terminal angle for 12°.

9. Evaluate: $\csc 5.23$. Round to four decimal places.

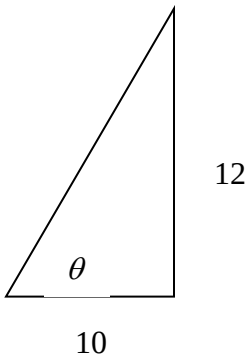
10. Determine the quadrant in which θ lies; $\tan\theta < 0$ and $\sin\theta > 0$.

11. Convert $\frac{5\pi}{7}$ from radians to degrees.

12. Convert 480° from degrees to radians.

13. Find the six trig functions of the angle θ (in standard position) whose terminal side passes through (12, 16).

14. Find the exact value of the six trig functions of the angle θ using the figure to the right.



15. Find the reference angle for $-\frac{6\pi}{5}$.

16. From a point 100 feet in front of a public library, the angles of elevation to the base of a flag pole and the top of the flagpole are 28° and $39^\circ 45'$, respectively. The flagpole is mounted on the front of the library's roof. Find the height of the flagpole.

17. A 40-foot extension ladder leans against the side of a building. Find the distance, h, up the side of the building the ladder extends if the angle of elevation of the ladder with the ground is 68°.

18. Evaluate without using a calculator. a. $\arccos\frac{\sqrt{2}}{2}$ b. $\arccos\left(-\frac{\sqrt{3}}{2}\right)$

19. Write an algebraic expression for $\sec\left[\arcsin\left(x-1\right)\right]$.

20. Graph and find the period and amplitude if applicable of $f(x)=\frac{5}{2}\sin\left(x-180^\circ\right)$

21. Find the period and amplitude if applicable of $g(x)=\frac{1}{4}\tan\left(x-90^\circ\right)$

22. Describe the transformation in the graph $g(x)=\frac{1}{2}\sin\pi x-3$ with respect to the graph $f(x)=\sin x$.

23. Describe the transformation in the graph $g(x)=\tan\left(x+\frac{\pi}{4}\right)$ with respect to the graph $f(x)=\tan x$.

24. What is the vertical asymptote of the graph of $y=-\tan\left(x-\frac{\pi}{3}\right)$?

Oblique Triangles – Unit 3

25. Use the given information to solve the triangle. If two solutions exist, list both.
A = 12° B = 58° a = 8

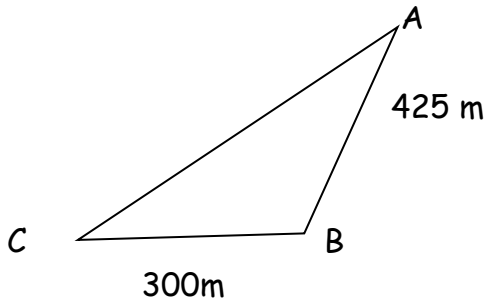
26. Use the given information to find the two possible values of C.
B = 56°, a = 98 cm, b = 85 cm.

27. Solve the triangle having the indicated sides a = 5, b = 8, c = 10.

28. Given a triangle with A = 71°, b = 10 m, and c = 19 m, find the area.

29. From a certain distance, the angle of elevation to the top of a building is 17°. At a point 50 meters closer to the building, the angle of elevation is 31°. Approximate the height of the building.

30. To approximate the length of a marsh, a surveyor walks 425 meters from point A to point B. Then the surveyor turns 65° and walks 300 meters to point C. Approximate the length AC of the marsh.



Trig Identities – Unit 4

31. Use the given values and the **trig identities** to evaluate (if possible) the remaining trig functions. $\csc\left(\frac{\pi}{2}-x\right)=3$ and $\sin x=\frac{2\sqrt{2}}{3}$

32. Use the fundamental identities to simplify $\frac{\sin^2 x-\cos^2 x}{\sin^2 x-\sin x\cos x}$.

33. Perform the addition and use the fundamental identities to simplify $\frac{\cos x}{1+\sin x}+\frac{1+\sin x}{\cos x}$.

34. Verify $\cot^2 x-\cos^2 x=\cot^2 x\cos^2 x$.

35. Solve the equation in the interval $[0,2\pi)$; $3\tan^2 x-1=0$.

36. Solve the equation for $0\le x<360^\circ$. a. $3\sqrt{3}\tan x=3$ b. $2\sin x-1=0$

37. Solve the equation. $2\cos^2 x-\cos x=1$.

38. Evaluate $\sin 105^\circ$.

39. Given $\tan u=\frac{3}{4}$, $0<u<\frac{\pi}{2}$ and $\csc v=\frac{\sqrt{10}}{3}$, $\frac{\pi}{2}<v<\pi$, find $\cos(u-v)$.

Matrices – Unit 5

40. Determine the order of $\begin{bmatrix} 2 & 3 & 4 & 5 \\ -1 & 0 & 4 & -6 \end{bmatrix}$

41. Solve for y.

$$\begin{cases} x+2y+z=5 \\ 2x-y-3z=5 \\ -2x+3y+z=-11 \end{cases}$$

42. Evaluate $3\begin{bmatrix} 2 & 7 \\ 9 & -1 \end{bmatrix}-3\begin{bmatrix} 4 & 1 \\ 6 & 2 \end{bmatrix}$.

43. Evaluate $\begin{bmatrix} 1 & 3 & 6 \\ 4 & 1 & 3 \end{bmatrix}\begin{bmatrix} 0 & 1 & 6 \\ 3 & -1 & 1 \\ 5 & 2 & 3 \end{bmatrix}$.

44. Write a matrix equation and solve using inverses. $\begin{cases} 3x+4.5y=825 \\ 0.2x+0.5y=89 \end{cases}$

45. A small business borrows $175,000; some at 7%, some at 10%, and some at 11% simple interest. The annual interest is $15,800, and the amount borrowed at 7% exceeds the amount borrowed at 10% by $20,000. Use Cramer's Rule to find the amount borrowed at 11%.

46. Solve for x; $\begin{vmatrix} (5+2x) & -2 \\ (7-x) & 3 \end{vmatrix}=5$.

47. Find the area of a triangle with vertices $(1,3),(7,2),(9,5)$.

Vectors and Complex Numbers – Unit 7

48. Find the magnitude and direction of the vector with P(3, 2) and Q(-2, -5).

49. Write $4-8i$ in polar form.

50. Given $5(\cos(38^\circ)+i\sin(38^\circ))$, write in component form.

51. Given **u** = ⟨1, 5⟩ and **v** = ⟨-2, 7⟩, find the magnitude and direction of 3**u** + 4**v**.