| 1 c | Given a point or trig function value and quadrant of the terminal side of an angle, find the <br> exact value of all the trigonometric functions of the angle. |
| :--- | :--- |
| 1 f | Use exact values from the special triangles to simplify trigonometric expressions |
| 1 g | Use a calculator to find approximate trigonometric values for a given angle and approximate <br> angle values for a given trigonometric value. |
| 1 j | Model and solve problems involving vectors |
| 2 a | Use a graphing calculator to find the graph of a trigonometric equation. |
| 2 b | Find the graph from the equation of a sinusoidal without a graphing calculator. |
| 2 c | Given a sinusoidal graph or its traits, find its equation. |
| 2 d | Given a sinusoidal equation, find values of $y$ from $x$ and vice versa. |
| 2 e | Model and Solve Sinusoidal Equations |
| 3 b | Factor polynomials using grouping and sum/difference rules |
| 3 e | Solve equations involving composite argument rules. |
| 3 h | Solve equations involving double angle rules |
| 3 i | Solve equations involving half angle rules |
| 4 a | Find equations and intercepts of lines from points, slopes, and parallel or perpendicular lines. |
| 4 b | Find equations, zeros, vertex, and range of a parabola. |

## Pre-Calculus Practice Final Exam

Find the values of $x$ for which:

1) $x^{2}-19 x+60=0$
2) $3 x^{2}+5 x-28=0$

Simplify
3) $\frac{x^{2}+4 x+3}{3 x^{3}+3 x^{2}} \cdot \frac{12 x^{3}+6 x^{2}+3 x}{x^{2}-9} \div \frac{8 x^{3}-1}{x^{2}-1}$
4) $\frac{x^{3}-5 x^{2}+2 x-10}{x^{2}-25} \div \frac{x^{3}+2 x}{x^{2}}$
5) Find the equation of the line with an $x$-intercept of 2 and perpendicular to one through the points $(-4,-1)$ and $(-2,-7)$
6) Find the vertex and $x$ and $y$ intercepts of the given parabola and graph on the given axes $y=3 x^{2}-12 x-15$

7) Solve for all possible values of $x$ $\sin x \cos x=\frac{\sqrt{3}}{4}$
8) $\sqrt{\frac{1-\cos x}{2}}=-\frac{\sqrt{3}}{2} \quad 540^{\circ} \leq x \leq 630^{\circ}$
9) Solve for all possible values of $x \sin 2 x \cos 5^{\circ}-\cos 2 x \sin 5^{\circ}=\frac{\sqrt{2}}{2}$
$10)$ If $(-9,-40)$ is a point on the terminal side of angle $A$, find the exact values of

| $\cos A=$ | $\sec A=$ |
| :--- | :--- |
| $\sin A=$ | $\csc A=$ |
| $\tan A=$ | $\cot A=$ |

11) Use the results from $\# 10$ to solve for the following
a) $\sin 2 A$
b) $\cos 2 A$
c) The quadrant in which $2 A$ terminates with explanation
12) Find all values for each of the following (in degrees).
a) $\sin ^{-1}(0.656059029)$
b) $\tan ^{-1}(-1.664279482)$
c) $\cos \theta=-0.5877852523$
13) If $\sec B=-\frac{\sqrt{26}}{5}$ and is in Quadrant III, find the following:
$\sin B=$ $\csc B=$
$\cos B=\quad \sec B=-\frac{\sqrt{26}}{5}$
$\tan B=\quad \cot B=$

Find angle B rounded to three decimal places (in radians).
$B=$
14) Find the exact values of each of the following expressions. Show all work and use only the unit circle to find your trig values
a) $\cos \left(\frac{5 \pi}{6}\right)-\sin \left(\frac{2 \pi}{3}\right)$ b) $\tan ^{2}\left(\frac{5 \pi}{4}\right)-\sec ^{2}\left(\frac{5 \pi}{4}\right)$
c) $\csc ^{2}\left(\frac{\pi}{4}\right)-\cos \left(\frac{5 \pi}{3}\right)$
15) Julia, being chased by Shay and Carter who are offended by something she said, runs 27 feet at $57^{\circ}$, turns and runs 32 feet at $221^{\circ}$, and then turns again to run 18 feet at $187^{\circ}$. Find the distance and direction that she has run from where he started.
16) Given that $\vec{u}=5 \vec{i}-36 \vec{j}$ and $\vec{v}=8 \vec{i}-49 \vec{j}$, find each of the following:
a. $\vec{u}+\vec{v}$
b. $|\vec{u}+\vec{v}|$

Find two periods for each function. Label and mark the axes appropriately
17) $y=3+5 \cos \left[\frac{\pi}{6}(x-2)\right]$
amplitude:
period
vertical shift
horizontal shift

18) $f(x)=2-4 \sin \left[\frac{1}{8}(x+\pi)\right]$
amplitude:
period
vertical shift
horizontal shift

19) Find one sine and one cosine equation for the following graph.

20) Find one sine and one cosine equation for the graph below:

21) Seeking a peaceful place to study for finals, Uma and Tessa decide to go for a ride on the SkyStar wheel. Mikey, Will, Gavin, Bailey, and Monty, having all landed jobs as wheel operators, are fighting over
whose turn it is to work the controls. In all the flailing and arguing, they inadvertently turn up the speed so that the wheel now makes one revolution every 3 seconds. Out of morbid curiosity, Miles and Jae recognize that the height of Uma and Tessa off the ground varies sinusoidally with time. They start timing when their car is at its lowest point 4 feet off of the ground. Since the diameter of the wheel is 50 feet,
a) Sketch at least one cycle of the graph that represents this situation.
b) Find an equation that represents this situation
c) How high off the ground are they at 7 seconds?
d) What are the first four times that they are 12 feet off of the ground?

