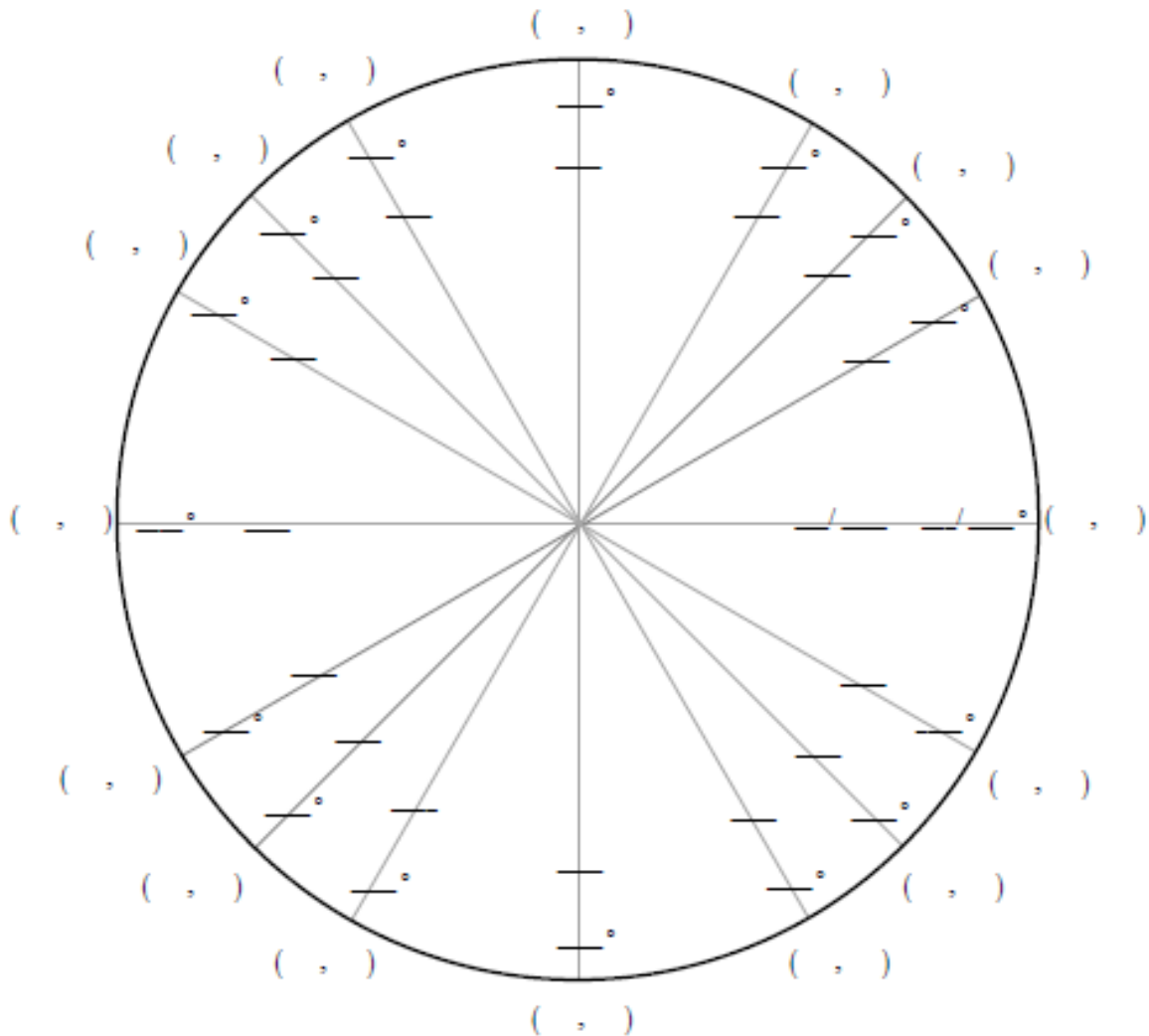


M52: AP Calculus AB: Summer Assignment

- You have signed up to take M52: AP Calculus AB next year.
- It is suggested that you complete this packet during the summer to ensure that the skills gathered in your past math class have not magically disappeared.
- You may use any resources that you have available to you, but please know that finding an answer and copying it down does not serve you well as a student.

Complete the unit circle. Include angles measured in both degrees and radians.



1. Solve the following equations and check for extraneous solutions.

a. $8x - 9 = 2(x + 7)$

b. $|2x - 3| = 5$

c. $x^2 - 7x + 10 = 0$

d. $2\sqrt{x-3} - 5 = 1$

e. $x^2 + 4x = -5$

f. $2(3^x) - 1 = 53$

g. $\log_2(x - 6) + 3 = 5$

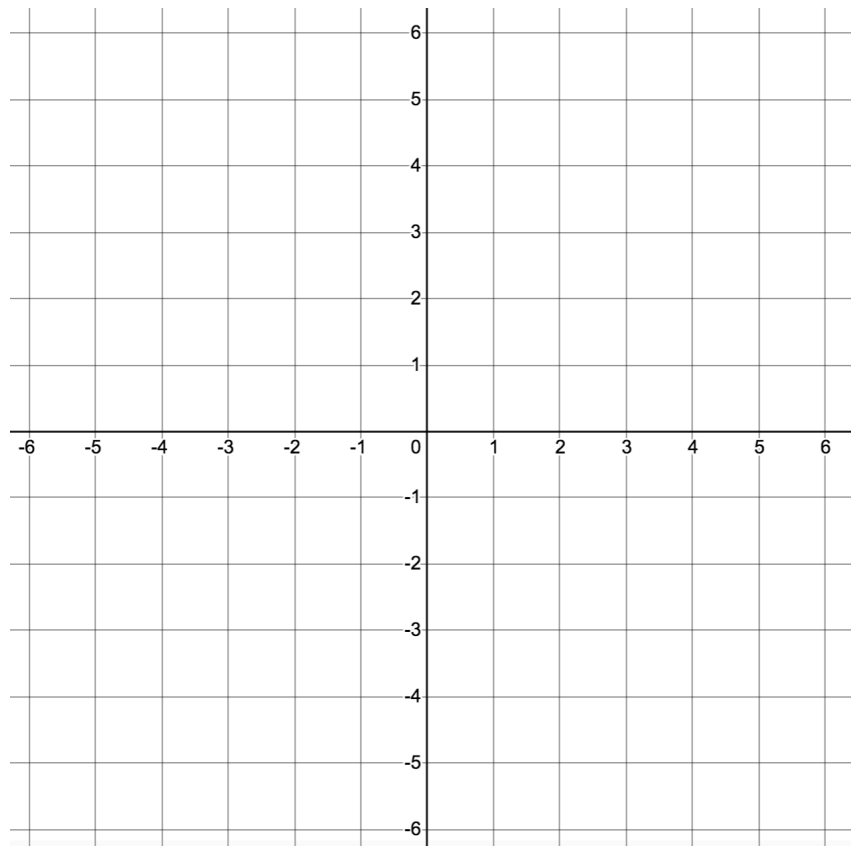
h. $2\sin^2 x - \sin x - 1 = 0$ over $[0, 2\pi)$

i. $2\cos^2 x - \sqrt{3} \cos x = 0$ over $[0, 2\pi)$

2. Write the equation of the line that goes through the points (7, 2) and (4, 8).

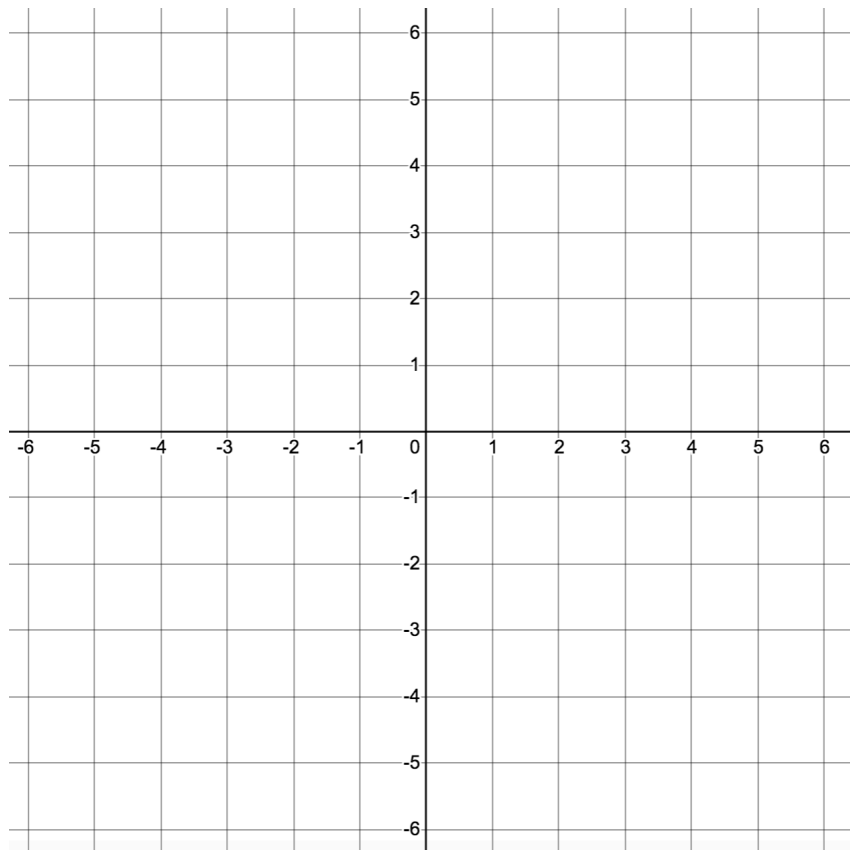
3. Graph the following linear inequality. Make sure to include shading.

$$y - 4 > \frac{1}{2}(x + 1)$$



4. a. Graph the following function using transformations of a parent function table. Show all your work for complete credit. Check your answer on your calculator.

$$f(x) = 2|x - 3| + 1$$



b. What is the domain of your graph in interval notation?

c. What is the range of your graph in interval notation?

5. Given $f(x) = 3x - 1$ and $g(x) = x^2 - 2$, find the following and simplify.

a. $g(x) - f(x) =$

b. $g(f(x)) =$

6. Find the inverse of $f(x) = \sqrt{x - 3} + 5$ algebraically.

7. $3i$ is an imaginary zero of $f(x) = 2x^3 + 3x^2 + 18x + 27$. Find all remaining imaginary and real zeros, using synthetic division.

8. Given the function $f(x) = (x - 1)(x + 2)^2(x + 3)$, answer the following questions:

a. x-intercept(s):

b. y-intercept:

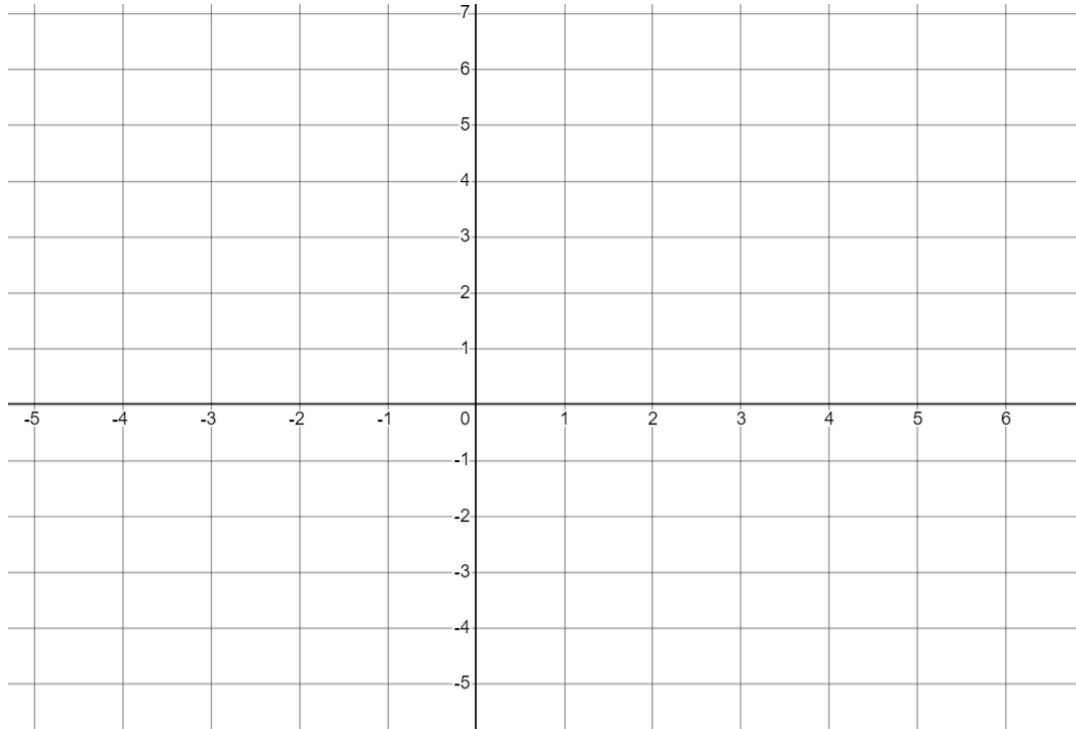
c. End behavior (draw a sketch):

d. At what x-intercept(s) does the function “bounce” off of the x-axis?

e. At what x-intercept(s) does the function “cross” the x-axis?

9. Sketch a graph of the following function and answer the questions below:

$$f(x) = \frac{(x-1)(x+3)}{(x+3)(x-3)}$$



- a. Domain:
- b. x-intercept(s):
- c. Y-intercept:
- d. Vertical asymptote(s):
- e. Hole(s) (at what x-value?):
- f. Horizontal asymptote:

10. Find the exact value of the following trig functions using the unit circle.

a). $\cos(60^\circ) =$

b). $\cos(270^\circ) =$

c). $\cos(225^\circ) =$

d). $\sin(135^\circ) =$

e). $\sec(225^\circ) =$

f). $\cot(330^\circ) =$

g). $\cos(\frac{5\pi}{4}) =$

h). $\tan(\frac{5\pi}{6}) =$

i). $\sin(\frac{7\pi}{6}) =$

11. If $\cos x = \frac{-5}{13}$ and $\sin x > 0$, find the $\tan(x)$.

12. Match the following equations to their corresponding graph.

A. $f(x) = -5\sin x$

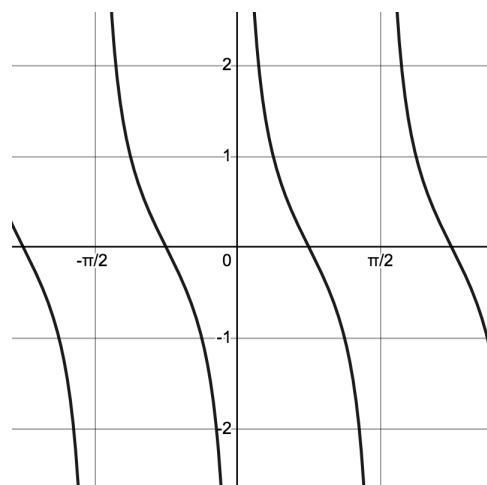
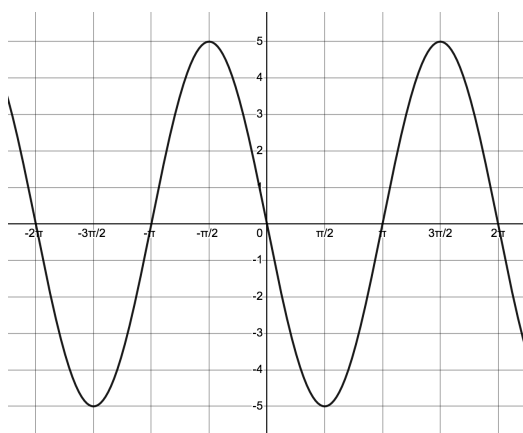
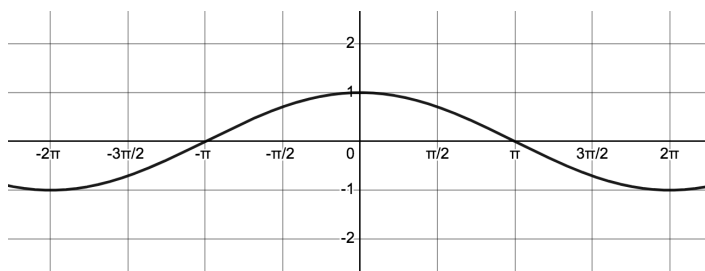
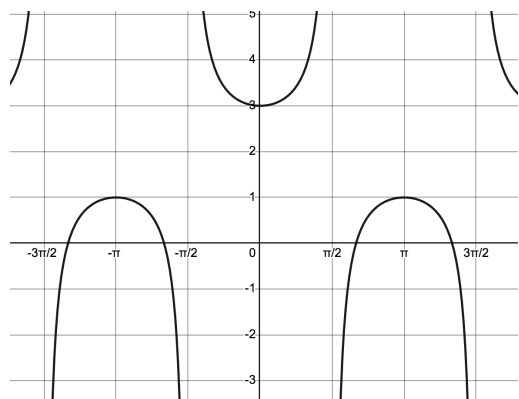
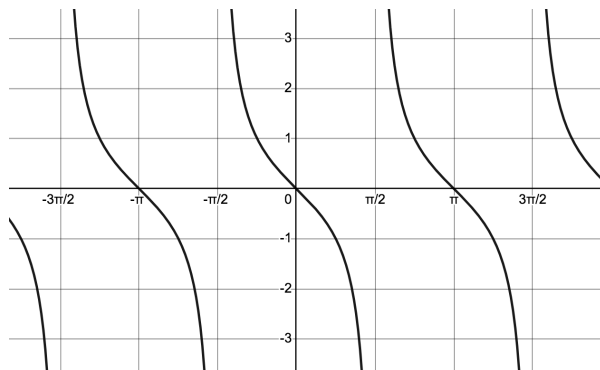
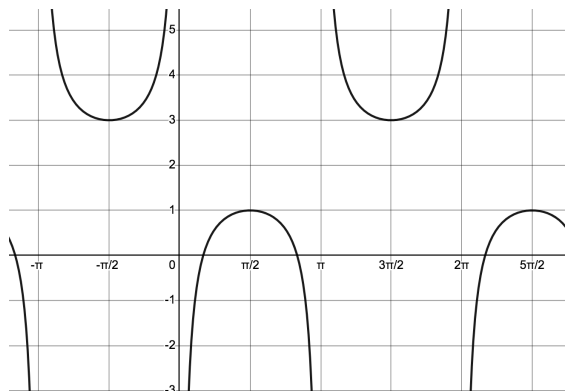
B. $f(x) = \cos\left(\frac{x}{2}\right)$

C. $f(x) = \sec(x) + 2$

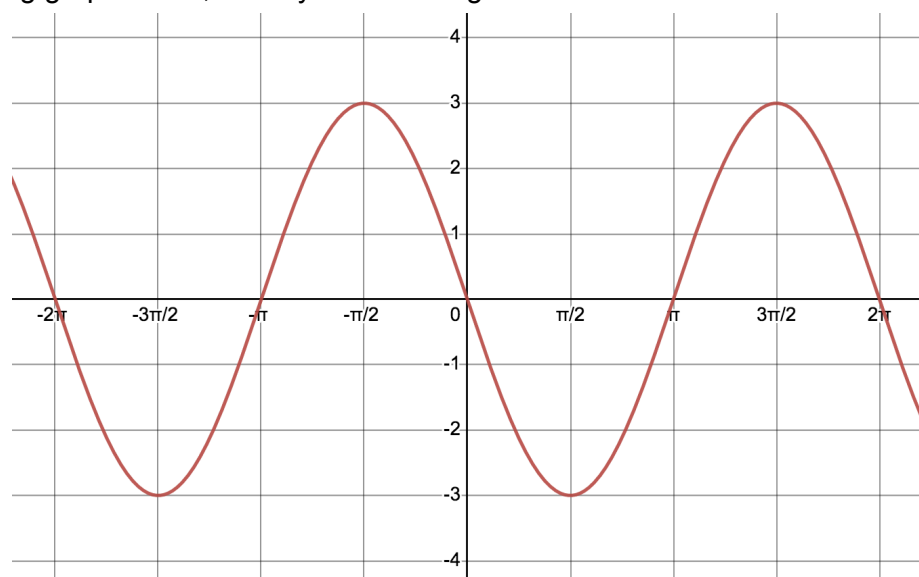
D. $f(x) = -\csc(x) + 2$

E. $f(x) = -\tan(x)$

F. $f(x) = \cot(2x)$



13. For the trig graph below, identify the following:



a. Domain:

b. Range:

c. Amplitude:

d. Period:

e. Intercepts (in general form where n is an integer):

f. Equation of the graph:

14. Verify the following trig identities. Show all your steps.

a. $\cot^2(x)(1 + \tan^2(x)) = \csc^2 x$

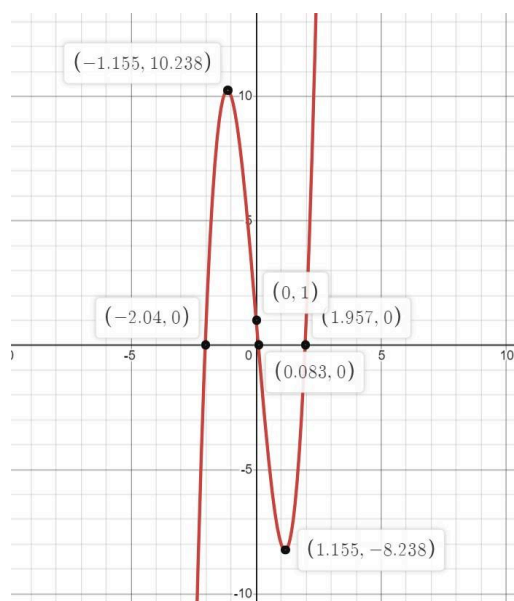
b. $\cos x(\tan x + \cot x) = \csc x$

15. Find the exact value of the following using inverse trig.

a. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

b. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

16.



Find the following properties of the graph above:

x-intercepts:

y-intercept:

Intervals where increasing:

Intervals where decreasing:

Local Maximum point:

Local Minimum point:

17. Simplify the complex fraction. Write your answers without negative exponents.

$$\frac{\frac{5}{2x} - \frac{2}{3x}}{\frac{4}{x} + \frac{3}{2x}}$$

18. Graph the following piecewise function:

$$h(x) = \begin{cases} x+3 & \text{if } x < -2 \\ x^2 & \text{if } -2 \leq x < 1 \\ -x+2 & \text{if } x \geq 1 \end{cases}$$

