

Name \_\_\_\_\_

**Calculus Honors & AP Summer Review:**

**SHOW ALL WORK!**

Determine the **EXACT** values of the six trigonometric functions of each angle without the use of a calculator:

1.  $3\pi/2$

2.  $135^\circ$

3.  $-\pi/6$

4.  $2\pi/3$

5.  $5\pi/3$

6.  $\pi$

7.  $7\pi/6$

8.  $5\pi/4$

If  $0 \leq \theta < 2\pi$ , determine the **EXACT** values of  $\theta$ , in radians, that make each statement true without using a calculator:

1.  $\cos \theta = -1/2$

2.  $\sin \theta = \sqrt{2}/2$

3.  $\tan \theta = \sqrt{3}/3$

4.  $\cot \theta = -1$

5.  $\sec \theta = \sqrt{2}$

6.  $\csc \theta = -2$

7.  $\tan \theta = 0$

8.  $\sec$  is undefined

If  $0 \leq \theta < 2\pi$ , determine the **EXACT** value of each expression without using a calculator:

$0 \leq \theta < 2\pi$

1.  $\csc^{-1} 1$

2.  $\operatorname{Arcsec} \left( \frac{2\sqrt{3}}{3} \right)$

3.  $\tan^{-1} (-1)$

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

5.  $\operatorname{Arcsin} \left( -\frac{1}{2} \right)$

6.  $\cot^{-1} \left( \cot \frac{\pi}{3} \right)$

7.  $\sec \left( \sin^{-1} \left( -\frac{7}{25} \right) \right)$

8.  $\tan \left( \cos^{-1} \frac{3}{4} \right)$

Use a calculator to evaluate each expression:  
Round answers to the nearest ten-thousandth.

1.  $\sin \frac{5\pi}{7}$

2.  $\cos 2$

3.  $\tan 303^\circ$

4.  $\sec 42^\circ$

5.  $\csc \left(-\frac{5\pi}{7}\right)$

6.  $\cot (1.3)$

Use a calculator to evaluate each expression:  
Round answers to the nearest hundredth of a radian.

1.  $\cos^{-1} 0.3325$

2.  $\operatorname{Arccot} 1.792$

3.  $\csc^{-1} (-0.2383)$

4.  $\sec^{-1} 3$

Solve for the **EXACT** values of  $x$  where  $0 \leq x \leq 2\pi$ :

1.  $2 \cos^2 x + 3 \cos x - 2 = 0$

2.  $2 \cos^2 x = 2 \cos x$

3.  $2 \cos^2 x - 3 \sin x - 3 = 0$

4.  $\sqrt{3} \tan 2x + 1 = 0$

Solve:  $2 \sin^2 x = 1 + 2 \sin x$  for the values of  $x$  where  $0 \leq x \leq 2\pi$ .  
Round answers to the nearest hundredth of a radian.

Graph each equation. Label  $x$  and  $y$ -intercepts and all important points on each graph.

1.  $f(x) = 2\sin x$

2.  $f(x) = \tan x + 1$

3.  $f(x) = \cos \frac{1}{2}x$

4.  $f(x) = \sec x$

5.  $f(x) = \csc x - 3$

6.  $f(x) = -\cos x$

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

8.  $f(x) = -x^2 + 2x - 3$

9.  $f(x) = 2(x + 1)^2 + 3$

10.  $f(x) = x(x - 3)(x + 2)^2$

11.  $f(x) = -x^3(x + 2)(x - 2)$

12.  $f(x) = \|x\|$

13.  $f(x) = \frac{1}{x + 1}$

14.  $f(x) = \frac{1}{x} + 1$

15.  $f(x) = |x + 2|$

16.  $f(x) = |x| + 2$

17.  $f(x) = \sqrt[3]{x}$

18.  $f(x) = \sqrt{x} - 2$

19.  $f(x) = -\sqrt{x} - 2$

20.  $(x - 2)^2 + y^2 = 9$

21.  $f(x) = \begin{cases} 2x - 1 & x < 0 \\ \sqrt{x} & x \geq 0 \end{cases}$

22.  $f(x) = \begin{cases} x^2 & x > 0 \\ -2 & x \leq 0 \end{cases}$

Simplify each expression:

1. 
$$\frac{3x + \frac{x}{x+1}}{3x+3}$$

2. 
$$\frac{x}{x-1} - \frac{2x-1}{x+1}$$

Determine whether the function is odd, even, or neither:

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

2.  $f(x) = x^2 + 1$

Determine the domain and the range of each function:

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

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

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

4.  $f(x) = |x - 3|$

Divide:  $(8x^4 - 16x^3 + 16x^2 - 27x + 18) \div (2x - 3)$

1. Using Long Division of Polynomials
2. Using Synthetic Division

Express the answer as a product of a divisor and a quotient with a remainder.

Find all of the complex zeros of each function:

1.  $f(x) = 2x^3 + 6x^2 - 5x - 15$

2.  $f(x) = 12x^4 - 5x^2 - 2$

3.  $f(x) = x^3 - 27$

4.  $f(x) = 9x^3 - 108x^2 + x - 12$

5.  $f(x) = x^3 + x^2 - 3x - 3$

6.  $f(x) = x^5 + x^3 - 2x^2 - 12x - 8$

7.  $f(x) = \frac{3}{x}$

8.  $f(x) = \frac{x^2 - 4}{x + 1}$

Solve each equation:

1.  $\ln x = 4$

2.  $e^x = 8$

3.  $\ln(e^3 x^2) = 4 - \ln(1/x)$

4.  $e^{2x} - e^x - 6 = 0$