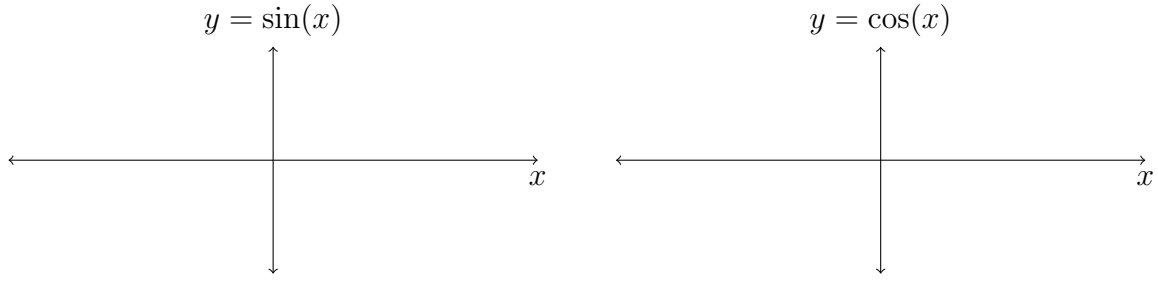
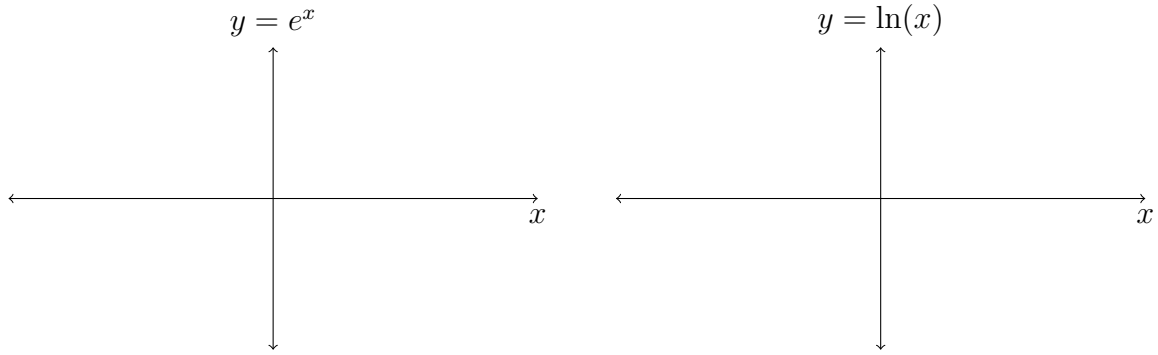
162 Final Exam Name: _____

Warm up questions:

1. The domain of sine is _____ and the range is _____.
2. The domain of cosine is _____ and the range is _____.
3. The domain of tangent is _____ and the range is _____.
4. The domain of $\ln(x)$ is _____ and the range is _____.
5. The domain of e^x is _____ and the range is _____.
6. If $\sin(\alpha) = .3$ then $\sin(-\alpha) =$_____.
7. If $\cos(\alpha) = .4$ then $\cos(-\alpha) =$_____.
8. If $\sin(\alpha) = .3$ and $\cos(\alpha) = .4$ then $\tan(-\alpha) =$_____.
9. Rewrite $\log_2(\frac{1}{8}) = y$ in equiavalent exponential form _____.
10. Solve for $y : \log_2(\frac{1}{8}) = y$ _____
11. Graph $y = \sin(x)$ on the left and $y = \cos(x)$ on the right.



12. Graph $y = e^x$ on the left and $y = \ln(x)$ on the right.



13. If you deposit \$2,000 at 5% compounded *monthly*, how much will you have it 10 years?

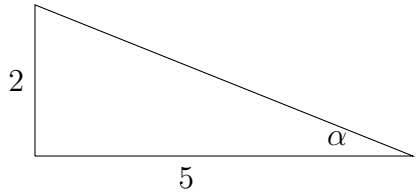
14. Using logarithms, how long would it take for your money to double?

15. Solve $e^{\ln(x^2+1)} = 6x$ for x

16. Solve $5^x = 3$ for x. Write your answer with 4 decimal place accuracy.

17. Solve $2\log(x) - \log(x+1) = 1$
    hint: first rewrite as a single log, then in equivalent exponential form, then solve a quadratic.

18. Find all the trigonmetric functions of α.



(a) $\sin(\alpha) =$

(b) $\cos(\alpha) =$

(c) $\tan(\alpha) =$

(d) $\sec(\alpha) =$

(e) $\csc(\alpha) =$

(f) $\cot(\alpha) =$

19. Using your answer above, find $\sin(\tan^{-1}(\frac{2}{5}))$

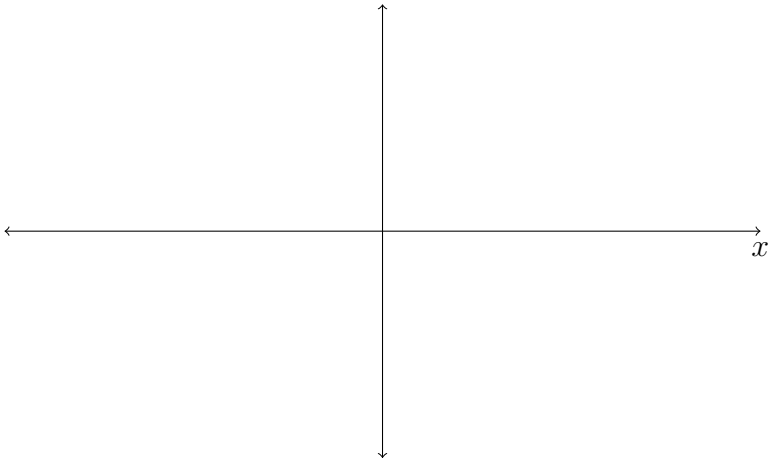
20. More generally, find $\sin(\tan^{-1}(x))$

21. For the same α above, find $\cos(2\alpha)$.

22. Let $f(x) = 2\sin\left(\frac{\pi}{2}x\right)$. The period is _____ and the amplitude is _____.

23. Graph $f(x) = 2\sin\left(\frac{\pi}{2}x\right)$ clearly labelling the x and y axes.

$y = 2\sin\left(\frac{\pi}{2}x\right)$



24. Use the substitution $x = 2\sin(\theta)$ to rewrite $\sqrt{4 - x^2}$ as a trigonometric function of θ.

25. The domain of $\sin^{-1}(x)$ is _____ and the range is _____.

26. The domain of $\tan^{-1}(x)$ is _____ and the range is _____.

27. $\sin^{-1}(0) =$_____, and $\cos^{-1}(0) =$_____.

28. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) =$_____, and $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) =$_____

29. If $\theta = \cos^{-1}\left(\frac{x}{2}\right)$, what is $\tan(\theta)$? That is, find $\tan\left(\cos^{-1}\left(\frac{x}{2}\right)\right)$

30. Find $\sin^{-1}\left(\sin\left(\frac{7\pi}{6}\right)\right)$
hint: it is not $\frac{7\pi}{6}$

31. Solve the triange with $A = 25°, C = 100°, a = 10$

    (a) $B =$ _____

    (b) $b =$ _____

    (c) $c =$ _____

32. Solve the triangle with $a = 6, b = 7, c = 8$

    (a) $A =$ _____

    (b) $B =$ _____

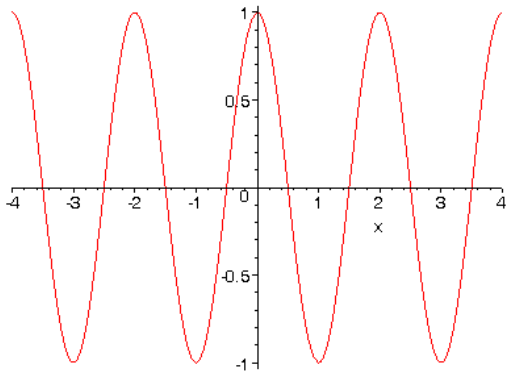
    (c) $C =$ _____

33. Find $|1 - \sqrt{3}i|$

34. Write $1 - \sqrt{3}i$ in trigonometric form, i.e. as $r\left(\cos(\theta) + i\sin(\theta)\right)$

35. Using you answer above, find $\left(1 - \sqrt{3}i\right)^3$ and rewrite your answer in standard form.

36. For the function below, find the amplitude and the period.



(a) Period: _____

(b) Amplitude: _____

37. Using your answer above, give a good guess as to what function was graphed.

38. The equation for exponential growth is $A(t) = A_0 e^{rt}$. A vial contains 20 bacteria. 15 minutes later it contains 30. What is the growth rate r?

39. How many bacteria will there be in another 30 minutes?

40. Have a good holiday