MS 101 Sample Final Exam

Formulas: $A = P(1 + \frac{r}{n})^{n\,t}$ $A = P\,e^{r\,t}$ $\log_a(u) = v$ is equivalent to $a^v = u$ for $0<a\neq 1$ and $u>0$

01. (04 pts) Let f be the exponential function $f(x) = 2.7^x$. Find the value $f(3.1) =$

02. (04 pts) Suppose \$750 is invested at 5% APR for 10 years compounded monthly. What is the final value of the investment?

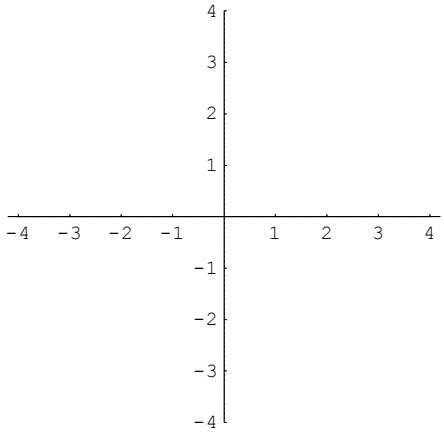
03. (04 pts) Suppose \$750 is invested at 5% APR for 10 years compounded continously. What is the final value of the investment?

04. (04 pts) Suppose $g(x) = 3^x$.

a) Complete the table for the given values of x.

x	-1	0	1
$g(x)$			

b) Plot the points from the table and sketch the graph of g on the axes below.

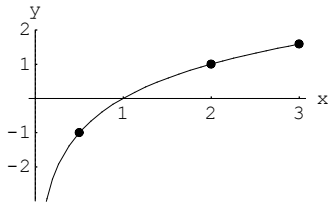


05. (04 pts) Convert the exponential equation $8^2 = 64$ to the equivalent logarithmic equation.

06. (04 pts) Convert the logarithmic equation $\log_2(8) = 3$ to the equivalent exponential equation.

07. (04 pts) Use your calculator to evaluate the function $f(x) = \log(x)$ for $x = 15$. **answer:**

08. (04 pts) Observe the graph below. It is the graph of a function of the form $f(x) = \log_a(x)$
What is the value of a?



09. (04 pts) The expression $\log(2x)$ is equivalent to which of the following:

a) $\log(x^2)$ b) $2\log(x)$ c) $\log(2)\log(x)$ d) $\log(2)+\log(x)$

10. (04 pts) The expression $\frac{\log(x)-\log(y)}{2}$ is equivalent to which of the following:

a) $\log(\frac{x}{2})-\log(\frac{y}{2})$ b) $\log\left(\sqrt{\frac{x}{y}}\right)$ c) $\sqrt{\log(x)-\log(y)}$ d) $2\log(\frac{x}{y})$

11. (04 pts) The expression $\ln(2^x)$ is equivalent to which of the following:

a) $\ln(x+x)$ b) $2\ln(x)$ c) $\frac{\ln(x)}{2}$ d) $x\ln(2)$

12. (04 pts each) Solve the following equations for the variable. Express the final answer as a decimal.

a) $4\ln(3x)=8$

b) $4+2\ln(x)=12$

c) $e^{3x}=9$

d) $3e^{2x}+1=10$

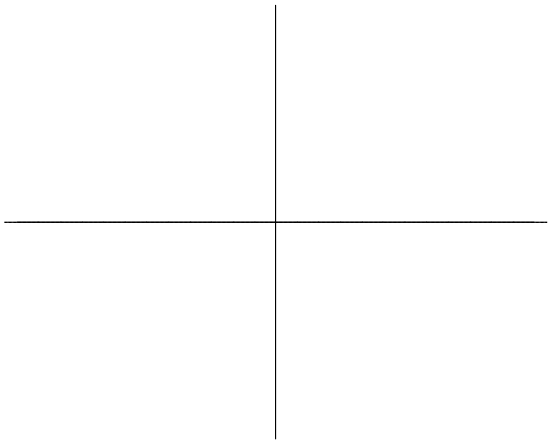
13. (04 pts) An investment of \$750 is made at r% APR compounded continously. After 5 years the investment is worth \$950. What is the APR?

14. (04 pts) The population of Dogville can be modeled by $P=200e^{kt}$ where t is years since 1990. In 1995 the population was 250.

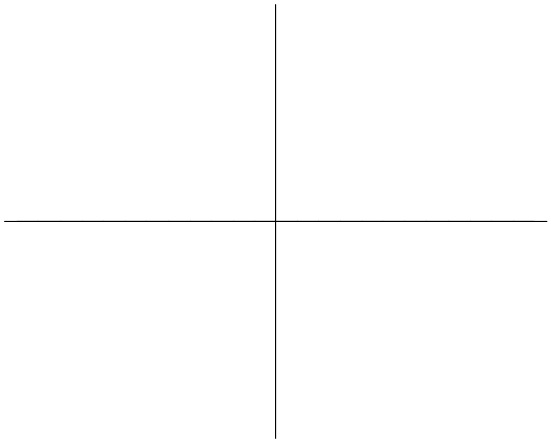
a) Find the value of k.

b) Does this model represent exponential growth or exponential decay?

15. (04 pts) On the axes below, sketch the angle 150° in standard position. Use an arrow to indicate the amount and direction of the rotation that forms the angle.



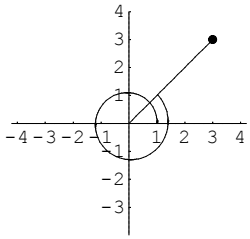
16. (04 pts) On the axes below, sketch the angle -205° in standard position. Use an arrow to indicate the amount and direction of the rotation that forms the angle.



17. (04 pts) Tell me the meaning of "reference angle."

18. (04 pts) Tell me the meaning of "acute angle".

19. (04 pts) Estimate the reference angle for the angle sketched below.



20. (04 pts) Suppose $\theta = 240°$. What is the measure of θ in radians(preserve π)?

21. (04 pts) Suppose $\theta = \frac{2\pi}{3}$. What is the measure of θ in degrees?

22. (04 pts) Suppose $\theta = 60°$.

a) Tell me an angle which is positive and coterminal to θ.

b) Tell me an angle which is negative and coterminal to θ.

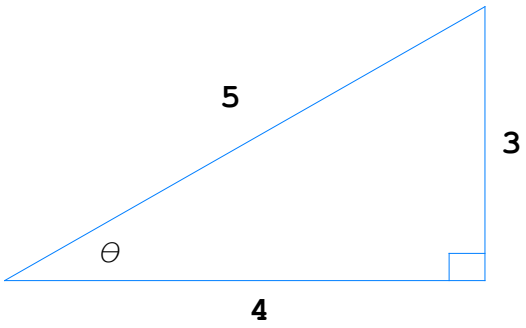
23. (10 pts) Suppose the right triangle below has legs of length 3 and 4 and hypotenuse 5. Also the angle θ lies opposite the leg of length 3.

a) Label each side with the proper length.

b) Indicate which angle is θ.

c) Complete the table:

$\sin(\theta) =$	$\csc(\theta) =$
$\cos(\theta) =$	$\sec(\theta) =$
$\tan(\theta) =$	$\cot(\theta) =$

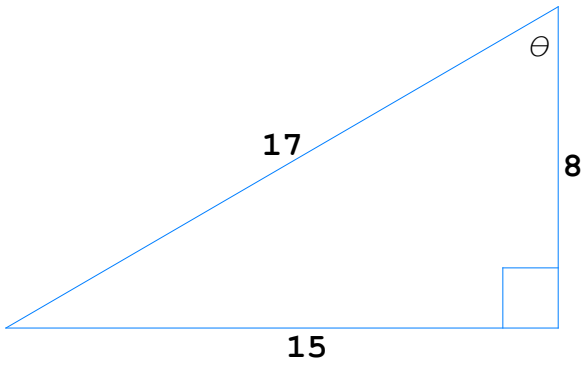


24. (10 pts) Suppose the right triangle below has legs of length 8 and 15. The angle θ lies opposite the leg of length 15.

a) Label each side with the proper length, including the hypotenuse. $\sin(\theta) =$ $\csc(\theta) =$

b) Indicate which angle is θ. $\cos(\theta) =$ $\sec(\theta) =$

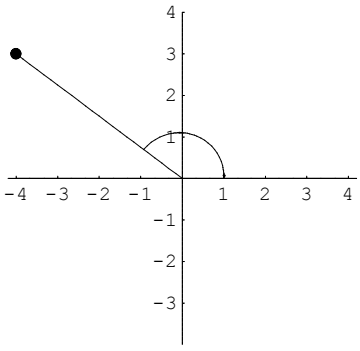
c) Complete the table: $\tan(\theta) =$ $\cot(\theta) =$



25. (08 pts) Please refer to the angle θ sketched below. Note that the terminal ray of θ is passing thru the point (-4,3). Answer the following:

a) In which quadrant does the angle lie ?

b) Find the values: $\sin(\theta) =$ $\cos(\theta) =$ $\tan(\theta) =$



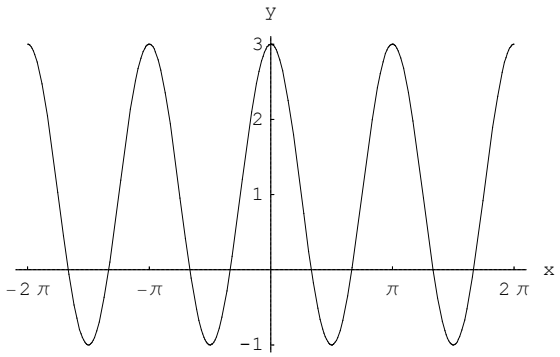
26. (06 pts) Observe the periodic function graphed below.

a) What is the midline of the function?

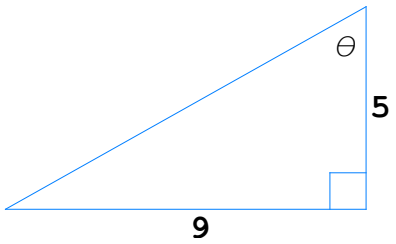
b) What is the period of the function?

c) What is the amplitude of the the function?

d) Find the formula for the function.



27. (04 pts) A right triangle has legs of length 5 and 9. Suppose θ lies adjacent the leg of length 5. Use your calculator's inverse function buttons to determine the degree measure of θ. **answer** = _____



28. (04 pts) TRUE or FALSE: The equation $\cos(\theta) = \frac{1}{\sec(\theta)}$ is a trigonometric identity.

29. (04 pts) Find the acute $(0 < x < 90°)$ solution to the equation $2\sin(x) - 1 = 0$.

30. (04 pts) Find the acute $(0° < x < 90°)$ solution to the equation $2\cos(x) - 1 = 0$.

31. (04 pts) Find the solution $(-90° < x < 90°)$ solution to the equation $\tan^2(x) = 3$.

32. (04 pts) What is the Pythagorean Trigonometric Identity?

33. (04 pts) TRUE or FALSE: The maximum value of a periodic function is *always* the amplitude.

34. (04 pts) TRUE or FALSE: The best way to study for an exam is by staring at the sample test.