Math 41
Exam 3
April 22, 2016

calculators ok! permitted

1. The value of a new SUV can be modeled by the equation $V = 40{,}000(0.75)^t$ and is depreciating in value where *t* is the number of years ***since*** purchase.

a. Find the value of the SUV when purchased.

b. Find the value after 4 years.

2. Use the appropriate formula in Problem #2. $A = P(1+\frac{r}{n})^{nt}$ and $A = Pe^{rt}$

Suppose very rich and very eccentric great Aunt Sofia Maria deposited $10,000 into an account the day that you were born. Find the amount in that account on your 21st birthday, if the interest rate was 2% and the interest was compounded,

a. **Monthly.**

b. **Continuously.**

3. Evaluate the logarithm without a calculator:

a. $\log_2 8 =$

b. $\log_\pi 1 =$

4. Use the change of base formula to approximate the logarithm, and round to three decimal places.

a. $\log_3 20 \approx$

b. $\log_{\frac{1}{2}} 5 \approx$

5. Use the properties of logarithms to write *(expand)* the expression as a sum, difference and/or multiple of logarithms.

$$\ln\left(\frac{\sqrt{x^2+1}}{x^2}\right)$$

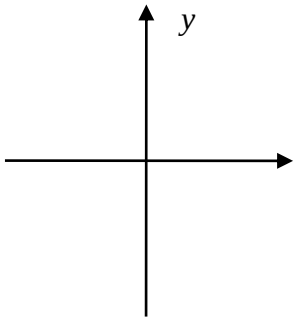
6. Use the properties of logarithms to write *(condense)* the expression as the logarithm of a single quantity.

$$2\ln(x)+\tfrac{1}{3}\ln(x+1)$$

7. Solve the exponential equation for x: $$2e^{x-4} - 1 = 0$$
Leave your answer in terms of logarithms.

8. a. Draw the angle is standard position and convert the angle to degree measure.

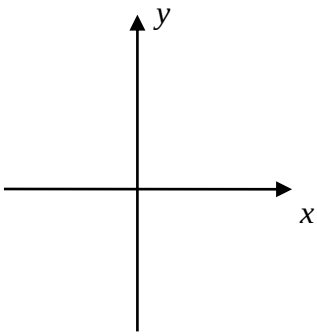
$$\theta = \frac{5\pi}{3}$$



$\theta =$ ____ °

b. Draw the angle in standard position and convert the angle to degree measure.

$$\theta = -\frac{5\pi}{6}$$

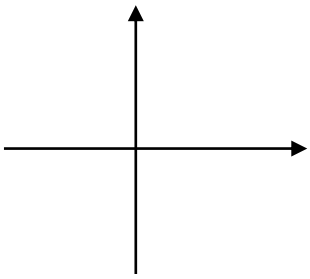


Degrees

$\theta =$ ____ °

9. a. Draw the angle in standard position and convert the angle to radian measure

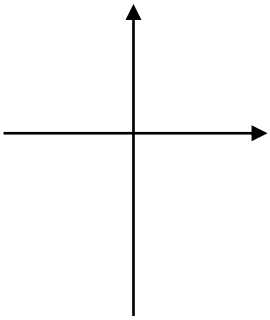
$\theta = -150^\circ$



$\theta =$

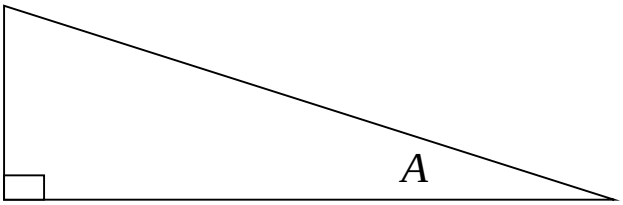
b. Draw the angle in standard position and convert the angle to radian measure

$\theta = 720^\circ$



$\theta =$

10. Label the right triangle to find $\tan A$, given $\sin A = \frac{5}{13}$.



11. Find θ, $0^o < \theta < 90^o$, in degrees, for each equation. Do not use a calculator.

a. $\sin\theta = \frac{\sqrt{3}}{2}$

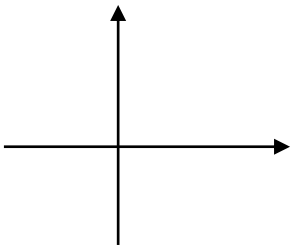
b. $\csc\theta = \sqrt{2}$

12. Find θ, $0 < \theta < \frac{\pi}{2}$, in radians, for each equation. Do not use a calculator.

a. $\tan\theta = \frac{\sqrt{3}}{3}$

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

13. Find $\sin\theta$ of the angle θ whose terminal side passes through the point $(2,-1)$.



$\sin\theta =$

14. Evaluate the trigonometric function without using a calculator:

a. $\sin 135^\circ =$

b. $\cos 300^\circ =$

15. Evaluate the trigonometric function without using a calculator:

a. $\tan \frac{4\pi}{3} =$

b. $\sin \frac{7\pi}{6} =$

16. If possible, evaluate the trigonometric function of the quadrant angle.

a. $\tan \frac{3\pi}{2} =$

b. $\cos 270^\circ =$

17. Find two solutions in degrees $\left(0^\circ \le x < 360^\circ\right)$ of the equation: $\tan x = -1$

18. Find two solutions in radians $\left(0 \le x < 2\pi\right)$ of the equation: $\sin x = \frac{1}{2}$