Name:

Directions: Complete all questions and **show all applicable work.** Partial credit will be given.

1.) Write the following using interval notation: *The set of all real numbers greater than or equal to -2 and less than 3.*

2.) Given a right triangle with a leg of length 5 centimeters and hypotenuse of length 13 centimeters, what is the length of the other leg?

3.) Simplify:

$$\frac{4}{8}\, x^{\frac{1}{4}}\, x^{-\frac{1}{2}}$$

4.) Solve for x:

$$\frac{x-1}{3} + \frac{x+2}{6} = 1$$

5.) Solve the following equation for x:

$$x^2 = 4x + 5$$

6.) Find the vertex, y-intercept and x-intercept(s) of the following function, then graph it.

$$y = (x-1)^2 - 3$$

7.) Evaluate $\log_3 \frac{1}{9}$.

8.) Solve the equation for x:

$$\log_3 x = 4$$

9.) Solve the equation for x:

$$10^{x-3} = 6.$$

10.) Create four individual plots, one for each of the following. Be sure to label one point on each graph and any asymptotes.

a.) e^x

b.) e^{x+2}

c.) $-4e^{x+2}$

d.) $-4e^{x+2} + 3$

11.) Dan invests \$12,000 into his local bank. Three years later his investment is worth \$14,500.

a.) How much interest is accrued?

b.) If interest was compounded continuously, what was the annual interest rate of his investment as a percentage?

12.) Solve the following for x:

$$\log_3 2x^2 - \log_3 x = 6$$

13.) Write the following in expanded form:

$$\log_4\left(\frac{(x-2)^4}{(x+3)(x+4)^7}\right)$$

14.) Draw the following angles in standard position:

a.) $-90°$

b.) $\frac{3\pi}{4}$

c.) $600°$

d.) $-\frac{\pi}{3}$

15.) Find the reference angle for each of the following:

a.) $\frac{\pi}{3}$ = _____

b.) $170°$ = _____

c.) $\frac{2\pi}{3}$ = _____

d.) $180°$ = _____

16.) If $\tan\theta = \frac{\sqrt{2}}{2}$ and $\sin\theta < 0$, find $\cos\theta$. Express your answer as a fraction.

17.) Compute $\cos 60°$. Express your result exactly as a fraction, not as a decimal (ie. do not use your calculator).

18.) Compute $\tan\frac{\pi}{6}$. Express your result exactly as a fraction, not as a decimal (ie. do not use your calculator).

19.) Let $f(x) = \tan x$.

- Find the domain of $f(x)$.
- Find the period of $f(x)$.
- Plot $f(x)$.

20.) Let $f(x) = -3\sin(x + \pi)$.

- Find the domain of $f(x)$.
- Find the period of $f(x)$.
- Find the amplitude of $f(x)$.
- Describe the translations of $f(x)$ then plot $f(x)$.

21.) Bonus [5pts]: Divide the polynomial $x^4 - 3x^3 + 2x^2 + 4x + 5$ by the term $x - 2$.