Precalculus Final Exam 2019 Review #3 Name:_____

1. Find $z_1 \cdot z_2$ if $z_1 = 3\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$ and $z_2 = 4\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$

2. Find $\frac{4i}{1-\sqrt{3}i}$ in a) trig form and check in b) standard form

3. Use DeMoivre's theorem to find $\left(\sqrt{3} - i\right)^7$. Give your answer in both trigonometric and standard form.

4. Given the following information where u is in QII and v is in QIV, find the exact value of each trig function after drawing a diagram:

$$\sin u = \frac{8}{17}, \qquad \cos v = \frac{12}{13}$$

a. $\sin 2u$ b. $\cos\frac{u}{2}$ c. $\tan(u+v)$ d. $\cos(u-v)$ e. $\tan\frac{u}{2}$

5. Solve $2\sin 4x = \sqrt{2}$ giving a) all solutions and b) all solutions in the interval $[0, 2\pi)$

6. Solve $x^2 - 6x + 9 < 16$. Graph your solution and write your answer in interval notation.

7. Solve: $\frac{x}{x-3} \geq \frac{12}{x}$. Graph your solution and write your answer in interval notation.

8. Rewrite in exponential form: a. $\log_4 16 = 2$ b. $\ln 3 \approx 1.099$ c. $\ln 1 = 0$

9. Rewrite in logarithmic form: a. $e^4 \approx 54.6$ b. $e^{-1} \approx .37$ c. $e^0 = 1$

10. Find the domain: a. $\ln(5x+3)$ b. $\ln(2x^2 - 5x - 3)$

11. Simplify: a. $e^{\ln(x+2)} - \ln e + e^{\ln 5x}$ b. $\ln 1 - 2\ln x + \ln(x+1)$ c. $\ln e^{5\pi} + \ln 1 + \pi \ln e$

12. Write in terms of sums, differences and/or multiples of single logarithms:

a. $\log_e\left(\dfrac{\sqrt{x}y^2}{z^3}\right)$ b. $\ln\left(\dfrac{\sqrt[3]{a}}{b^2c^5}\right)$

13. Write an equivalent expression with positive exponents:

a. e^{-x+1} b. e^{5x-3} c. e^{-2x-4}

14. The graphs of $y = e^{-2x}$ and $y = e^{3x}$ intersect at what point?

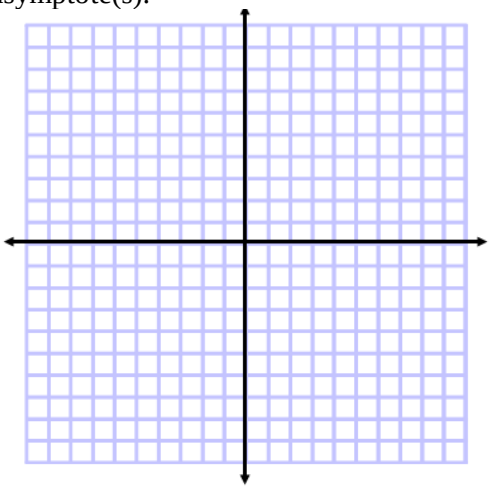
15. Graph $f(x) = -\ln(x + 3) - 1$. Describe transformations and find domain, range, and asymptote(s).

Transformations:

Domain:

Range:

Asymptote(s):



16. State the domain, identify all intercepts, find and plot all asymptotes, and find and plot additional points as needed to graph the following function:

$$f(x) = \frac{3x-1}{x^2-4}$$

Domain:

x–int: *y*–int:

VA:

HA/Slant: