Pre-Calculus
REVIEW – Unit B

Name _____

## Part One: Calculator

$A = P\left(1 + \frac{r}{n}\right)^{nt}$ $A = Pe^{rt}$ $N = N_0(1 \pm r)^t$ $A = N_0e^{k\,t}$

**For questions 1 – 3, find the domain and range of each function given.**

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

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

3. $f(x) = \ln(x + 5) - 4$

4. In 2008, the deer population in a certain area was 800. The number of deer increases exponentially at a rate of 7% per year. During what year will the population triple?

5. Find the balance in an account at the end of 8 years if $6000 is invested at an interest rate of 4.2% that is compounded continuously.

6. Write $2^{-3} = \frac{1}{8}$ in logarithmic form.

7. Evaluate $\log_9 \frac{1}{81}$.

8. Condense $\ln 17 - 2 \ln x - 3 \ln y$

9. Condense $2 \log x - \log 3$.

10. Expand $3 \log_9 \frac{81x^2}{y^5}$

11. Which is the correct expansion of $\log_3 \frac{6x^2}{4y^3}$ ?

**A** $\log_3 6 - \log_3 4 - \log_3 x - \log_3 y$
**B** $\log_3 6 + 2\log_3 x - [\log_3 4 + 3\log_3 y]$
**C** $\log_3 6 + 2\log_3 x - \log_3 4 + 3\log_3 y$
**D** $2\log_3 6x - 3\log_3 4y$

**For 12 - 18 , Solve the equation. Round to the nearest hundredth when necessary.**

12. $4^{x-2} = 3$

13. $\log_4 x^2 + \log_4 5 = \log_4 125$

14. $e^{4x} = 98.6$

15. $\ln x + \ln(x+2) = \ln 35$

16. $3\ln(x-7) = 41$

17. $\log_6(2x) + \log_6(x-2) = 1$

18. $\ln x + \ln(x-4) = \ln 12$

19. The table below shows the population for a given bacteria colony.

| **Time (days)** | 0 | 4 | 8 | 12 | 16 |
|---|---|---|---|---|---|
| **Population (thousands)** | 87 | 112 | 135 | 173 | 224 |

Let *x* represent the number of days and let *y* represent the population in thousands. Find an exponential regression equation for the data. Round to three decimal places.

## Part Two: Non- Calculator

$e^1 \approx 2.7, e^{-1} \approx .4$

20. Which describes the end behavior of $f(x) = 4x^3 - 5x^2 + 2x + 3$?

**A** $\lim_{x\to-\infty} f(x) = \infty,\ \lim_{x\to\infty} f(x) = \infty$

**B** $\lim_{x\to-\infty} f(x) = -\infty,\ \lim_{x\to\infty} f(x) = \infty$

**C** $\lim_{x\to-\infty} f(x) = -\infty,\ \lim_{x\to\infty} f(x) = -\infty$

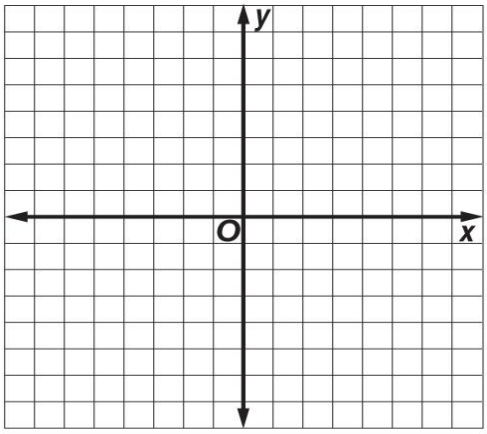
**D** $\lim_{x\to-\infty} f(x) = \infty,\ \lim_{x\to\infty} f(x) = -\infty$

21. What are the horizontal and vertical asymptotes of $f(x) = \frac{x^2-4}{x^2-9}$?

22. Given $f(x) = e^x$ and $g(x) = 2e^{x-2}$, describe the transformations from the parent function.

**For graphs: graph the function (include asymptotes) state the domain, range, asymptote equation, and end behavior.**

23. $f(x) = ln(x - 2)$




Domain:

Range:

Any intercepts:

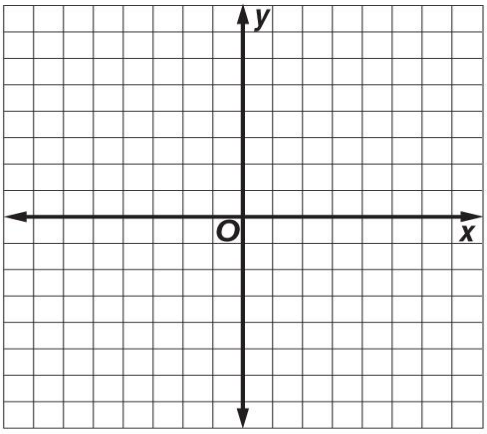
End Behavior:

Decreasing:

Increasing:

Asymptote Equation:

24. $f(x) = 3\left(\frac{1}{2}\right)^x$




Domain:

Range:

Any intercepts:

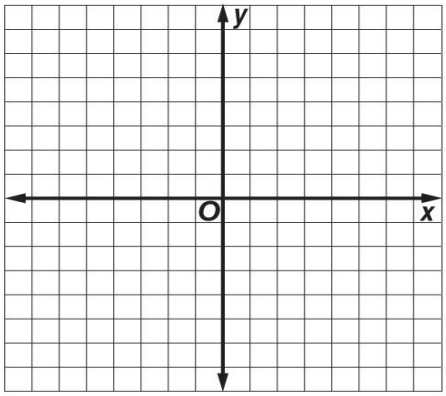
End Behavior:

Decreasing:

Increasing:

Asymptote Equation:

25. $f(x) = e^{x-1} + 2$




Domain:

Range:

Any intercepts:

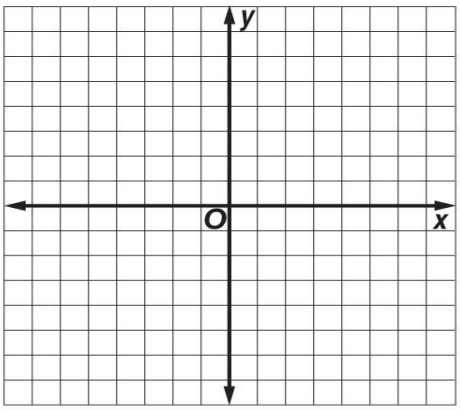
End Behavior:

Decreasing:

Increasing:

Asymptote Equation:

26. $f(x) = -\ln(x + 1) + 3$




Domain:

Range:

Any intercepts:

End Behavior:

Decreasing:

Increasing:

Asymptote Equation: