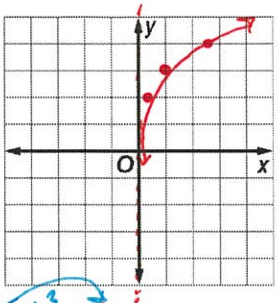
Pre-Calc 3.1 – 3.3 Quick Review Name: Key

**Sketch a graph of each function. Then identify what's indicated below.**

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

1) $f(x) = \ln x + 3$



Domain: $(0, \infty)$

Range: $(-\infty, \infty)$

Any intercepts: x-int $(.04, 0)$

Decreasing: none

Increasing: $(0, \infty)$

Asymptote Equation: $x = 0$

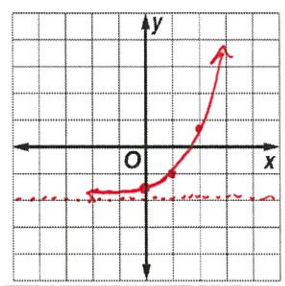
End Behavior: $\lim_{x\to\infty} f(x) = \infty$ $\lim_{x\to 0^+} f(x) = -\infty$

+3

| x | y |
|---|---|
| .4 | -1 |
| 1 | 0 |
| 2.7 | 1 |

| x | y |
|---|---|
| .4 | 2 |
| 1 | 3 |
| 2.7 | 4 |

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



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

Domain: $(-\infty, \infty)$

Range: $(-2, \infty)$

Any intercepts: y-int: $(0, -1.6)$ x-int: $(1.7, 0)$

Decreasing: none

Increasing: $(-\infty, \infty)$

Asymptote Equation: $y = -2$

End Behavior: $\lim_{x\to\infty} f(x) = \infty$ $\lim_{x\to -\infty} f(x) = -2$

x+1, y-2

| x | y |
|---|---|
| -1 | .4 |
| 0 | 1 |
| 1 | 2.7 |

| x | y |
|---|---|
| 0 | -1.6 |
| 1 | -1 |
| 2 | .7 |

3) In mediaeval times, there were 10,000 people living in a city that was struck by a plague so that people began to die at an exponential rate daily. After 6 days, there were only 8,500 people living. Find the rate as a percentage. Then, determine how many were living after three weeks.

option 1

The calc!

| L1 | L2 |
|---|---|
| 0 | 10,000 |
| 6 | 8500 |

$y = 10{,}000(.9732..)^x$

$r = .0268$ or $2.7\%$

$x = 21$ on table

5,662 people

option 2

$8500 = 10000(1-r)^6$

$\sqrt[6]{.85} = \sqrt[6]{(1-r)^6}$

$.9732.... = 1 - r$

$r = .0267...$ or $r = 2.7\%$

Use original! Don't round

$y = 10000(1 - .0267...)^{21}$

$y = 5661.95$

$\approx 5{,}662$ people

4) Use the change of base formula to evaluate. Route to the nearest thousandth. $\log_{12} 21$

$\frac{\log 21}{\log 12} = 1.225$

5) Expand: $\ln \frac{z^2(x-1)}{\sqrt[3]{5y+2}}$

$\ln z^2(x-1) - \ln \sqrt[3]{5y+2}$

$\ln z^2 + \ln(x-1) - \ln(5y+2)^{1/3}$

$\boxed{2\ln z + \ln(x-1) + \frac{1}{3}\ln(5y+2)}$

6) Condense: $\frac{1}{4}(log_2 5 + log_2 x - log_2 4 - 2log_2 y)$

$\frac{1}{4}(\log_2 5x - \log_2 4 - \log_2 y^2)$

$\frac{1}{4}\left(\log_2\left(\frac{5x}{4}\right) - \log_2 y^2\right)$

$\frac{1}{4}\left(\log_2 \frac{\frac{5x}{4}}{y^2}\right)$

$\frac{1}{4}\left(\log_2 \frac{5x}{4y^2}\right)$

$\log_2\left(\frac{5x}{4y^2}\right)^{1/4}$

$\log_2 \sqrt[4]{\left(\frac{5x}{4y^2}\right)}$