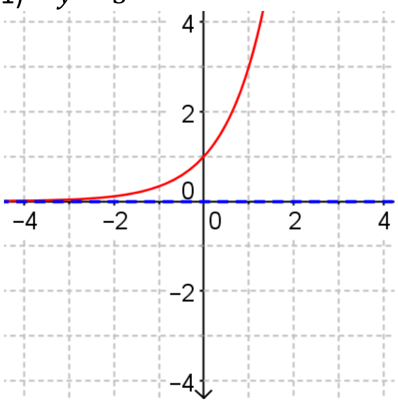
SM3 Unit7 Review Name:___________________________

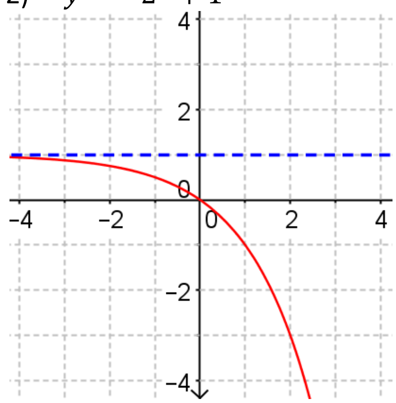
Graph the function. State the domain, range, intervals of increase and decrease, intercepts, and end behavior (using limit notation).

1) $y = 3^x$



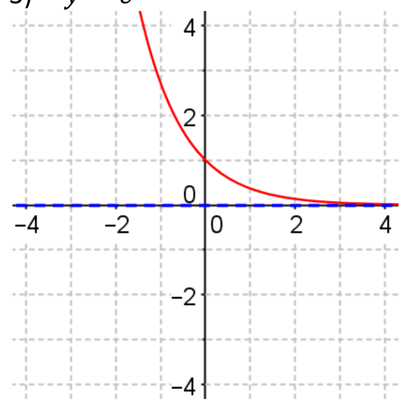
D: $(-\infty, \infty)$	R: $(0, \infty)$
Inc: $(-\infty, \infty)$	Dec: $\emptyset$
x-int: $\emptyset$	y-int: $(0, 1)$
EB: $\lim_{x\to\infty} y = \infty$, $\lim_{x\to-\infty} y = 0$	

2) $y = -2^x + 1$



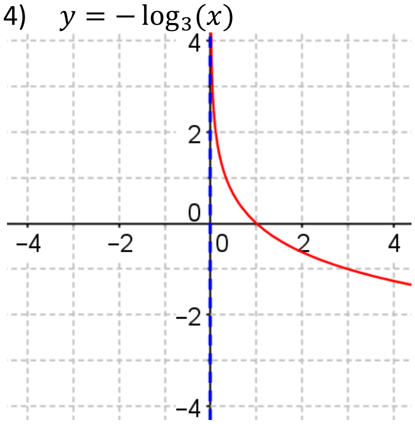
D: $(-\infty, \infty)$	R: $(-\infty, 1)$
Inc: $\emptyset$	Dec: $(-\infty, \infty)$
x-int: $(0, 0)$	y-int: $(0, 0)$
EB: $\lim_{x\to\infty} y = -\infty$, $\lim_{x\to-\infty} y = 1$	

3) $y = e^{-x}$



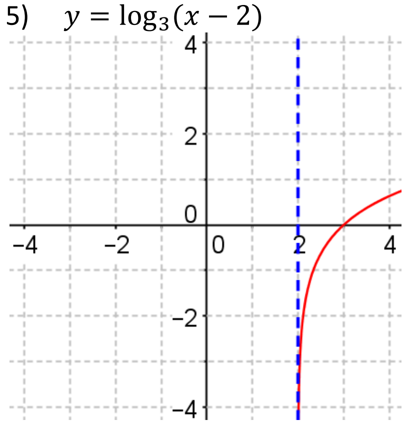
D: $(-\infty, \infty)$	R: $(0, \infty)$
Inc: $\emptyset$	Dec: $(-\infty, \infty)$
x-int: $\emptyset$	y-int: $(0, 1)$
EB: $\lim_{x\to\infty} y = 0$, $\lim_{x\to-\infty} y = \infty$	

4) $y = -\log_3(x)$



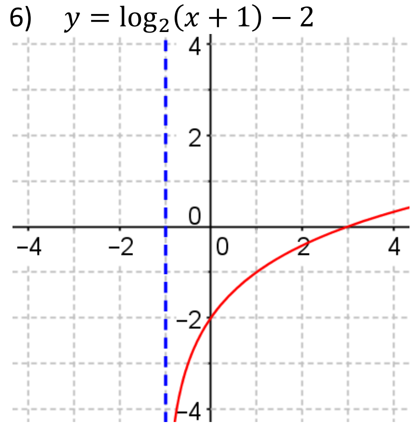
D: $(0, \infty)$	R: $(-\infty, \infty)$
Inc: $\emptyset$	Dec: $(0, \infty)$
x-int: $(1,0)$	y-int: $\emptyset$
EB: $\lim_{x\to\infty} y = -\infty$	

5) $y = \log_3(x - 2)$



D: $(2, \infty)$	R: $(-\infty, \infty)$
Inc: $(2, \infty)$	Dec: $\emptyset$
x-int: $(3, 0)$	y-int: $\emptyset$
EB: $\lim_{x\to\infty} y = \infty$	

6) $y = \log_2(x + 1) - 2$



D: $(-1, \infty)$	R: $(-\infty, \infty)$
Inc: $(-1, \infty)$	Dec: $\emptyset$
x-int: $(3, 0)$	y-int: $(0, -2)$
EB: $\lim_{x\to\infty} y = \infty$	

Find the average rate of change on the given interval.

7) $y = 3(2^x)$ on $[1,3]$

$y(3) = 3(2^3) = 24$
$y(1) = 3(2^1) = 6$

$$m = \frac{24-6}{3-1} = 9$$

8) $y = 3^{-x} + 1$ on $[0,2]$

$y(2) = 3^{-2} + 1 = \frac{10}{9}$
$y(0) = 3^0 + 1 = 2$

$$m = \frac{\frac{10}{9} - 2}{2-0} = -\frac{4}{9}$$

9) $y = \log_2(x+2)$ on $[6,30]$

$y(30) = \log_2(30+2) = 5$
$y(6) = \log_2(6+2) = 3$

$$m = \frac{5-3}{30-6} = \frac{1}{12}$$

Evaluate the expressions

10) $\log_5 125$
3

11) $\log_8 1$
0

12) $\log_{11} 11^{-3}$
-3

13) $\log_6 \frac{1}{216}$
$\log_6 6^{-3}$
-3

Expand the logarithmic expressions.

14) $\log_3[x(8-x)]$
$\log_3 x + \log_3(8-x)$

15) $\log_4 \frac{x^2}{x-11}$
$\log_4 x^2 - \log_4(x-11)$
$2\log_4 x - \log_4(x-11)$

16) $\ln \sqrt[6]{2x-5}$
$\ln(2x-5)^{1/6}$
$\frac{1}{6}\ln(2x-5)$

Rewrite the expression as a single logarithmic expression.

17) $\log_2 x + \log_2 7$
$\log_2(7x)$

18) $\log_7 x - \log_7(3x-4)$
$\log_7 \frac{x}{3x-4}$

19) $\frac{1}{4}\log_7 x - \frac{3}{4}\log_7(x+2)$
$\log_7 x^{1/4} - \log_7(x + 2)^{3/4}$
$\log_7 \frac{x^{1/4}}{(x+2)^{3/4}}$
$\log_7 \sqrt[4]{\frac{x}{(x+2)^3}}$

Rewrite the expression using logarithmic expressions in base 10 and simplify if possible.

20) $\log_8 5$
$\frac{\log 5}{\log 8}$

21) $\log_3 81$
$\frac{\log 81}{\log 3} = \frac{\log 3^4}{\log 3} = \frac{4\log 3}{\log 3}$
$= 4$

22) $\ln 6$
$\frac{\log 6}{\log e}$