

Useful Guidelines:

* An exponential function: $f(x) = a^x$, where $a > 0$ and $a \neq 1$. The domain of f is the set of all real numbers.
 [Note that the base is a constant and the exponent is a variable.] $e = 2.718281828...$

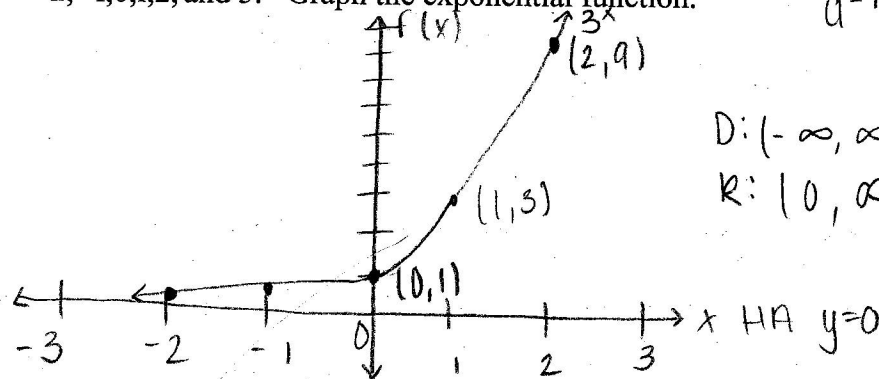
* Properties of the Exponential Function $f(x) = a^x$ (where $a > 0$ and $a \neq 1$):

- (1) Domain: the interval $(-\infty, \infty)$; Range: the interval $(0, \infty)$;
- (2) x-intercepts: none; y-intercept: 1;
- (3) Horizontal asymptote: $y = 0$ as $x \rightarrow \infty$;
- (4) $f(x) = a^x, a > 1$, is an increasing, one-to-one, smooth and continuous function;
 $f(x) = a^x, 0 < a < 1$, is a decreasing, one-to-one, smooth and continuous function;
- (5) The points $(0,1), (1,a)$, and $(-1, \frac{1}{a})$ are always on the graph of f .

*20/20
 Game
 Abs!*

1. Evaluate $f(x) = 3^x$ at $x = -2, -1, 0, 1, 2$, and 3. Graph the exponential function.

x	f(x)
-2	$3^{-2} = \frac{1}{9}$
-1	$3^{-1} = \frac{1}{3}$
0	$3^0 = 1$
1	$3^1 = 3$
2	$3^2 = 9$
3	$3^3 = 27$

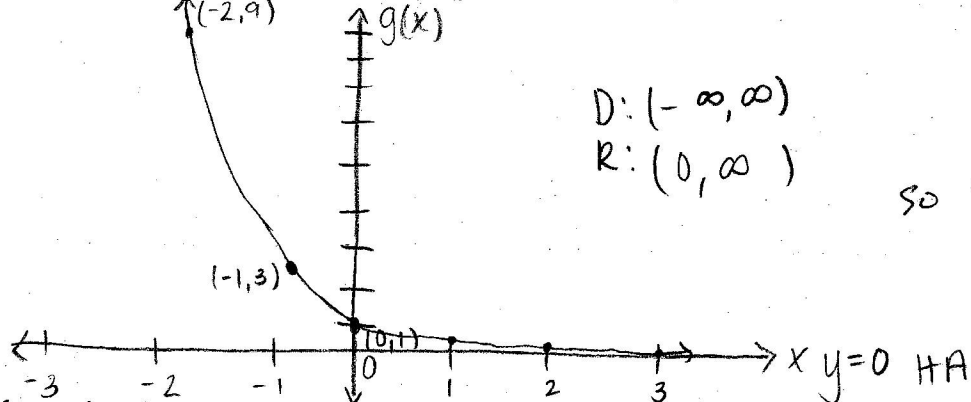


$a^{-n} = \frac{1}{a^n}$

D: $(-\infty, \infty)$
 R: $(0, \infty)$

2. Evaluate $g(x) = (\frac{1}{3})^x$ at $x = -2, -1, 0, 1, 2$, and 3. Graph the exponential function.

x	g(x)
-2	9
-1	3
0	1
1	$\frac{1}{3}$
2	$\frac{1}{9}$
3	$\frac{1}{27}$



D: $(-\infty, \infty)$
 R: $(0, \infty)$

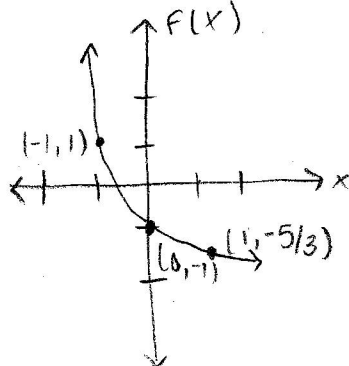
so neat!

3. Graph each function and determine the y-intercept, domain, range, and horizontal asymptote of f .

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

x	f(x)
-1	1
0	-1
1	$-\frac{5}{3}$

y-int = -1
 d: $(-\infty, \infty)$
 r: $(-2, \infty)$
 HA = $y = -2$



(b) $f(x) = e^x$

x	f(x)
-1	$\frac{1}{e}$
0	1
1	e

y-int = 1
 d: $(-\infty, \infty)$
 r: $(0, \infty)$
 HA = $y = 0$

