

Check Your Understanding:

Each item here gives three algebraic rules – one of which will have quite different table and graph patterns than the other two. In each case, spot the “alien” rule and explain how and why its graph and/or table pattern will look different from the other two.

a) $y = \frac{10}{x}$, $y = 10x$, $y = x + 10$

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

c) $y = 1.5x - 4$, $y = (1.5^x) - 4$, $y = 2^x$

d) $y = 1.5x - 4$, $y = 0.5x - 4$, $y = -1.5x - 4$

Practice:

1. Without the use of your graphing calculator, match the following five rule types to the tables in parts a – e. Explain your reasoning in each case.

$y = ax + b$ $y = a|x| + b$ $y = ax^2 + b$ $y = \frac{a}{x}$ $y = a^x$

a)

x	-4	-3	-2	-1	0	1	2	3	4	5
y	18	11	6	3	2	3	6	11	18	27

b)

x	-4	-3	-2	-1	0	1	2	3	4	5
y	16	14	12	10	8	6	4	2	0	-2

c)

x	-4	-3	-2	-1	0	1	2	3	4	5
y	0.0625	0.125	0.25	0.5	1	2	4	8	16	32

d)

x	-4	-3	-2	-1	0	1	2	3	4	5
y	-1.5	-2	-3	-6	Error	6	3	2	1.5	1.2

e)

x	-4	-3	-2	-1	0	1	2	3	4	5
y	13	10	7	4	1	4	7	10	13	16

2. Without the use of your graphing calculator, match the following five rule types to the graph sketches below. Explain your reasoning in each case.

$$y = ax + b$$

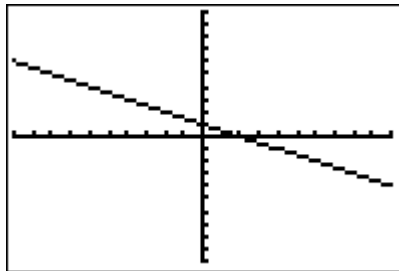
$$y = a|x| + b$$

$$y = ax^2 + b$$

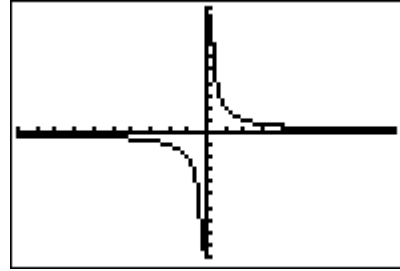
$$y = \frac{a}{x}$$

$$y = a^x$$

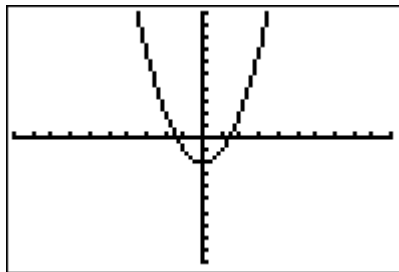
a)



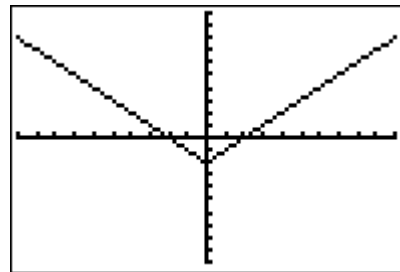
b)



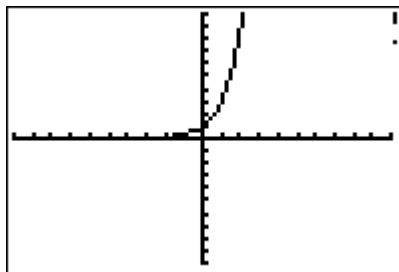
c)



d)



e)



3. Without the use of your graphing calculator, sketch graphs you would expect to see from these rules. Explain your reasoning in each case.

a) $y = 7x^2 + 4$

b) $y = 7 - \frac{1}{4}x$

c) $y = 4^x - 7$

d) $y = \frac{4}{x}$

e) $y = 4|x| + 7$