Name: _____

Graphing Logs and Exponentials F.IF.C.7e Task

Part A: For each of the following functions, identify the *y*-intercept, asymptote, and end behavior using a graphing calculator. How do those features relate to the equations?

a. $y = 3^x$ (0,1) $y=0$ As $x \to -\infty, f(x) \to 0$; As $x \to \infty, f(x) \to \infty$

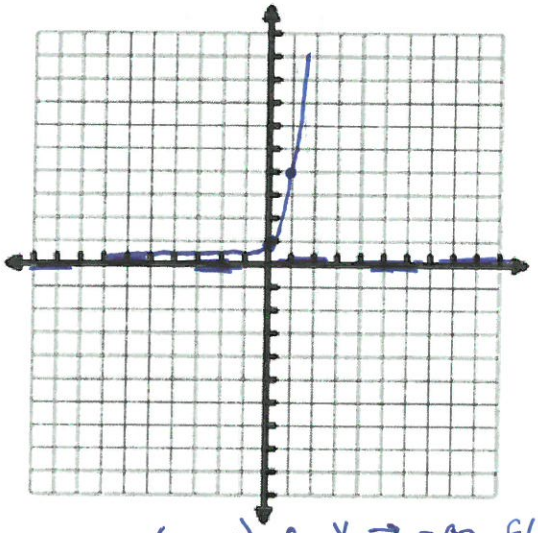
b. $y = 2(3)^x$ (0,2) $y=0$ As $x \to -\infty, f(x) \to 0$; As $x \to \infty, f(x) \to \infty$

c. $y = 2(3)^x + 5$ (0,7) $y=5$ As $x \to -\infty, f(x) \to 5$; As $x \to \infty, f(x) \to \infty$

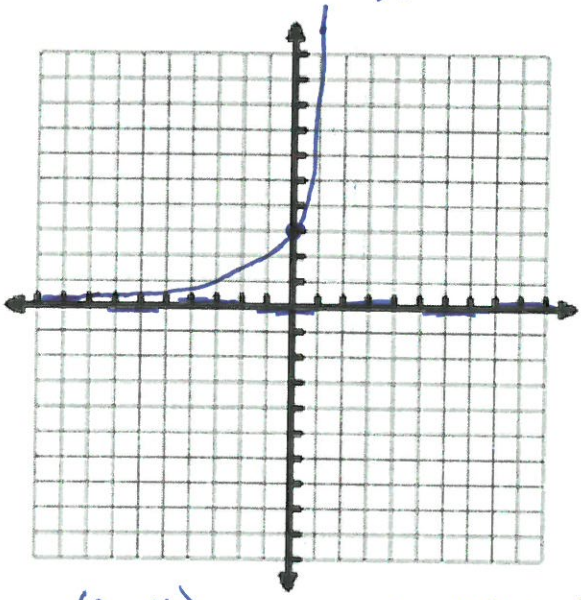
d. $y = -2(3)^x + 5$ (0,3) $y=5$ As $x \to -\infty, f(x) \to 5$; As $x \to \infty, f(x) \to -\infty$

Part B: Use what you learned from part 1 to identify the *y*-intercept, asymptote, and end behavior without the use of a graphing calculator. Sketch a graph using this information. Once you have completed all the graphs, check your work using the graphing calculator.

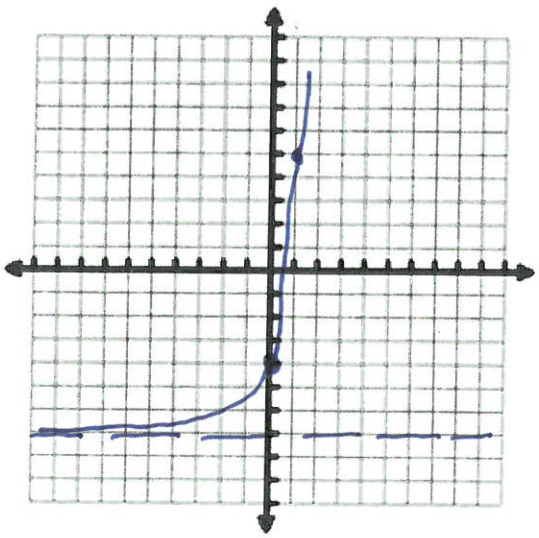
a. $y = 4^x$ (0,1) $y=0$ As $x \to -\infty, f(x) \to 0$; As $x \to \infty, f(x) \to \infty$



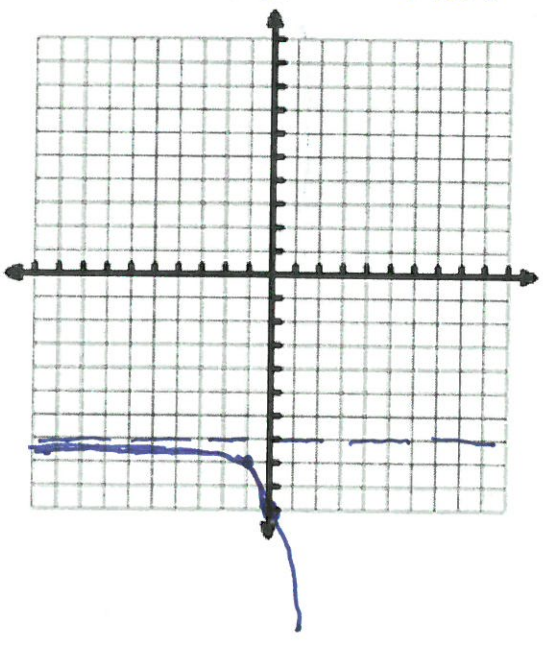
b. $y = 3(4)^x$ (0,3) $y=0$ As $x \to -\infty, f(x) \to 0$; As $x \to \infty, f(x) \to \infty$



c. $y = 3(4)^x - 7$ (0,-4) $y=-7$ As $x \to -\infty, f(x) \to -7$; As $x \to \infty, f(x) \to \infty$



d. $y = -3(4)^x - 7$ (0,-10) $y=-7$ As $x \to -\infty, f(x) \to -7$; As $x \to \infty, f(x) \to -\infty$



Part C: Summarize how you find the *y*-intercept, asymptote and end behavior of an exponential function from the equation, and use them to sketch a graph. mult. (0,1) by a and add/subtract K to fn = 0
Shift asymptote up/down according to K; shift end behavior up/down according to K

Part D: For each of the following functions, identify the *x*-intercept, asymptote, and end behavior using a graphing calculator. How do those features relate to the equations?

a. $y = \log_2 x$ (1,0) x=0 as x → 0, f(x) → -∞ ; as x → ∞, f(x) → ∞

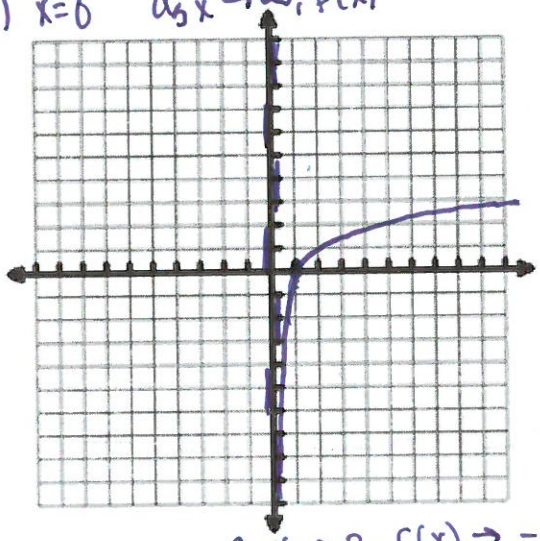
b. $y = \log_2(x - 5)$ (6,0) x=5 as x → 5, f(x) → -∞ ; as x → ∞, f(x) → ∞

c. $y = \log_2(x - 5) + 2$ (4.75, 0) x=5 as x → 5, f(x) → -∞ ; as x → ∞, f(x) → ∞

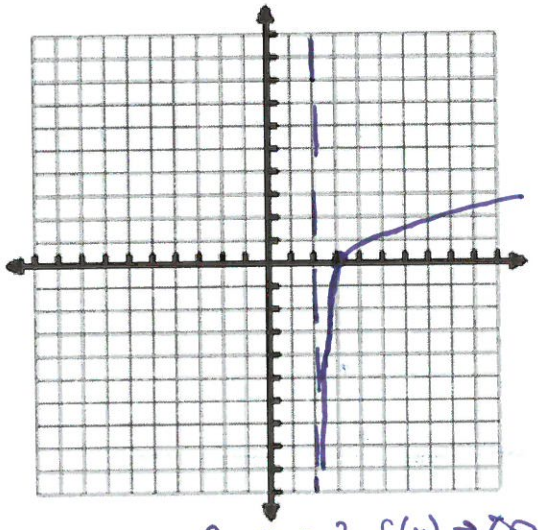
d. $y = -\log_2(x - 5) + 2$ (9,0) x=5 as x → 5, f(x) → ∞ ; as x → ∞, f(x) → -∞

Part E: Use what you learned from part 4 to identify the *y*-intercept, asymptote, and end behavior without the use of a graphing calculator. Sketch a graph using this information. Once you have completed all the graphs, check your work using the graphing calculator.

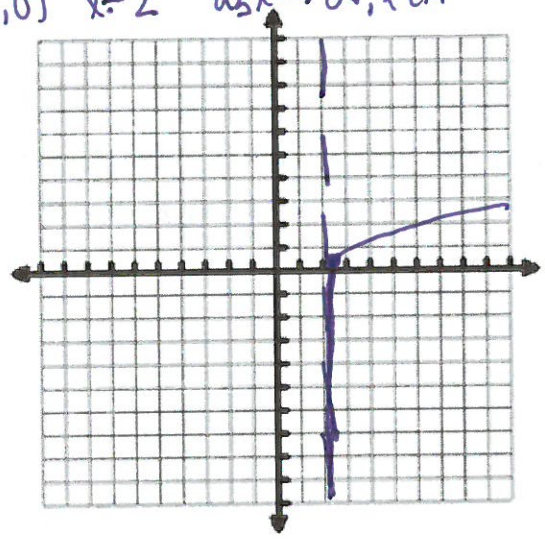
a. $y = \log_3 x$ as x → 0, f(x) → -∞ ; as x → ∞, f(x) → ∞ (1,0) x=0



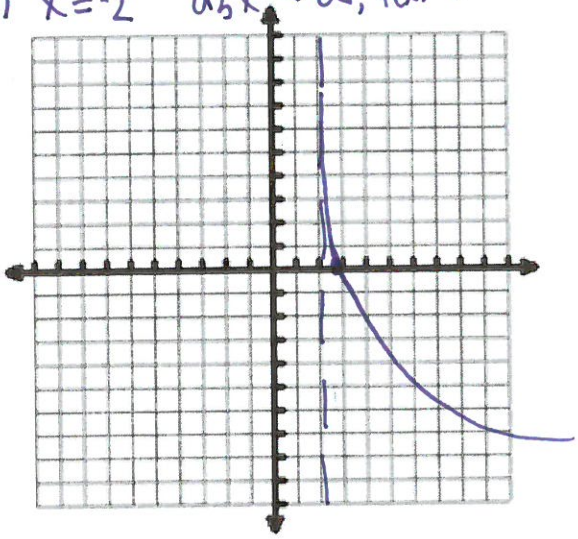
b. $y = \log_3(x - 2)$ (3,0) as x → 2, f(x) → -∞ ; as x → ∞, f(x) → ∞ x=2



c. $y = \log_3(x - 2) - 3$ as x → 2, f(x) → -∞ ; as x → ∞, f(x) → ∞ (2.1,0) x=2



d. $y = -\log_3(x - 2) - 3$ as x → 2, f(x) → ∞ ; as x → ∞, f(x) → -∞ (2.1,0) x=2



Part F: Summarize how you find the *y*-intercept, asymptote and end behavior of an exponential function from the equation, and use them to sketch a graph.

Intercept: convert to an exponential + plug in -or- mult. (1,0) by a, add/subtract h at K=0

Asymptote: Shift left/right according to h

End behavior: shift left/right according to h