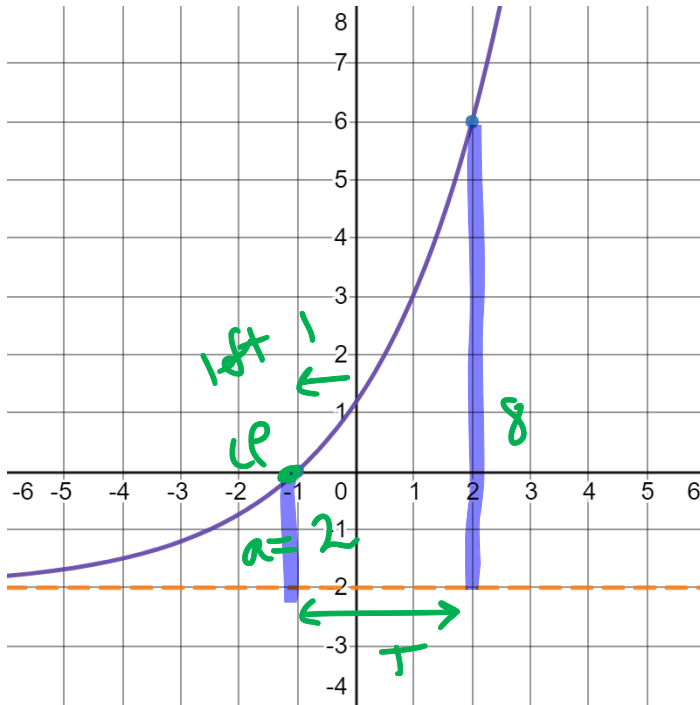


Practice Building Equations

Build an exponential function in base something and base e given that it passes through the indicated point. For base e , just get the exponent correct to one decimal (although you could use a graphing calculator to solve it more precisely).

1.

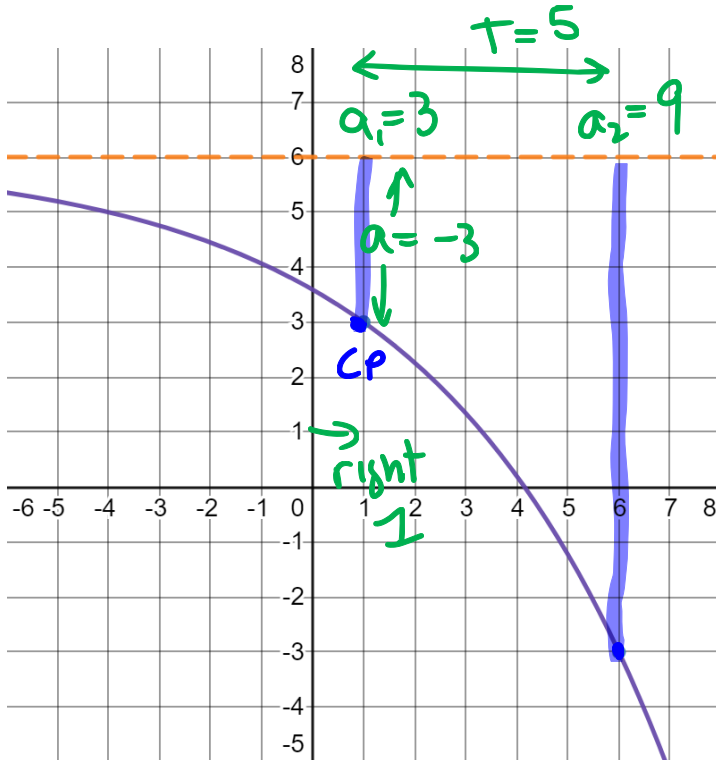


$$r=4 \quad T=3$$

$$f(x) = 2(4)^{\frac{x+1}{3}} - 2$$

$$\sim 2e^{0.467(x+1)} - 2$$

2.



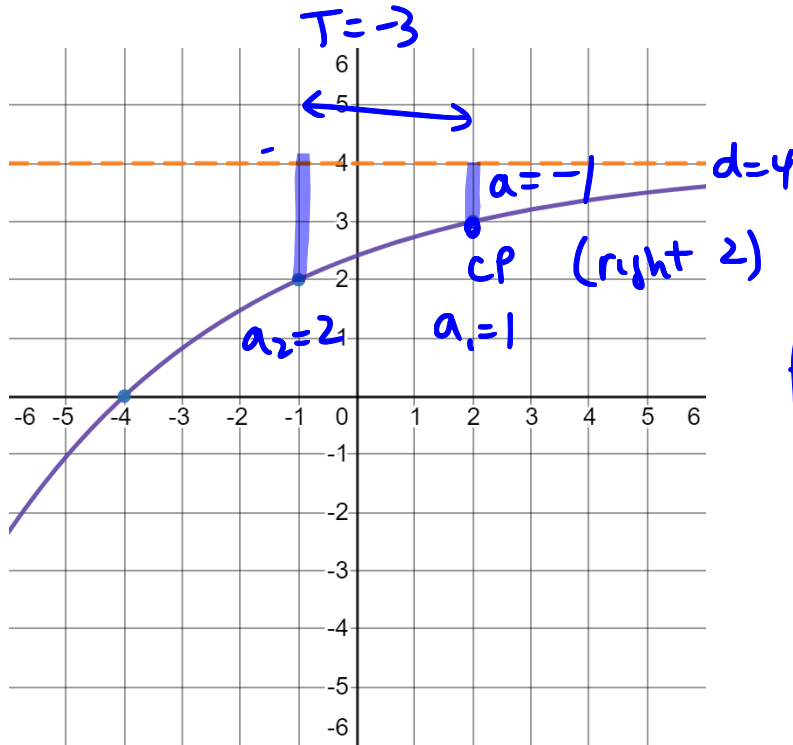
$$r = \frac{a_2}{a_1} = 3$$

$$d=6$$

$$f(x) = -3(3)^{\frac{x-1}{5}} + 6$$

$$\sim -3e^{0.22(x-1)} + 6$$

3.

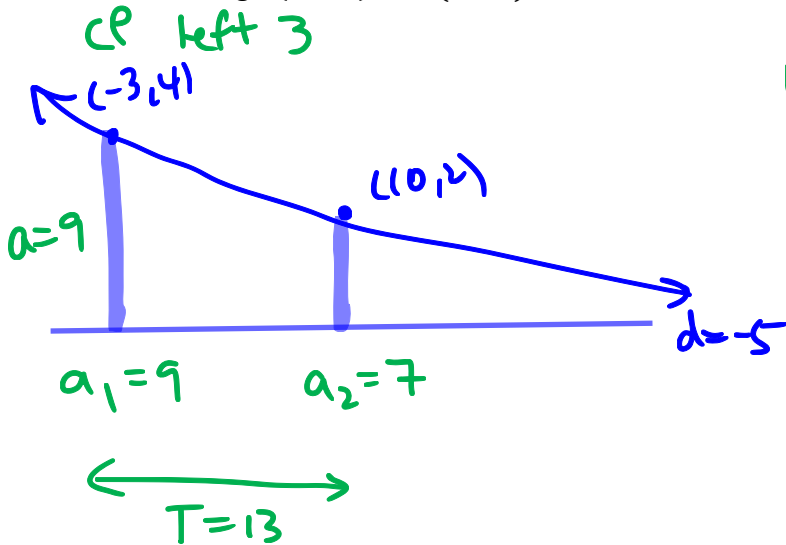


$$r = 2$$

$$f(x) = - (2)^{\frac{x-2}{-3}} + 4$$

$$\sim - e^{-0.671(x-2)} + 4$$

4. Through $(-3, 4)$ and $(10, 2)$ with a horizontal asymptote of $y = -5$



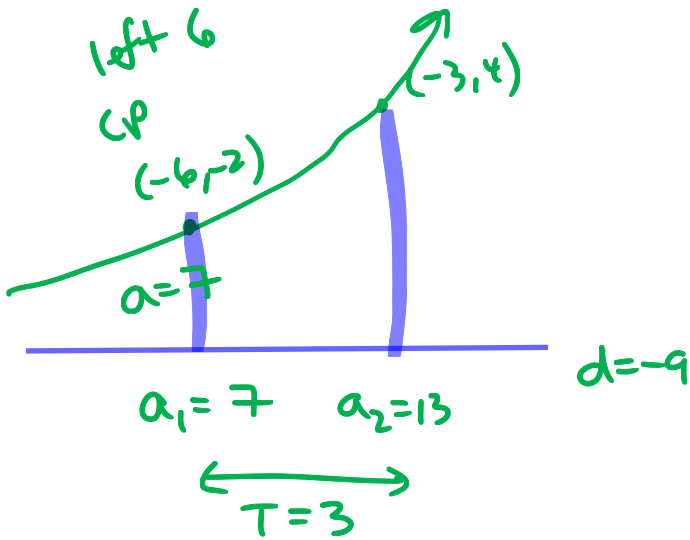
$$r = \frac{a_2}{a_1} = \frac{7}{9}$$

$$\frac{7}{9} = 0.\bar{7} \sim e^{-0.25}$$

$$f(x) = 9 \left(\frac{7}{9} \right)^{\frac{x+3}{13}} - 5 \sim 9 \left(e^{-0.25} \right)^{\frac{x+3}{13}} - 5$$

$$= 9 e^{-0.019(x+3)} - 5$$

5. Through $(-6, -2)$ and $(-3, 4)$ with a horizontal asymptote of $y = -9$



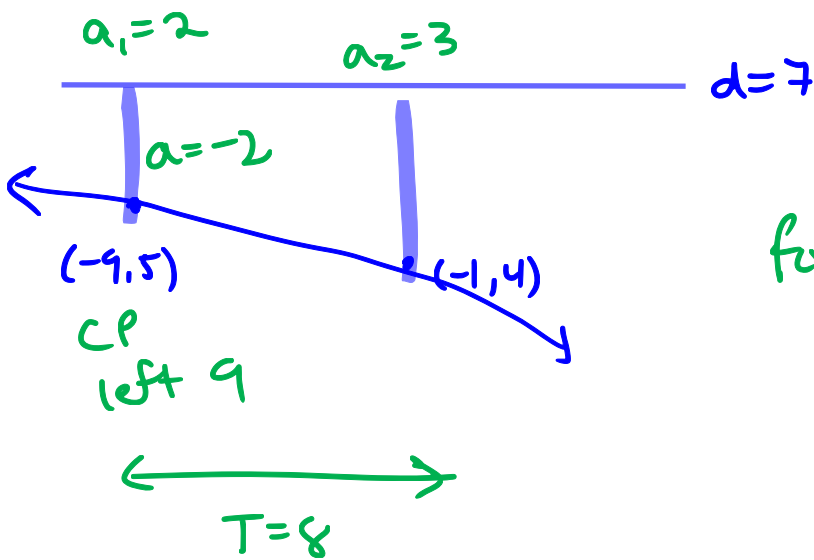
$$r = \frac{13}{7} = 1.86 \sim e^{0.6}$$

$$f(x) = 7 \left(\frac{13}{7} \right)^{\frac{x+6}{3}} - 9$$

$$\sim 7 (e^{0.6})^{\frac{x+6}{3}} - 9$$

$$= 7 e^{0.2(x+6)} - 9$$

6. Through $(-9, 5)$ and $(-1, 4)$ with a horizontal asymptote of $y = 7$

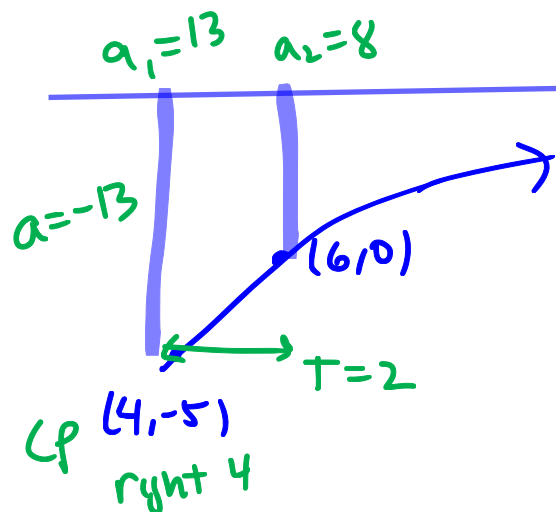


$$r = \frac{a_2}{a_1} = \frac{3}{2}$$

$$f(x) = -2 \left(\frac{3}{2} \right)^{\frac{x+9}{8}} + 7$$

$$\sim -2 e^{0.05(x+9)} + 7$$

7. Through $(4, -5)$ and $(6, 0)$ with a horizontal asymptote of $y = 8$



$$r = \frac{a_2}{a_1} = \frac{8}{13}$$

$$f(x) = -13 \left(\frac{8}{13} \right)^{\frac{x-4}{2}} + 8$$

$$\sim -13 e^{-0.5 \left(\frac{x-4}{2} \right)} + 8$$

$$= -13 e^{-0.25(x-4)} + 8$$

$$\frac{13}{8} = 1.625 \sim e^{0.5}$$

8. Through (x_1, y_1) and (x_2, y_2) with a horizontal asymptote of $y = y_0$. Test your solution by using the other examples.

$$f(x_1, y_1, x_2, y_2, y_0, x) = (y_1 - y_0) \left(\frac{y_2 - y_0}{y_1 - y_0} \right)^{\frac{x - x_1}{x_2 - x_1}} + y_0$$