

Graph the function below and supply all the work asked for.

$$y = -2(2)^x + 5$$

Parent: 2^x

Multiplier: -2 ; mult all y 's by -2

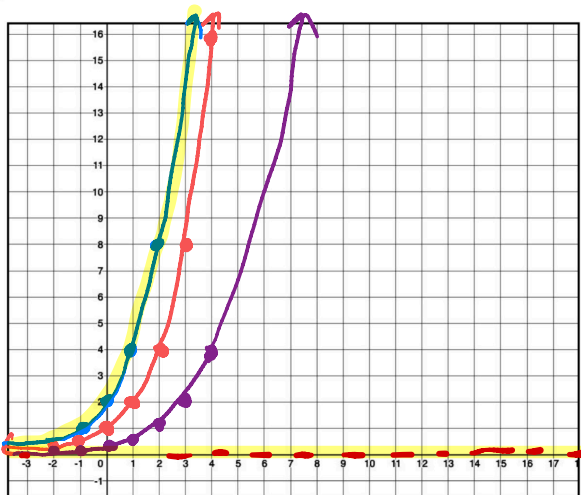
Shift: $\uparrow 5$

X - int: $(1.32, 0)$ $\underbrace{y\text{-int}}_{-2(0)^0 + 5}$
(do algebraically show your work)

Y - int: $(0, 3)$ $-2(1) + 5$

Asymptote: $y = 5$ 3

$$\begin{aligned} \underbrace{x\text{-int}}_{0} &= -2(2)^x + 5 \\ -5 & \quad -5 \\ \hline -5 &= -2(2)^x \\ \frac{-5}{-2} & \quad \frac{-5}{-2} \\ 2.5 &= 2^x \end{aligned} \quad \left\{ \begin{array}{l} \ln(2.5) = \ln(2^x) \\ \ln(2.5) = x \ln(2) \\ \frac{\ln(2.5)}{\ln(2)} = \frac{x \ln(2)}{\ln(2)} \\ x = \frac{\ln(2.5)}{\ln(2)} \approx 1.32 \end{array} \right.$$



Graph the function below and supply all the work asked for.

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

Parent: 2^x

Multiplier: 1/4; mult y's by 1/4

Shift: Left 3

X - int: none
(do algebraically show your work)

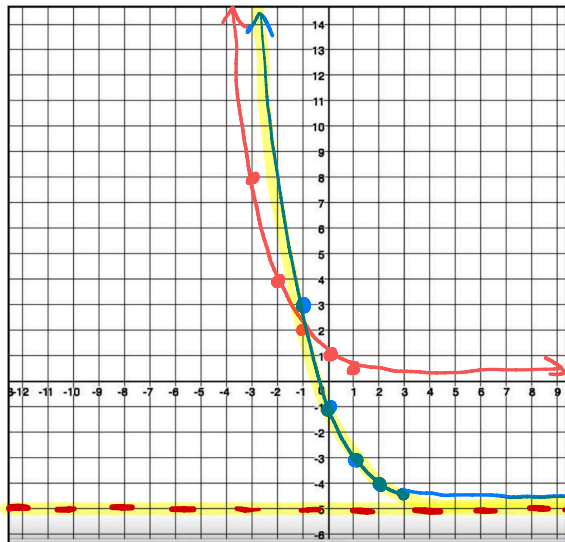
Y - int: (0, 2)

Asymptote: y = 0

y-int

$$\frac{1}{4}(2)^{0+3} \rightarrow 2$$

$$\frac{1}{4}(8)$$



Graph the function below and supply all the work asked for.

$$y = \left(\frac{1}{2}\right)^{x-2} - 5$$

Parent: $\left(\frac{1}{2}\right)^x$

Multiplier: None

Shift: Right 2, Down 5

X - int: (-0.32, 0)
(do algebraically show your work)

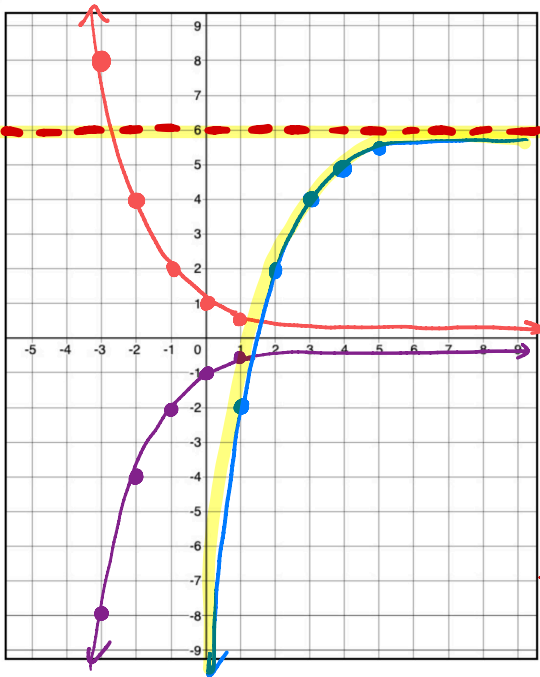
Y - int: (0, -1)

Asymptote: $y = -5$

$$\begin{aligned} \text{y-int} \\ \left(\frac{1}{2}\right)^{0-2} - 5 \\ \left(\frac{1}{2}\right)^{-2} - 5 \\ 4 - 5 = -1 \end{aligned}$$

$$\begin{aligned} \text{x-int} \\ 0 &= \left(\frac{1}{2}\right)^{x-2} - 5 \\ +5 & \quad +5 \\ \hline 5 &= \left(\frac{1}{2}\right)^{x-2} \end{aligned}$$

$$\begin{aligned} \ln(5) &= \ln\left(\left(\frac{1}{2}\right)^{x-2}\right) \\ \ln(5) &= (x-2) \ln\left(\frac{1}{2}\right) \\ \frac{\ln(5)}{\ln\left(\frac{1}{2}\right)} & \quad \frac{\ln\left(\frac{1}{2}\right)}{\ln\left(\frac{1}{2}\right)} \\ x-2 &= \frac{\ln(5)}{\ln\left(\frac{1}{2}\right)} \rightarrow x = \frac{\ln(5)}{\ln\left(\frac{1}{2}\right)} + 2 \end{aligned}$$



Graph the function below and supply all the work asked for.

$$y = -\left(\frac{1}{2}\right)^{x-4} + 6$$

Parent: $\left(\frac{1}{2}\right)^x$

Multiplier: -1 , mult y 's by -1

Shift: $\text{Right } 4 \text{ up } 6$

X - int: $(1.42, 0)$
(do algebraically show your work)

Y - int: $(0, -10)$

Asymptote: $y = 6$

$$\begin{aligned} \text{X-int} \\ 0 &= -\left(\frac{1}{2}\right)^{x-4} + 6 \\ \frac{-6}{-1} &= \frac{-\left(\frac{1}{2}\right)^{x-4}}{-1} \end{aligned}$$

$$\begin{aligned} \ln(6) &= \ln\left(\left(\frac{1}{2}\right)^{x-4}\right) \\ \ln(6) &= (x-4) \ln\left(\frac{1}{2}\right) \\ \frac{\ln(6)}{\ln\left(\frac{1}{2}\right)} &= x-4 \\ x-4 &= \frac{\ln(6)}{\ln\left(\frac{1}{2}\right)} \rightarrow x = \frac{\ln(6)}{\ln\left(\frac{1}{2}\right)} + 4 \\ &\approx 1.42 \end{aligned}$$

$$6 = \left(\frac{1}{2}\right)^{x-4}$$