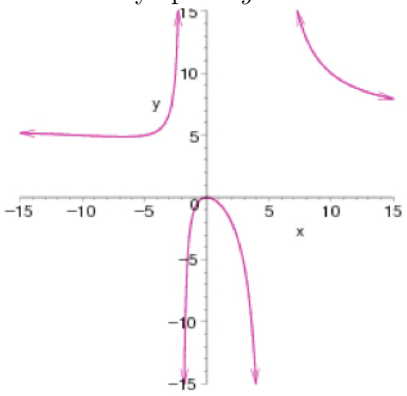
Self-Test A

1) Domain: $\Re \setminus \{-2, 5\}$
x-intercept $(0, 0)$; y-intercept $(0, 0)$
Vertical asymptotes $x = -2$ and $x = 5$
Horizontal asymptote $y = 6$



Note: you should indicate the asymptotes with dotted lines. I was not able to do this in the image above.

2) $(-\infty, -2) \cup (5, \infty)$

3) $(-\infty, 0)$

4) $\ln(e^{2/3}) = \frac{2}{3}$ because of the "round-trip theorem" $\log_b(b^x) = x$

5) $\ln x^{11}$

6) **a)** $\ln 10 = (\ln 2)(\ln 5)$ False: $\ln 10 = \ln 2 + \ln 5$

b) $\ln(e/6) = \ln e + \ln 6$ False: $\ln(e/6) = \ln e - \ln 6$

c) $\ln(1/7) + \ln 7 = 0$ True: $\ln(1/7) + \ln 7 = \ln\left(\frac{7}{7}\right) = \ln 1 = 0$

d) $\ln(-e) = -1$ False: $\ln(-e)$ is undefined

7) $x \approx -0.305$

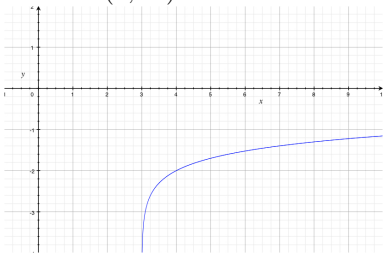
8) $x = \frac{\ln(5)}{\ln(4) - 2\ln(5)}$ (exact solution, which you could simplify to $x = \frac{\ln(5)}{\ln(0.16)}$)
$x \approx -0.878$

9) **a)** $f(t) = 100(\sqrt{15})^t \approx 100(3.873)^t$

b) 22500

c) about 5 months

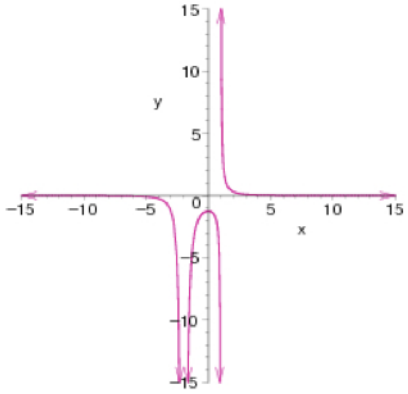
10) Domain: $(3, \infty)$



Note: There is a vertical asymptote at $x = 3$ but the graph goes so close so quickly that it is hard to draw the asymptote and keep it separate from the graph of the function!

Self-Test B

1) Domain: $\Re \setminus \{-2, 1\}$
No x-intercept; y-intercept $(0, -\frac{5}{4})$
Vertical asymptotes $x = -2$ and $x = 1$
Horizontal asymptote $y = 0$



Note: you should indicate the asymptotes with dotted lines. I was not able to do this in the image above

2) $(-3, 0] \cup (3, 4]$

3) $(0, 2) \cup (3, \infty)$

4) $\frac{5}{4}$: rewrite it as $\ln\left(e^{\frac{5}{4}}\right)$ and use the "round-trip theorem" $\log_b(b^x) = x$

5) $\frac{x}{2}$ because of the "round-trip theorem" $b^{\log_b(x)} = x$

6) $\frac{3}{2}u - 5v$

7) **a)** $10(\log 5) = \log 50$ False: $10(\log 5) = \log 5^{10}$

b) $\log 100 + 3 = \log 10^5$ True: $\log 100 + 3 = 2 + 3 = 5 = \log 10^5$

c) $\log 1 = \ln 1$ True: both equal 0

d) $\frac{\log 6}{\log 3} = \log 2$ False: $\frac{\log 6}{\log 3}$ cannot be simplified.

8) $x = -3$ or $x = 6$

9) $x = \frac{1}{3}$

10) In about 33.8 years, or in other words, in the year 2045 (nearly 2046).