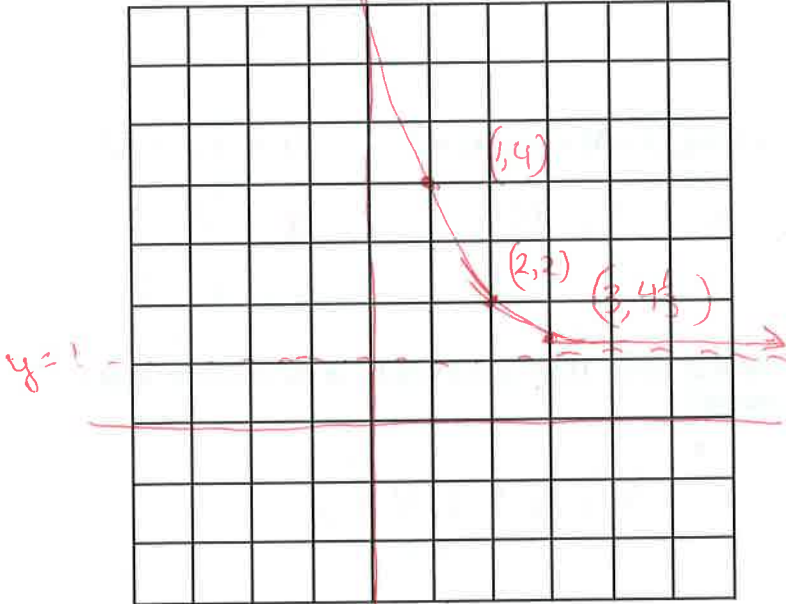
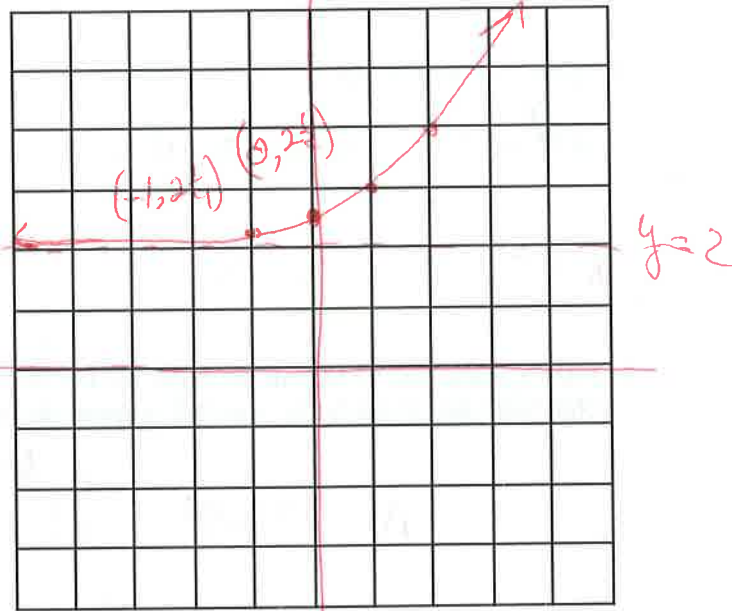


1. Graph the following. Put in you own axis where appropriate. Label (plot) at least 3 points and show the asymptote.

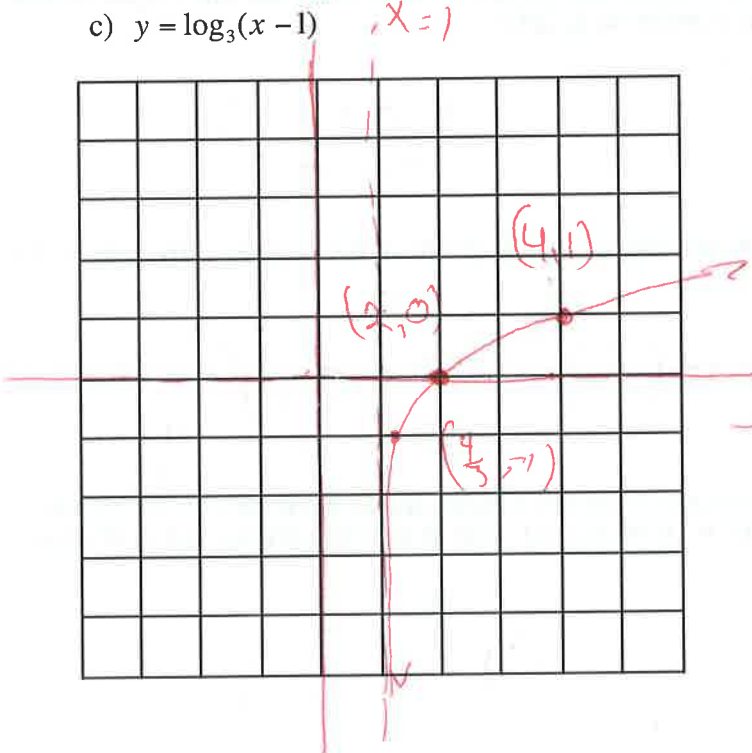
a) $y = \left(\frac{1}{3}\right)^{x-2} + 1$



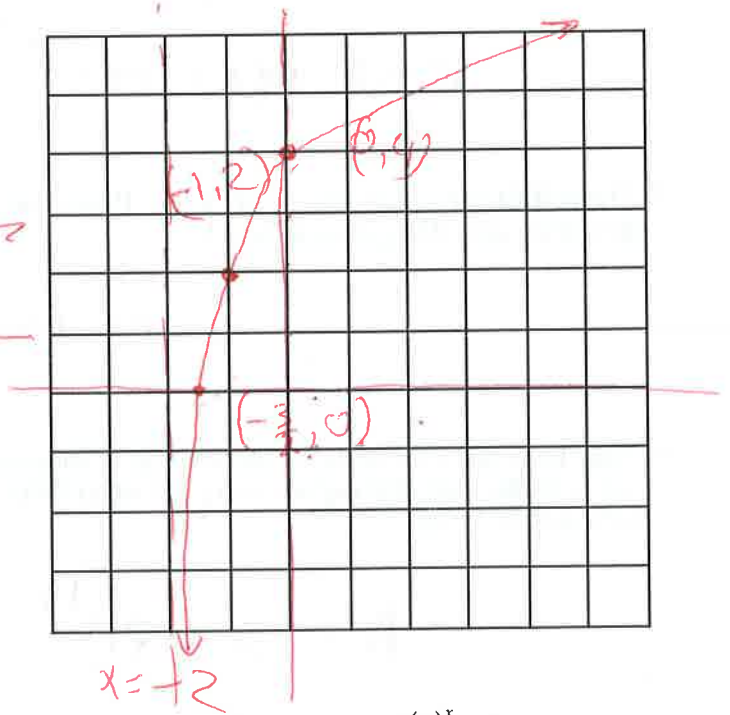
b) $f(x) = \frac{1}{2}(2)^x + 2$



c) $y = \log_3(x - 1)$



d) $y = 2\log_2(x + 2) + 2$



2. Find the domain, range, x intercept (if it exists), y intercept and asymptote. $y = 3(2)^x - 9$

Domain $(-\infty, \infty)$

x int $(1.58496, 0)$

Range $(-9, \infty)$

y int $(0, -6)$

asymptote $y = -9$

3. Condense or expand.

a) $2\log_3 x - 3\log_3 y + \frac{2}{3}\log_3 z$

$$\log_3 \frac{x^2 z^{\frac{2}{3}}}{y^3}$$

b) $\ln \frac{\sqrt[3]{x^4 b}}{d^2}$

$$\frac{4}{3} \ln x + \frac{1}{3} \ln b - 2 \ln d$$

c) $2.5\log_b x - 2(\log_b y + 3\log_b z) + \log_b \sqrt{x}$

$$\log_b \frac{x^{2.5}}{y^2 z^6} \sqrt{x}$$

4. Solve the following.

a) $9^{3x} = 3^{4x-1}$

$$x = -\frac{1}{2}$$

b) $\log_5(3x+1) = 2$

$$x = 8$$

c) $\log_6(x-5) + \log_6(x) = 2$

$$x = 9, \quad \cancel{-4}$$

d) $e^{2x} + e^x = 42$

$$x = \ln 6$$

$$x \approx 1.79$$

5. Suzy's uncle put \$1,000 in the bank for her when she was born. How much will be in the account on her 16th birthday, if the bank pays 8% compounded quarterly?

$$A = 1000 \left(1 + \frac{.08}{4}\right)^{64}$$

$$\$3,551.49$$

6. The population of Suzyville has been growing at an annual rate of 12.5% since Suzy became mayor in 2003. If the population was 1802 in 2008, what was the population in 2003?

$$1802 = P(1 + .125)^5$$

$$1,000$$

7. The half life of an element is 347 days. If Suzy started out with 1200 grams of the element, how long will it be before only 238 grams remain?

$$238 = 1200 \left(\frac{1}{2}\right)^{\frac{t}{347}}$$

$$809.9 \text{ g}$$

8. Suzy took some ibuprofen. The amount of ibuprofen in a person's bloodstream decreases by 29% each hour. If she took 300 mg when she got up at 7:00 am, how much is still in her bloodstream when she goes to bed at 10:00 pm?

$$A = 300(1 - .29)^{15}$$

$$12.7 \text{ mg}$$

9. Suzy was doing an experiment with bacteria. She has a petri dish with 2,300 bacteria in it. At what rate are they growing per hour, if after 9 hours there are 53,991?

$$53,991 = 2300(1+r)^9$$

$$r = 42\%$$

10. Suzy was another experiment on fruit fly reproduction. After 3 days, she had 250 flies. After 7 days, she had 900 flies. Write an exponential model in the form $y = ae^{bx}$.

$$250 = ae^{3b}$$

$$900 = ae^{7b}$$

$$b \approx .3202$$

$$a \approx 95.656$$

$$y = 95.656 e^{.3202x}$$