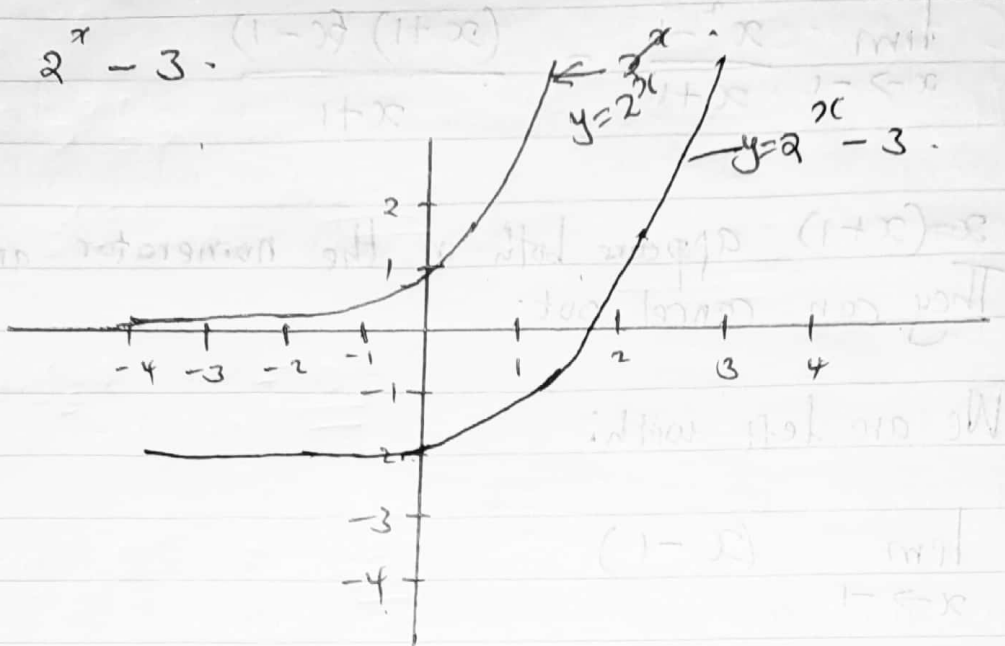


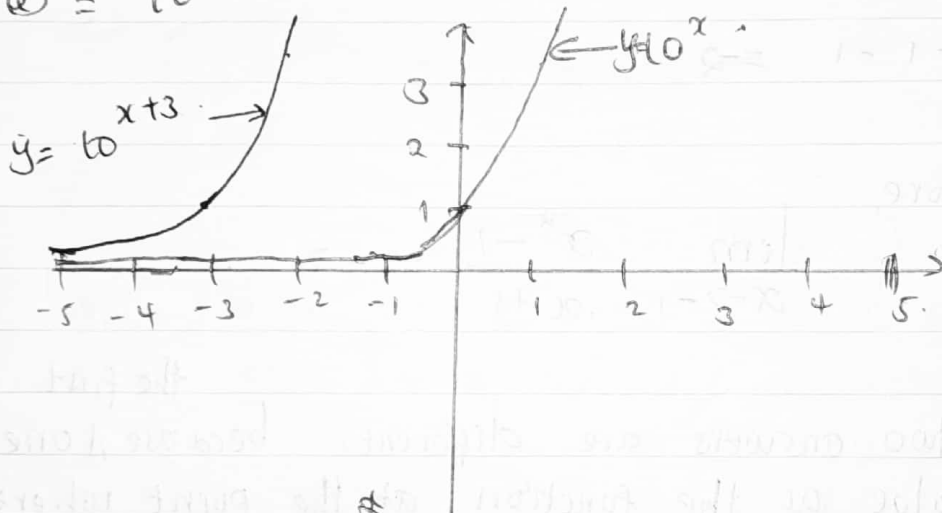
Section 4.1

27-40. Graphing exponential functions.

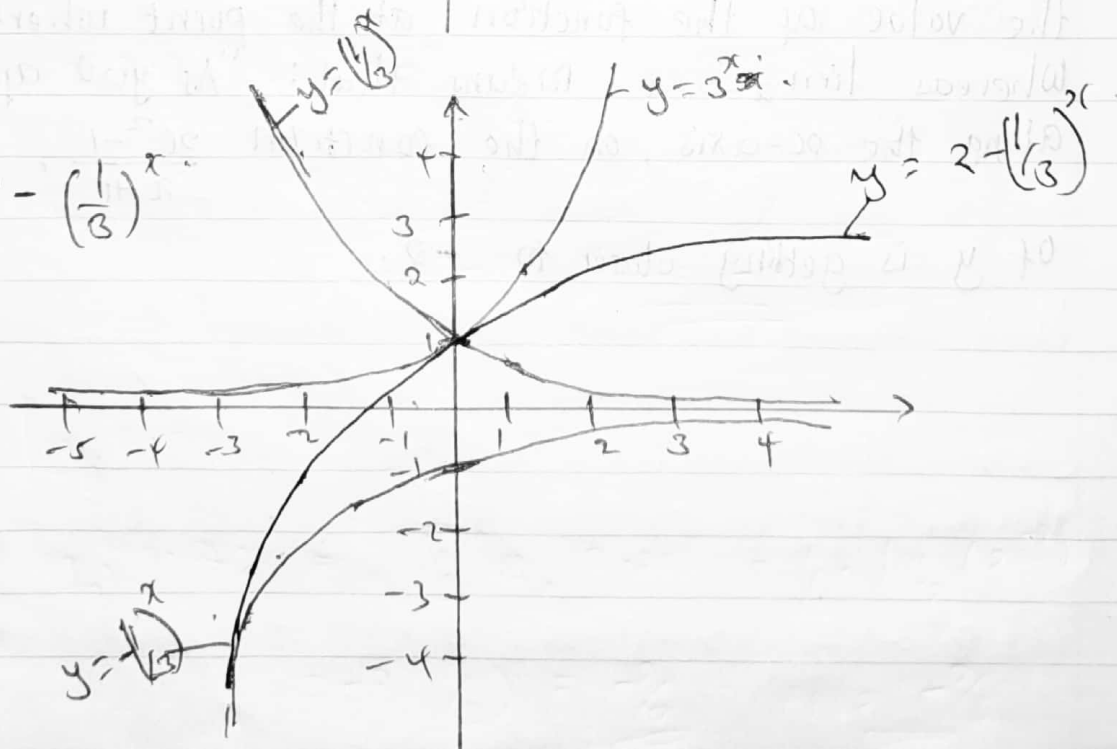
27. $g(x) = 2^x - 3$



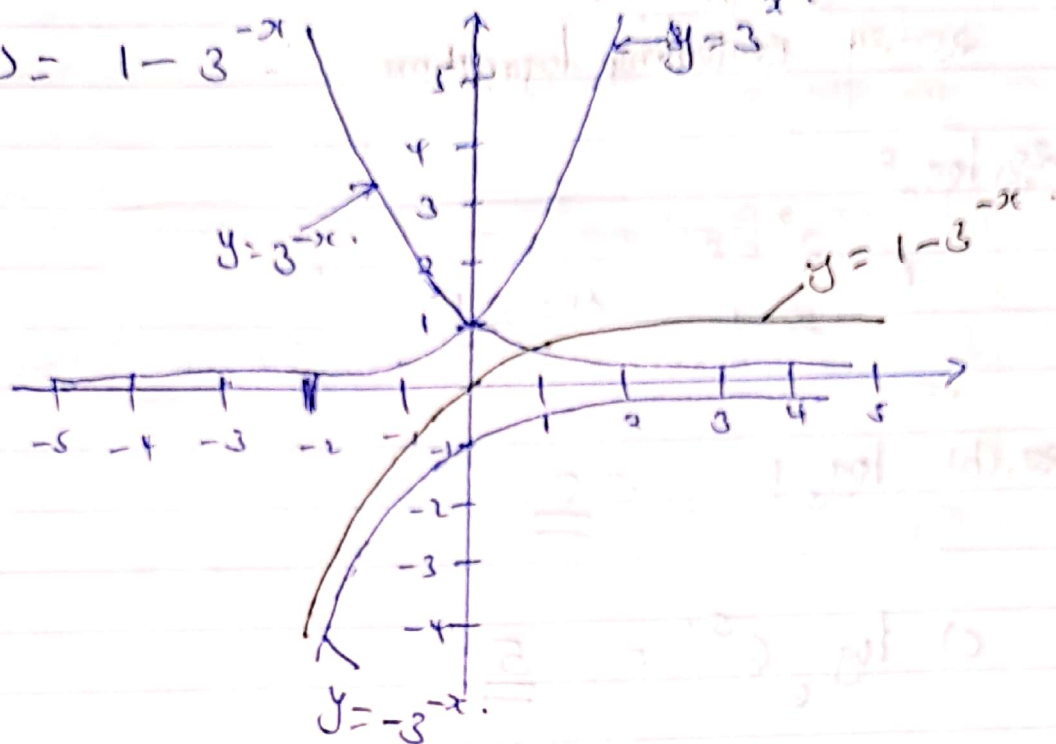
31. $f(x) = 10^{x+3}$



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



39. $g(x) = 1 - 3^{-x}$



Section 4.3

25-34 Evaluating logarithms.

25(a) $\log_2 2$

$$2^x = 2$$

$$x = 1$$

Ans = 1

26(b) $\log_5 1 = \underline{\underline{0}}$

c) $\log_6 6^5 = \underline{\underline{5}}$

29(a) $\log_3 (1/27) \Leftrightarrow 3^x = 27^{-1}$

$$\Leftrightarrow 3^x = 3^{-3}$$

Ans = -3

(b) $\log_{10} \sqrt{10} \quad \Leftrightarrow 10^x = 10^{1/2}$

$$x = 1/2 \quad \text{Ans} = \underline{\underline{1/2}}$$

c) $\log_5 0.2 \quad (2) \quad 5^x = 1/5$

$$\Leftrightarrow 5^x = 5^{-1}$$

$$x = -1 \quad \text{Ans} = \underline{\underline{-1}}$$

33 a) $\log_8 0.25 \quad \Leftrightarrow 8^x = 2^{-2}$

$$\Leftrightarrow \log_2 0.25 = \frac{1}{3} \log_2 (0.25) = \frac{1}{3} \cdot \log_2 (2^{-2})$$

$$= -2 \left(\frac{1}{3} \right) = -\frac{2}{3} \quad \text{Ans} = \underline{\underline{-\frac{2}{3}}}$$

$$(b) \ln e^4 = 4 \ln(e) = \underline{\underline{4}} \quad \text{Ans} = \underline{\underline{4}}$$

$$(c) \ln\left(\frac{1}{e}\right) = \ln(e^{-1}) = -1 \ln(e) = \underline{\underline{-1}} \quad \text{Ans} = \underline{\underline{-1}}$$

35-44 Logarithmic Equations

$$37.(a) \ln x = 3.$$

$$e^{(\ln(x))} = e^3.$$

$$~~x e~~ \quad x = e^3.$$

$$b) \ln e^2 = x.$$

$$2 \ln(e) = x.$$

$$\underline{\underline{x=2}}$$

$$41 (a) \log_2\left(\frac{1}{2}\right) = x$$

$$2^x = \frac{1}{2} \quad (\Rightarrow) \quad 2^x = (2)^{-1}$$

$$\underline{\underline{x=-1}}$$

$$(b) \log_{10} x = -3.$$

$$10^{-3} = x \quad (\Rightarrow) \quad \frac{1}{10^3} = x \quad (\Rightarrow) \quad \frac{1}{1000} = x.$$

$$\underline{\underline{x=0.001}}$$

45-48 Evaluating logarithms

$$45 \quad \log 2 = \underline{\underline{0.3010}}$$

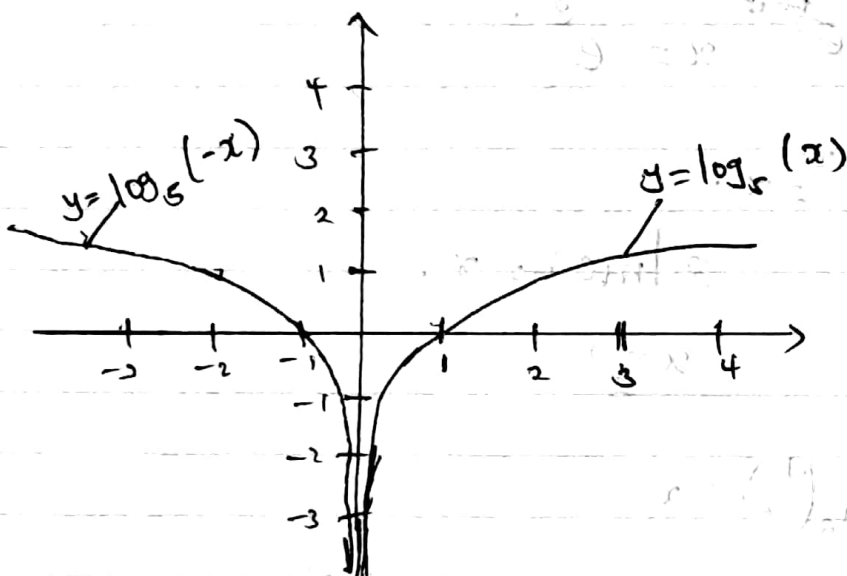
53-56. Finding logarithmic functions.

53 $y = \log_5 x$

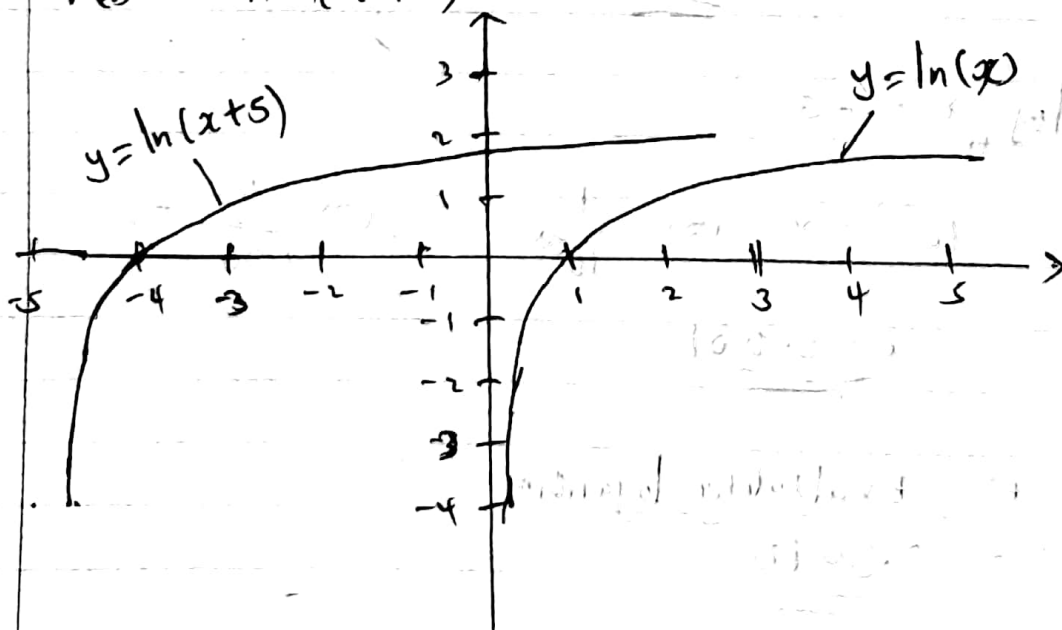
57-58 Graphing logarithmic functions.

57 $f(x) = 2 - \ln(x)$. Answer: Graph I

61 $g(x) = \log_5(-x)$



65. $h(x) = \ln(x+5)$



69. ~~69~~ $y = \log_3(x-1) - 2$.

