Example 5.16

- $log_2 5 - log_2 9 = log_2 \left(\frac{5}{9}\right)$.
- $log_3 7 - log_3 5 = log_3 \left(\frac{7}{5}\right)$.

Rule 3

$$\log_a 1 = 0$$

Example 5.17

- $log_{125} 1 = 0$.
- $log_7 1 = 0$.

Rule 4

$$\log_a a = 1$$

Example 5.18

- $log_{125} 125 = 1$.
- $log_7 7 = 1$.

Rule 5

$$\log_b a^n = n\log_b a$$

Example 5.19

- $log_3 5^2 = 2log_3 5$.
- $log_3 7^5 = 5log_3 7$.

Rule 6

If we need to change the base number of a log, then we use this rule.

$$\log_3\left(\frac{(2x+1)}{(5)}\right) = 1 \qquad \text{rule 2 of logs}$$

$$\left(\frac{(2x+1)}{(5)}\right) = 3^1 \qquad \text{now apply the above rule}$$

$$2x + 1 = 15$$

$$x = 7$$

Exercises 7.2.2

Solve each of the following :

1. $\log_2(x+5) = 5$
2. $\log_3(x-3) = 2$
3. $\log_3(x-3) = -2$
4. $\log_2(x+3) = -1$
5. $\log_5(x^2+25) = 3$
6. $\log_2(x^2+4) = 3$
7. $\log_2(x+1) + \log_2(x+4) = 2$
8. $\log_3(x+1) + \log_3(x-3) = 1$
9. $\log_2(x) + \log_2(x-7) = 3$
10. $\log_3(x) + \log_3(x-2) = 1$
11. $\log_2(3x+1) - \log_2(7) = 1$
12. $\log_2(x^2+2) - \log_2(x+1) = 1$