

### පුනරීක්ෂණ අභ්‍යාසය

1. සුළු කර අගය සොයන්න.

a.  $2^2 \times 2^3$

b.  $(2^4)^2$

c.  $3^{-2}$

d.  $\frac{5^3 \times 5^2}{5^5}$

e.  $\frac{3^5 \times 3^2}{3^6}$

f.  $(5^2)^2 \div 5^3$

g.  $\frac{(2^2)^3 \times 2^4}{2^8}$

h.  $\frac{5^{-3} \times 5^2}{5^0}$

i.  $(5^2)^{-2} \times 5 \times 3^0$

1. a.  $2^2 \times 2^3$   
 $= 2^{2+3}$   
 $= 2^5$   
 $= \underline{\underline{32}}$

b.  $(2^4)^2$   
 $= 2^{4 \times 2}$   
 $= 2^8$   
 $= \underline{\underline{256}}$

c.  $3^{-2}$   
 $= \frac{1}{3^2}$   
 $= \frac{1}{9}$   
 $= \underline{\underline{\frac{1}{9}}}$

d.  $\frac{5^3 \times 5^2}{5^5}$   
 $= \frac{5^{3+2}}{5^5}$   
 $= \frac{5^5}{5^5} = 5^{5-5} = 5^0$   
 $= \underline{\underline{1}}$

e.  $\frac{3^5 \times 3^2}{3^6}$   
 $= \frac{3^{5+2}}{3^6}$   
 $= \frac{3^7}{3^6}$   
 $= 3^{7-6}$   
 $= 3^1$   
 $= \underline{\underline{3}}$

f.  $(5^2)^2 \div 5^3$   
 $= 5^{2 \times 2} \div 5^3$   
 $= 5^4 \div 5^3$   
 $= 5^{4-3}$   
 $= 5^1$   
 $= \underline{\underline{5}}$

g.  $\frac{(2^2)^3 \times 2^4}{2^8}$   
 $= \frac{2^{2 \times 3} \times 2^4}{2^8}$   
 $= \frac{2^6 \times 2^4}{2^8}$   
 $= \frac{2^{6+4}}{2^8}$   
 $= \frac{2^{10}}{2^8}$   
 $= 2^{10-8}$   
 $= 2^2$   
 $= \underline{\underline{4}}$

h.  $\frac{5^{-3} \times 5^2}{5^0}$   
 $= \frac{5^{-3+2}}{5^0}$   
 $= \frac{5^{-1}}{1}$   
 $= 5^{-1} = \frac{1}{5^1}$   
 $= \underline{\underline{\frac{1}{5}}}$

i.  $(5^2)^{-2} \times 5 \times 3^0$   
 $= 5^{-4} \times 5 \times 1$   
 $= 5^{-4+1}$   
 $= 5^{-3}$   
 $= \frac{1}{5^3}$   
 $= \underline{\underline{\frac{1}{125}}}$

## 2. සුළු කරන්න.

**a.**  $a^2 \times a^3 \times a$     **b.**  $a^5 \times a \times a^0$     **c.**  $(a^2)^3$   
**d.**  $(x^2)^3 \times x^2$     **e.**  $(xy)^2 \times x^0$     **f.**  $(2x^2)^3$   
**g.**  $\frac{2pq \times 3p}{6p^2}$     **h.**  $2x^{-2} \times 5xy$     **i.**  $\frac{(3a)^{-2} \times 4a^2b^2}{2ab}$

**a.**  $a^2 \times a^3 \times a$   
 $= a^{2+3+1}$   
 $= \underline{\underline{a^6}}$

**b.**  $a^5 \times a \times a^0$   
 $= a^{5+1+0}$   
 $= \underline{\underline{a^6}}$

**c.**  $(a^2)^3$   
 $= a^{2 \times 3}$   
 $= \underline{\underline{a^6}}$

**d.**  $(x^2)^3 \times x^2$   
 $= x^{2 \times 3} \times x^2$   
 $= x^{6+2}$   
 $= \underline{\underline{x^8}}$

**e.**  $(xy)^2 \times x^0$   
 $= x^2y^2 \times 1$   
 $= \underline{\underline{x^2y^2}}$

**f.**  $(2x^2)^3$   
 $= 2^3x^{2 \times 3}$   
 $= \underline{\underline{8x^6}}$

**g.**  $\frac{2pq \times 3p}{6p^2}$   
 $= \frac{6p^2q}{6p^2}$   
 $= \underline{\underline{q}}$

**h.**  $2x^{-2} \times 5xy$   
 $= 10x^{-2+1}y$   
 $= 10x^{-1}y$   
 $= \underline{\underline{\frac{10y}{x}}}$

**i.**  $\frac{(3a)^{-2} \times 4a^2b^2}{2ab}$   
 $= \frac{4a^2b^2}{(3a)^2 \times 2ab}$   
 $= \frac{4a^2b^2}{9a^2 \times 2ab}$   
 $= \frac{2b}{9a}$

## 3. සුළු කරන්න.

**a.**  $\lg 25 + \lg 4$     **b.**  $\log_2 8 - \log_2 4$   
**c.**  $\log_5 50 + \log_5 2 - \log_5 4$     **d.**  $\log_a 5 + \log_a 4 - \log_a 2$   
**e.**  $\log_x 4 + \log_x 12 - \log_x 3$     **f.**  $\log_p a + \log_p b - \log_p c$

**a.**  $\lg 25 + \lg 4$   
 $= \lg 25 \times 4$   
 $= \lg 100$   
 $= \lg 10^2$   
 $= 2\lg 10$   
 $= 2 \times 1$   
 $= \underline{\underline{2}}$

**b.**  $\log_2 8 - \log_2 4$   
 $= \log_2 2^3 - \log_2 2^2$   
 $= 3\log_2 2 - 2\log_2 2$   
 $= 3 \times 1 - 2 \times 1$   
 $= 3 - 2$   
 $= \underline{\underline{1}}$

**b.**  $\log_2 8 - \log_2 4$   
 $= \log_2 \left(\frac{8}{4}\right)$   
 $= \log_2 2$   
 $= \underline{\underline{1}}$

**c.**  $\log_5 50 + \log_5 2 - \log_5 4$   
 $= \log_5 \left(\frac{50 \times 2}{4}\right)$   
 $= \log_5 25$   
 $= \log_5 5^2$   
 $= 2 \log_5 5$   
 $= 2 \times 1$   
 $= \underline{\underline{2}}$

**d.**  $\log_a 5 + \log_a 4 - \log_a 2$   
 $= \log_a \left(\frac{5 \times 4}{2}\right)$   
 $= \log_a 10$

**e.**  $\log_x 4 + \log_x 12 - \log_x 3$   
 $= \log_x \left(\frac{4 \times 12}{3}\right)$   
 $= \log_x 16$

**f.**  $\log_p a + \log_p b - \log_p c$   
 $= \log_p \left(\frac{a \times b}{c}\right)$   
 $= \log_p \left(\frac{ab}{c}\right)$

4. පහත දැක්වෙන සමීකරණ විසඳන්න.

a.  $\log_5 x = \log_5 4 + \log_5 2$

b.  $\log_5 4 - \log_5 2 = \log_5 x$

c.  $\log_a 2 + \log_a x = \log_a 10$

d.  $\log_3 x + \log_3 10 = \log_3 5 + \log_3 6 - \log_3 2$

e.  $\lg 5 - \lg x + \lg 8 = \lg 4$

f.  $\log_x 12 - \log_5 4 = \log_5 3$

a.  $\log_5 x = \log_5 4 + \log_5 2$

$$\log_5 x = \log_5 (4 \times 2)$$

$$\log_5 x = \log_5 8$$

$$\underline{\underline{x = 8}}$$

b.  $\log_5 4 - \log_5 2 = \log_5 x$

$$\log_5 \left(\frac{4}{2}\right) = \log_5 x$$

$$\log_5 2 = \log_5 x$$

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

c.  $\log_a 2 + \log_a x = \log_a 10$

$$\log_a 2x = \log_a 10$$

$$2x = 10$$

$$\underline{\underline{x = 5}}$$

d.  $\log_3 x + \log_3 10 = \log_3 5 + \log_3 6 - \log_3 2$

$$\log_3 10x = \log_3 \left(\frac{5 \times 6}{2}\right)$$

$$\log_3 10x = \log_3 15$$

$$10x = 15$$

$$x = \frac{15}{10} = \frac{3}{2} = 1\frac{1}{2}$$

e.  $\lg 5 - \lg x + \lg 8 = \lg 4$

$$\lg \left(\frac{5 \times 8}{x}\right) = \lg 4$$

$$\left(\frac{40}{x}\right) = 4$$

$$x = \frac{40}{4}$$

$$\underline{\underline{x = 10}}$$

f.  $\log_x 12 - \log_5 4 = \log_5 3$

$$\log_x 12 = \log_5 4 + \log_5 3$$

$$\log_x 12 = \log_5 4 \times 3$$

$$\log_x 12 = \log_5 12$$

$$\underline{\underline{x = 5}}$$

## 2.1 අභ්‍යාසය

1. මූල ලකුණ සහිතව ලියන්න.

a.  $p^{\frac{1}{3}}$

b.  $a^{\frac{2}{3}}$

c.  $x^{-\frac{2}{3}}$

d.  $m^{\frac{4}{5}}$

e.  $y^{-\frac{3}{4}}$

f.  $x^{-\frac{5}{3}}$

a.  $p^{\frac{1}{3}} = \underline{\underline{\sqrt[3]{p}}}$

b.  $a^{\frac{2}{3}} = (a^2)^{\frac{1}{3}} = \underline{\underline{\sqrt[3]{a^2}}}$

c.  $x^{-\frac{2}{3}} = (x^{-2})^{\frac{1}{3}} = \underline{\underline{\sqrt[3]{x^{-2}}}}$

d.  $m^{\frac{4}{5}} = (m^4)^{\frac{1}{5}} = \underline{\underline{\sqrt[5]{m^4}}}$

e.  $y^{-\frac{3}{4}} = (y^{-3})^{\frac{1}{4}} = \underline{\underline{\sqrt[4]{y^{-3}}}}$

f.  $x^{-\frac{5}{3}} = (x^{-5})^{\frac{1}{3}} = \underline{\underline{\sqrt[3]{x^{-5}}}}$

## 2. ධන දර්ශක සහිතව ලියන්න.

a.  $\sqrt{m^{-1}}$

b.  $\sqrt[3]{x^{-1}}$

c.  $\sqrt[5]{p^{-2}}$

d.  $(\sqrt{a})^{-3}$

e.  $\sqrt[4]{x^{-3}}$

f.  $(\sqrt[3]{p})^{-5}$

g.  $\frac{1}{\sqrt{x^{-3}}}$

h.  $\frac{1}{\sqrt[3]{a^{-2}}}$

i.  $2\sqrt[3]{x^{-2}}$

j.  $\frac{1}{3\sqrt{a^{-5}}}$

$$\begin{aligned} \text{a. } \sqrt{m^{-1}} &= (m^{-1})^{\frac{1}{2}} \\ &= m^{-\frac{1}{2}} \\ &= \frac{1}{m^{\frac{1}{2}}} \\ &= \underline{\underline{\frac{1}{\sqrt{m}}}} \end{aligned}$$

$$\begin{aligned} \text{b. } \sqrt[3]{x^{-1}} &= (x^{-1})^{\frac{1}{3}} \\ &= x^{-\frac{1}{3}} \\ &= \frac{1}{x^{\frac{1}{3}}} \\ &= \underline{\underline{\frac{1}{\sqrt[3]{x}}}} \end{aligned}$$

$$\begin{aligned} \text{c. } \sqrt[5]{p^{-2}} &= (p^{-2})^{\frac{1}{5}} \\ &= p^{-\frac{2}{5}} \\ &= \frac{1}{p^{\frac{2}{5}}} \\ &= \underline{\underline{\frac{1}{\sqrt[5]{p^2}}}}} \end{aligned}$$

$$\begin{aligned} \text{d. } (\sqrt{a})^{-3} &= (a^{\frac{1}{2}})^{-3} \\ &= a^{-\frac{3}{2}} \\ &= \frac{1}{a^{\frac{3}{2}}} \\ &= \underline{\underline{\frac{1}{\sqrt{a^3}}}}} \end{aligned}$$

$$\begin{aligned} \text{e. } \sqrt[4]{x^{-3}} &= (x^{-3})^{\frac{1}{4}} \\ &= x^{-\frac{3}{4}} \\ &= \frac{1}{x^{\frac{3}{4}}} \\ &= \underline{\underline{\frac{1}{\sqrt[4]{x^3}}}}} \end{aligned}$$

$$\begin{aligned} \text{f. } (\sqrt[3]{p})^{-5} &= (p^{\frac{1}{3}})^{-5} \\ &= p^{-\frac{5}{3}} \\ &= \frac{1}{p^{\frac{5}{3}}} \\ &= \underline{\underline{\frac{1}{\sqrt[3]{p^5}}}}} \end{aligned}$$

$$\begin{aligned} \text{g. } \frac{1}{\sqrt{x^{-3}}} &= \frac{1}{(x^{-3})^{\frac{1}{2}}} \\ &= \frac{1}{x^{-\frac{3}{2}}} \\ &= x^{\frac{3}{2}} \\ &= \underline{\underline{x\sqrt{x^3}}}} \end{aligned}$$

$$\begin{aligned} \text{h. } \frac{1}{\sqrt[3]{a^{-2}}} &= \frac{1}{(a^{-2})^{\frac{1}{3}}} \\ &= \frac{1}{a^{-\frac{2}{3}}} \\ &= a^{\frac{2}{3}} \\ &= \underline{\underline{\sqrt[3]{a^2}}}} \end{aligned}$$

$$\begin{aligned} \text{i. } 2\sqrt[3]{x^{-2}} &= 2(x^{-2})^{\frac{1}{3}} \\ &= 2x^{-\frac{2}{3}} \\ &= \frac{2}{x^{\frac{2}{3}}} \\ &= \underline{\underline{\frac{2}{\sqrt[3]{x^2}}}}} \end{aligned}$$

$$\begin{aligned} \text{j. } \frac{1}{3\sqrt{a^{-5}}} &= \frac{1}{3(a^{-5})^{\frac{1}{2}}} \\ &= \frac{1}{3a^{-\frac{5}{2}}} \\ &= \frac{a^{\frac{5}{2}}}{3} \\ &= \underline{\underline{\frac{a^2\sqrt{a}}{3}}}} \end{aligned}$$

### 3. අගය සොයන්න.

a.  $\sqrt{25}$

b.  $\sqrt[4]{16}$

c.  $(\sqrt{4})^5$

d.  $(\sqrt[3]{27})^2$

e.  $\sqrt[4]{81^3}$

f.  $\sqrt[3]{1000^2}$

g.  $\left(\frac{27}{125}\right)^{\frac{2}{3}}$

h.  $\left(\frac{81}{10000}\right)^{\frac{3}{4}}$

i.  $\left(\frac{1}{64}\right)^{-\frac{5}{6}}$

j.  $\left(\frac{27}{64}\right)^{-\frac{2}{3}}$

k.  $(0.81)^{\frac{3}{2}}$

l.  $(0.125)^{-\frac{2}{3}}$

m.  $\left(\frac{4}{25}\right)^{\frac{1}{2}} \times \left(\frac{3}{4}\right)^{-1} \times 2^0$

n.  $\left(\frac{9}{100}\right)^{-\frac{3}{2}} \times \left(\frac{4}{25}\right)^{\frac{3}{2}}$

o.  $(27)^{\frac{1}{3}} \times (81)^{-1\frac{1}{4}}$

p.  $\left(11\frac{1}{9}\right)^{-\frac{1}{2}} \times \left(6\frac{1}{4}\right)^{-\frac{3}{2}}$

q.  $(0.125)^{-\frac{1}{3}} \times (0.25)^{\frac{3}{2}}$

r.  $(\sqrt[3]{8})^2 \times \sqrt[4]{16^3}$

a.  $\sqrt{25}$   
 $= 25^{\frac{1}{2}}$   
 $= 5^{2 \times \frac{1}{2}}$   
 $= \underline{\underline{5}}$

b.  $\sqrt[4]{16}$   
 $= 16^{\frac{1}{4}}$   
 $= 2^{4 \times \frac{1}{4}}$   
 $= \underline{\underline{2}}$

c.  $(\sqrt{4})^5$   
 $= (4^{\frac{1}{2}})^5$   
 $= (2^{2 \times \frac{1}{2}})^5$   
 $= 2^5$   
 $= \underline{\underline{32}}$

d.  $(\sqrt[3]{27})^2$   
 $= (27^{\frac{1}{3}})^2$   
 $= (3^{3 \times \frac{1}{3}})^2$   
 $= 3^2$   
 $= \underline{\underline{9}}$

e.  $\sqrt[4]{81^3}$   
 $= (81^3)^{\frac{1}{4}}$   
 $= (3^4)^{\frac{3}{4}}$   
 $= 3^3$   
 $= \underline{\underline{27}}$

f.  $\sqrt[3]{1000^2}$   
 $= (1000^2)^{\frac{1}{3}}$   
 $= (1000)^{\frac{2}{3}}$   
 $= (10^3)^{\frac{2}{3}}$   
 $= 10^2$   
 $= \underline{\underline{100}}$

g.  $\left(\frac{27}{125}\right)^{\frac{2}{3}}$   
 $= \left(\frac{3^3}{5^3}\right)^{\frac{2}{3}}$   
 $= \frac{3^{3 \times \frac{2}{3}}}{5^{3 \times \frac{2}{3}}}$   
 $= \frac{3^2}{5^2}$   
 $= \frac{9}{25}$   
 $= \underline{\underline{\frac{9}{25}}}$

h.  $\left(\frac{81}{10000}\right)^{\frac{3}{4}}$   
 $= \left(\frac{3^4}{10^4}\right)^{\frac{3}{4}}$   
 $= \frac{3^{4 \times \frac{3}{4}}}{10^{4 \times \frac{3}{4}}}$   
 $= \frac{3^3}{10^3}$   
 $= \frac{27}{1000}$   
 $= \underline{\underline{\frac{27}{1000}}}$

i.  $\left(\frac{1}{64}\right)^{-\frac{5}{6}}$   
 $= (64)^{\frac{5}{6}}$   
 $= (2^6)^{\frac{5}{6}}$   
 $= 2^5$   
 $= \underline{\underline{32}}$

j.  $\left(\frac{27}{64}\right)^{-\frac{2}{3}}$   
 $= \left(\frac{64}{27}\right)^{\frac{2}{3}}$   
 $= \left(\frac{4^3}{3^3}\right)^{\frac{2}{3}}$   
 $= \left(\frac{4^2}{3^2}\right)$   
 $= \frac{16}{9}$   
 $= \underline{\underline{\frac{16}{9}}}$

k.  $(0.81)^{\frac{3}{2}}$   
 $= \left(\frac{81}{100}\right)^{\frac{3}{2}}$   
 $= \left(\frac{9^2}{10^2}\right)^{\frac{3}{2}}$   
 $= \frac{9^3}{10^3}$   
 $= \frac{729}{1000}$   
 $= \underline{\underline{\frac{729}{1000}}}$

l.  $(0.125)^{-\frac{2}{3}}$   
 $= \left(\frac{125}{1000}\right)^{-\frac{2}{3}} = \left(\frac{1}{8}\right)^{-\frac{2}{3}}$   
 $= \left(\frac{1000}{125}\right)^{\frac{2}{3}} = 8^{\frac{2}{3}}$   
 $= \left(\frac{10^3}{5^3}\right)^{\frac{2}{3}} = 2^{3 \times \frac{2}{3}}$   
 $= \frac{10^2}{5^2} = 2^2$   
 $= \frac{100}{25} = 4$   
 $= \underline{\underline{4}}$

$$\begin{aligned} \text{m. } & \left(\frac{4}{25}\right)^{\frac{1}{2}} \times \left(\frac{3}{4}\right)^{-1} \times 2^0 \\ &= \left(\frac{2^2}{5^2}\right)^{\frac{1}{2}} \times \left(\frac{4}{3}\right) \times 1 \\ &= \frac{2}{5} \times \frac{4}{3} \\ &= \frac{8}{15} \end{aligned}$$

$$\begin{aligned} \text{n. } & \left(\frac{9}{100}\right)^{-\frac{3}{2}} \times \left(\frac{4}{25}\right)^{\frac{3}{2}} \\ &= \left(\frac{100}{9}\right)^{\frac{3}{2}} \times \left(\frac{4}{25}\right)^{\frac{3}{2}} \\ &= \left(\frac{10^2}{3^2}\right)^{\frac{3}{2}} \times \left(\frac{2^2}{5^2}\right)^{\frac{3}{2}} \\ &= \frac{10^3}{3^3} \times \frac{2^3}{5^3} \\ &= \frac{1000}{27} \times \frac{8}{125} \\ &= \frac{64}{27} \end{aligned}$$

$$\begin{aligned} \text{o. } & (27)^{1\frac{1}{3}} \times (81)^{-1\frac{1}{4}} \\ &= (27)^{\frac{4}{3}} \times (81)^{-\frac{5}{4}} \\ &= 3^{3 \times \frac{4}{3}} \times 3^{4 \times (-\frac{5}{4})} \\ &= 3^4 \times 3^{-5} \\ &= 3^{-1} \\ &= \frac{1}{3} \end{aligned}$$

$$\begin{aligned} \text{p. } & \left(11\frac{1}{9}\right)^{\frac{1}{2}} \times \left(6\frac{1}{4}\right)^{-\frac{3}{2}} \\ &= \left(\frac{100}{9}\right)^{\frac{1}{2}} \times \left(\frac{25}{4}\right)^{-\frac{3}{2}} \\ &= \left(\frac{9}{100}\right)^{\frac{1}{2}} \times \left(\frac{4}{25}\right)^{\frac{3}{2}} \\ &= \left(\frac{3^2}{10^2}\right)^{\frac{1}{2}} \times \left(\frac{2^2}{5^2}\right)^{\frac{3}{2}} \\ &= \frac{3}{10} \times \frac{2^3}{5^3} \\ &= \frac{3}{10} \times \frac{8}{125} \\ &= \frac{12}{625} \end{aligned}$$

$$\begin{aligned} \text{q. } & (0.125)^{-\frac{1}{3}} \times (0.25)^{\frac{3}{2}} \\ &= \left(\frac{1}{8}\right)^{-\frac{1}{3}} \times \left(\frac{1}{4}\right)^{\frac{3}{2}} \\ &= 8^{\frac{1}{3}} \times \left(\frac{1}{4}\right)^{\frac{3}{2}} \\ &= 2^{3 \times \frac{1}{3}} \times \frac{1}{2^{2 \times \frac{3}{2}}} \\ &= 2 \times \frac{1}{2^3} \\ &= \frac{1}{2^2} \\ &= \frac{1}{4} \end{aligned}$$

$$\begin{aligned} \text{r. } & (\sqrt[3]{8})^2 \times \sqrt[4]{16^3} \\ &= \left(8^{\frac{1}{3}}\right)^2 \times (16^3)^{\frac{1}{4}} \\ &= (2^{3 \times \frac{1}{3}})^2 \times (2^{4 \times 3})^{\frac{1}{4}} \\ &= 2^2 \times 2^3 \\ &= 2^5 \\ &= 32 \end{aligned}$$

#### 4. සුළු කර ධන දර්ශක සහිතව ලියන්න.

$$\text{a. } \sqrt[3]{a^{-1}} \div \sqrt[3]{a}$$

$$\text{b. } \sqrt[5]{a^{-3}} \div \sqrt[5]{a^7}$$

$$\text{c. } \sqrt[3]{a^2} \div \sqrt[3]{a^{-3}}$$

$$\text{d. } \left(\sqrt[3]{x^5}\right)^{\frac{1}{2}} \times \sqrt[6]{x^{-5}}$$

$$\text{e. } \left\{(\sqrt{a^3})^{-2}\right\}^{\frac{-1}{2}}$$

$$\text{f. } (\sqrt{x^2 y^2})^{-6}$$

$$\text{g. } \sqrt{\frac{4a^{-2}}{9x^2}}$$

$$\text{h. } (\sqrt[3]{27x^3})^{-2}$$

$$\text{i. } \left(\frac{xy^{-1}}{\sqrt{x^5}}\right)^{-2}$$

$$\begin{aligned} \text{a. } & \sqrt[3]{a^{-1}} \div \sqrt[3]{a} \\ &= (a^{-1})^{\frac{1}{3}} \div (a)^{\frac{1}{3}} \\ &= a^{-\frac{1}{3}} \div a^{\frac{1}{3}} \\ &= a^{-\frac{1}{3} - \frac{1}{3}} \\ &= a^{-\frac{2}{3}} \\ &= \frac{1}{a^{\frac{2}{3}}} \end{aligned}$$

$$\begin{aligned} \text{b. } & \sqrt[5]{a^{-3}} \div \sqrt[5]{a^7} \\ &= (a^{-3})^{\frac{1}{5}} \div (a^7)^{\frac{1}{5}} \\ &= a^{-\frac{3}{5}} \div a^{\frac{7}{5}} \\ &= a^{-\frac{3}{5} - \frac{7}{5}} \\ &= a^{-\frac{10}{5}} = a^{-2} \\ &= \frac{1}{a^2} \end{aligned}$$

$$\begin{aligned} \text{c. } & \sqrt[3]{a^2} \div \sqrt[3]{a^{-3}} \\ &= (a^2)^{\frac{1}{3}} \div (a^{-3})^{\frac{1}{3}} \\ &= a^{\frac{2}{3}} \div a^{-1} \\ &= a^{\frac{2}{3} - (-1)} \\ &= a^{\frac{2}{3} + 1} \\ &= a^{1\frac{2}{3}} \end{aligned}$$

$$\begin{aligned} \text{d. } & \left(\sqrt[3]{x^5}\right)^{\frac{1}{2}} \times \sqrt[6]{x^{-5}} \\ &= \{(x^5)^{\frac{1}{3}}\}^{\frac{1}{2}} \times (x^{-5})^{\frac{1}{6}} \\ &= x^{\frac{5}{6}} \times x^{-\frac{5}{6}} \\ &= x^{\frac{5}{6} - \frac{5}{6}} \\ &= x^0 \\ &= 1 \end{aligned}$$

$$\begin{aligned} \text{e. } \{(\sqrt{a^3})^{-2}\}^{-\frac{1}{2}} \\ &= (\sqrt{a^3})^{-2 \times (-\frac{1}{2})} \\ &= \sqrt{a^3} \\ &= a^{3 \times \frac{1}{2}} \\ &= \underline{\underline{a^{\frac{3}{2}}}} \end{aligned}$$

$$\begin{aligned} \text{f. } (\sqrt{x^2 y^2})^{-6} \\ &= (\sqrt{(xy)^2})^{-6} \\ &= [(xy)^{2 \times \frac{1}{2}}]^{-6} \\ &= (xy)^{-6} \\ &= \frac{1}{(xy)^6} \\ &= \underline{\underline{\frac{1}{x^6 y^6}}} \end{aligned}$$

$$\begin{aligned} \text{g. } \sqrt{\frac{4a^{-2}}{9x^2}} \\ &= \sqrt{\frac{2^2 a^{-2}}{3^2 x^2}} \\ &= \sqrt{\frac{(2a^{-1})^2}{(3x)^2}} \\ &= \left(\frac{(2a^{-1})^2}{(3x)^2}\right)^{\frac{1}{2}} \\ &= \frac{2a^{-1}}{3x} \\ &= \underline{\underline{\frac{2}{3ax}}} \end{aligned}$$

$$\begin{aligned} \text{h. } (\sqrt[3]{27x^3})^{-2} \\ &= (\sqrt[3]{(3x)^3})^{-2} \\ &= [(3x)^{3 \times \frac{1}{3}}]^{-2} \\ &= (3x)^{-2} \\ &= \frac{1}{(3x)^2} \\ &= \underline{\underline{\frac{1}{9x^2}}} \end{aligned}$$

$$\begin{aligned} \text{i. } \left(\frac{xy^{-1}}{\sqrt{x^5}}\right)^{-2} \\ &= \left(\frac{\sqrt{x^5}}{xy^{-1}}\right)^2 \\ &= \left(\frac{x^{5 \times \frac{1}{2}}}{xy^{-1}}\right)^2 \\ &= \frac{x^{5 \times \frac{1}{2} \times 2}}{x^2 y^{-2}} \\ &= \frac{x^5 y^2}{x^2} = \underline{\underline{x^3 y^2}} \end{aligned}$$

## 2.2 අභ්‍යාසය

1. පහත දැක්වෙන සමීකරණ විසඳන්න.

a.  $3^x = 9$

c.  $4^{3x} = 32$

e.  $8^{x-1} = 4^x$

g.  $2\sqrt{x} = 6$

b.  $3^{x+2} = 243$

d.  $2^{5x-2} = 8^x$

f.  $x^3 = 216$

h.  $\sqrt[3]{2x^2} = 2$

a.  $3^x = 9$

$$3^x = 3^2$$

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

b.  $3^{x+2} = 243$

$$3^{x+2} = 3^5$$

$$x + 2 = 5$$

$$\underline{\underline{x = 3}}$$

c.  $4^{3x} = 32$

$$(2^2)^{3x} = 2^5$$

$$2^{6x} = 2^5$$

$$6x = 5$$

$$\underline{\underline{x = \frac{5}{6}}}$$

d.  $2^{5x-2} = 8^x$

$$2^{5x-2} = (2^3)^x$$

$$2^{5x-2} = 2^{3x}$$

$$5x - 2 = 3x$$

$$5x - 3x = 2$$

$$2x = 2$$

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

e.  $8^{x-1} = 4^x$

$$(2^3)^{x-1} = (2^2)^x$$

$$2^{3x-3} = 2^{2x}$$

$$3x - 3 = 2x$$

$$3x - 2x = 3$$

$$\underline{\underline{x = 3}}$$

f.  $x^3 = 216$

$$x^3 = 6^3$$

$$\underline{\underline{x = 6}}$$

g.  $2\sqrt{x} = 6$

$$\sqrt{x} = 3$$

$$x^{\frac{1}{2}} = 9^{\frac{1}{2}}$$

$$\underline{\underline{x = 9}}$$

h.  $\sqrt[3]{2x^2} = 2$

$$\sqrt[3]{2x^2} = \sqrt[3]{8}$$

$$2x^2 = 8$$

$$x^2 = 4$$

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

2. පහත දැක්වෙන සමීකරණ විසඳන්න.

a.  $2^x \times 8^x = 256$

c.  $5 \times 25^{2x-1} = 125$

e.  $4^x = \frac{1}{64}$

g.  $3^{4x} \times \frac{1}{9} = 9^x$

b.  $8 \times 2^{x-1} = 4^{x-2}$

d.  $3^{2x} \times 9^{3x-2} = 27^{-3x}$

f.  $(3^x)^{-\frac{1}{2}} = \frac{1}{27}$

h.  $x^2 = \left(\frac{1}{8}\right)^{-\frac{2}{3}}$

a. $2^x \times 8^x = 256$ $2^x \times (2^3)^x = 2^8$ $2^x \times 2^{3x} = 2^8$ $2^{x+3x} = 2^8$ $2^{4x} = 2^8$ $4x = 8$ <u><math>x = 2</math></u>	b. $8 \times 2^{x-1} = 4^{x-2}$ $2^3 \times 2^{x-1} = (2^2)^{x-2}$ $2^{3+x-1} = 2^{2x-4}$ $2^{x+2} = 2^{2x-4}$ $x+2 = 2x-4$ $2+4 = 2x-x$ <u><math>x = 6</math></u>	c. $5 \times 25^{2x-1} = 125$ $5^1 \times (5^2)^{2x-1} = 5^3$ $5^1 \times 5^{4x-2} = 5^3$ $5^{1+4x-2} = 5^3$ $5^{4x-1} = 5^3$ $4x-1 = 3$ $4x = 4$ <u><math>x = 1</math></u>	d. $3^{2x} \times 9^{3x-2} = 27^{-3x}$ $3^{2x} \times (3^2)^{3x-2} = (3^3)^{-3x}$ $3^{2x} \times 3^{6x-4} = 3^{-9x}$ $3^{2x+6x-4} = 3^{-9x}$ $3^{8x-4} = 3^{-9x}$ $8x-4 = -9x$ $17x = 4$ <u><math>x = \frac{4}{17}</math></u>
e. $4^x = \frac{1}{64}$ $4^x = \frac{1}{4^3}$ $4^x = 4^{-3}$ <u><math>x = -3</math></u>	f. $(3^x)^{-\frac{1}{2}} = \frac{1}{27}$ $3^{x \times (-\frac{1}{2})} = \frac{1}{3^3}$ $3^{-\frac{x}{2}} = 3^{-3}$ $-\frac{x}{2} = -3$ <u><math>x = 6</math></u>	g. $3^{4x} \times \frac{1}{9} = 9^x$ $3^{4x} \times \frac{1}{3^2} = (3^2)^x$ $3^{4x} \times 3^{-2} = 3^{2x}$ $3^{4x-2} = 3^{2x}$ $4x-2 = 2x$ $2x = 2$ <u><math>x = 1</math></u>	h. $x^2 = \left(\frac{1}{8}\right)^{\frac{2}{3}}$ $x^2 = 8^{\frac{2}{3}}$ $x^2 = (2^3)^{\frac{2}{3}}$ $x^2 = 2^2$ <u><math>x = 2</math></u>

## 2.3 අනුමාපය

### 1. අගය සොයන්න.

a.  $\log_2 32$

b.  $\lg 10000$

c.  $\frac{1}{3} \log_3 27$

d.  $\frac{1}{2} \log_5 \sqrt{25}$

e.  $\log_3 \sqrt[4]{81}$

f.  $3 \log_2 \sqrt[3]{8}$

a.  $\log_2 32$

$$= \log_2 2^5$$

$$= 5 \log_2 2$$

$$= 5 \times 1$$

$= 5$

b.  $\lg 10000$

$$= \lg 10^4$$

$$= 4 \lg 10$$

$$= 4 \times 1$$

$= 4$

c.  $\frac{1}{3} \log_3 27$

$$= \frac{1}{3} \log_3 3^3$$

$$= \frac{1}{3} \times 3 \log_3 3$$

$$= \log_3 3$$

$= 1$

d.  $\frac{1}{2} \log_5 \sqrt{25}$

$$= \frac{1}{2} \log_5 25^{\frac{1}{2}}$$

$$= \frac{1}{2} \log_5 5^{2 \times \frac{1}{2}}$$

$$= \frac{1}{2} \log_5 5$$

$$= \frac{1}{2} \times 1$$

$= \frac{1}{2}$

e.  $\log_3 \sqrt[4]{81}$

$$= \log_3 81^{\frac{1}{4}}$$

$$= \log_3 3^{4 \times \frac{1}{4}}$$

$$= \log_3 3$$

$= 1$

f.  $3 \log_2 \sqrt[3]{8}$

$$= 3 \log_2 8^{\frac{1}{3}}$$

$$= 3 \log_2 2^{3 \times \frac{1}{3}}$$

$$= 3 \log_2 2$$

$$= 3 \times 1$$

$= 3$



## 2. සුළු කර අගය සොයන්න.

a.  $2 \log_2 16 - \log_2 8$

c.  $2 \lg 5 + 3 \lg 2 - \lg 2$

e.  $\lg 18 - 3 \lg 3 + \frac{1}{2} \lg 9 + \lg 5$

g.  $\lg \frac{1}{256} - \lg \frac{125}{4} - 3 \lg \frac{1}{20}$

i.  $\lg \frac{12}{5} + \lg \frac{25}{21} - \lg \frac{2}{7}$

b.  $\lg 80 - 3 \lg 2$

d.  $\lg 75 - \lg 3 + \lg 28 - \lg 7$

f.  $4 \lg 2 + \lg \frac{15}{4} - \lg 6$

h.  $\log_3 27 + 2 \log_3 3 - \log_3 3$

j.  $\lg \frac{3}{4} - 2 \lg \frac{3}{10} + \lg 12 - 2$

a.  $2 \log_2 16 - \log_2 8$

$$= 2 \log_2 2^4 - \log_2 2^3$$

$$= 2 \times 4 \log_2 2 - 3 \log_2 2$$

$$= 2 \times 4 \times 1 - 3 \times 1$$

$$= 8 - 3$$

$$= \underline{\underline{5}}$$

b.  $\lg 80 - 3 \lg 2$

$$= \lg 80 - \lg 2^3$$

$$= \lg 80 - \lg 8$$

$$= \lg \left( \frac{80}{8} \right)$$

$$= \lg 10$$

$$= \underline{\underline{1}}$$

c.  $2 \lg 5 + 3 \lg 2 - \lg 2$

$$= 2 \lg 5 + 2 \lg 2$$

$$= \lg 5^2 + \lg 2^2$$

$$= \lg 25 + \lg 4$$

$$= \lg 25 \times 4$$

$$= \lg 100$$

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

c.  $2 \lg 5 + 3 \lg 2 - \lg 2$

$$= 2 \lg 5 + 2 \lg 2$$

$$= 2 (\lg 5 + \lg 2)$$

$$= 2 \lg (5 \times 2)$$

$$= 2 \lg 10$$

$$= 2 \times 1$$

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

d.  $\lg 75 - \lg 3 + \lg 28 - \lg 7$

$$= \lg \frac{75 \times 28}{3 \times 7}$$

$$= \lg 100$$

$$= \lg 10^2$$

$$= 2 \lg 10$$

$$= 2 \times 1$$

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

e.  $\lg 18 - 3 \lg 3 + \frac{1}{2} \lg 9 + \lg 5$

$$= \lg 18 - \lg 3^3 + \frac{1}{2} \lg 3^2 + \lg 5$$

$$= \lg 18 - \lg 27 + \frac{1}{2} \times 2 \lg 3 + \lg 5$$

$$= \lg 18 - \lg 27 + \lg 3 + \lg 5$$

$$= \lg \frac{18 \times 3 \times 5}{27}$$

$$= \lg 10$$

$$= \underline{\underline{1}}$$

f.  $4 \lg 2 + \lg \frac{15}{4} - \lg 6$

$$= \lg 2^4 + \lg \frac{15}{4} - \lg 6$$

$$= \lg 16 + \lg \frac{15}{4} - \lg 6$$

$$= \lg \frac{16 \times 15}{6 \times 4}$$

$$= \lg \frac{60}{6}$$

$$= \lg 10$$

$$= \underline{\underline{1}}$$

g.  $\lg \frac{1}{256} - \lg \frac{125}{4} - 3 \lg \frac{1}{20}$

$$= \lg \frac{1}{256} - \lg \frac{125}{4} - \lg \frac{1}{20^3}$$

$$= \lg \frac{1}{256} - \lg \frac{125}{4} - \lg \frac{1}{8000}$$

$$= \lg \left( \frac{\frac{1}{256}}{\frac{125}{4} \times \frac{1}{8000}} \right)$$

$$= \lg \left( \frac{\frac{1}{256}}{\frac{1}{256}} \right)$$

$$= \lg 1$$

$$= \underline{\underline{0}}$$

h.  $\log_3 27 + 2 \log_3 3 - \log_3 3$

$$= \log_3 27 + 2 \times 1 - 1$$

$$= \log_3 3^3 + 1$$

$$= 3 \log_3 3 + 1$$

$$= 3 \times 1 + 1$$

$$= 3 + 1$$

$$= \underline{\underline{4}}$$

j.  $\lg \frac{3}{4} - 2 \lg \frac{3}{10} + \lg 12 - 2$

$$= \lg \frac{3}{4} - \lg \frac{3^2}{10^2} + \lg 12 - 2$$

$$= \lg \frac{3}{4} - \lg \frac{9}{100} + \lg 12 - 2$$

$$= \lg \left( \frac{\frac{3}{4} \times 12}{\frac{9}{100}} \right) - 2$$

$$= \lg \left( \frac{9}{9} \right) - 2$$

$$= \lg \left( 9 \times \frac{100}{9} \right) - 2$$

$$= \lg 100 - 2$$

$$= 2 - 2$$

$$= \underline{\underline{0}}$$

i.  $\lg \frac{12}{5} + \lg \frac{25}{21} - \lg \frac{2}{7} = \lg \left( \frac{12 \times 25}{5 \times 21} \right) = \lg 10 = \underline{\underline{1}}$

### 3. විසඳන්න.

a.  $\lg x + \lg 4 = \lg 8 + \lg 2$

b.  $4 \lg 2 + 2 \lg x + \lg 5 = \lg 15 + \lg 12$

c.  $3 \lg x + \lg 96 = 2 \lg 9 + \lg 4$

d.  $\lg x = \frac{1}{2} (\lg 25 + \lg 8 - \lg 2)$

e.  $3 \lg x + 2 \lg 8 = \lg 48 + \frac{1}{2} \lg 25 - \lg 30$

f.  $\lg 125 + 2 \lg 3 = 2 \lg x + \lg 5$

a.  $\lg x + \lg 4 = \lg 8 + \lg 2$

$$\lg (x \times 4) = \lg (8 \times 2)$$

$$\lg 4x = \lg 16$$

$$4x = 16$$

$$\underline{\underline{x = 4}}$$

c.  $3 \lg x + \lg 96 = 2 \lg 9 + \lg 4$

$$\lg x^3 + \lg 96 = \lg 9^2 + \lg 4$$

$$\lg x^3 + \lg 96 = \lg 81 + \lg 4$$

$$\lg (x^3 \times 96) = \lg (81 \times 4)$$

$$x^3 \times 96 = 81 \times 4$$

$$x^3 = \frac{81 \times 4}{96}$$

$$x^3 = \frac{27}{8}$$

$$x^3 = \frac{3^3}{2^3}$$

$$\underline{\underline{x = \frac{3}{2}}}$$

e.  $3 \lg x + 2 \lg 8 = \lg 48 + \frac{1}{2} \lg 25 - \lg 30$

$$3 \lg x = \lg 48 + \frac{1}{2} \lg 25 - \lg 30 - 2 \lg 8$$

$$\lg x^3 = \lg 48 + \lg 25^{\frac{1}{2}} - \lg 30 - \lg 8^2$$

$$\lg x^3 = \lg 48 + \lg 5^{2 \times \frac{1}{2}} - \lg 30 - \lg 8^2$$

$$\lg x^3 = \lg 48 + \lg 5 - \lg 30 - \lg 64$$

$$\lg x^3 = \lg \left( \frac{48 \times 5}{30 \times 64} \right)$$

$$\lg x^3 = \lg \frac{1}{8}$$

$$x^3 = \frac{1}{8}$$

$$x^3 = \frac{1^3}{2^3} \quad \underline{\underline{x = \frac{1}{2}}}$$

b.  $4 \lg 2 + 2 \lg x + \lg 5 = \lg 15 + \lg 12$

$$\lg 2^4 + \lg x^2 + \lg 5 = \lg 15 + \lg 12$$

$$\lg 16 + \lg x^2 + \lg 5 = \lg 15 + \lg 12$$

$$\lg (16 \times x^2 \times 5) = \lg (15 \times 12)$$

$$16 \times x^2 \times 5 = 15 \times 12$$

$$x^2 = \frac{15 \times 12}{16 \times 5}$$

$$x^2 = \frac{15 \times 12}{16 \times 5}$$

$$x^2 = \frac{9}{4}$$

$$\underline{\underline{x = \frac{3}{2}}}$$

d.  $\lg x = \frac{1}{2} (\lg 25 + \lg 8 - \lg 2)$

$$\lg x = \frac{1}{2} \lg \left( \frac{25 \times 8}{2} \right)$$

$$\lg x = \frac{1}{2} \lg 100$$

$$\lg x = \frac{1}{2} \lg 10^2$$

$$\lg x = \frac{1}{2} \times 2 \lg 10$$

$$\lg x = \lg 10$$

$$\underline{\underline{x = 10}}$$

f.  $\lg 125 + 2 \lg 3 = 2 \lg x + \lg 5$

$$\lg 125 + 2 \lg 3 - \lg 5 = 2 \lg x$$

$$\lg 125 + \lg 3^2 - \lg 5 = \lg x^2$$

$$\lg x^2 = \lg \frac{125 \times 9}{5}$$

$$\lg x^2 = \lg 225$$

$$x^2 = 225$$

$$\underline{\underline{x = 15}}$$

1. අගය සොයන්න.

a.  $(\sqrt[3]{8})^2 \times \frac{1}{\sqrt[3]{27}}$

b.  $(\sqrt{125})^3 \times \frac{1}{\sqrt{20}} \times 10$

c.  $\frac{32^{-\frac{2}{5}} \times 216^{\frac{2}{3}}}{81^{\frac{3}{4}} \times \sqrt[3]{8^0} \times \sqrt[3]{27^{-2}}}$

d.  $\sqrt{\frac{18 \times 5^2}{8}}$

e.  $\left(\frac{1}{8}\right)^{-\frac{1}{3}} \times 5^{-2} \times 100$

f.  $27^{\frac{2}{3}} - 16^{\frac{3}{4}}$

$$\begin{aligned} \text{a. } & (\sqrt[3]{8})^2 \times \frac{1}{\sqrt[3]{27}} \\ &= (8^{\frac{1}{3}})^2 \times \frac{1}{27^{\frac{1}{3}}} \\ &= (2^{3 \times \frac{1}{3}})^2 \times \frac{1}{3^{3 \times \frac{1}{3}}} \\ &= 2^2 \times \frac{1}{3} \\ &= \underline{\underline{\frac{4}{3}}} \end{aligned}$$

$$\begin{aligned} \text{b. } & (\sqrt{125})^3 \times \frac{1}{\sqrt{20}} \times 10 \\ &= (\sqrt{5^3})^3 \times \frac{10}{\sqrt{20}} \\ &= (5^{3 \times \frac{1}{2}})^3 \times \sqrt{\frac{100}{20}} \\ &= 5^{\frac{9}{2}} \times \sqrt{5} \\ &= 5^{\frac{9}{2}} \times 5^{\frac{1}{2}} \\ &= 5^{\frac{9}{2} + \frac{1}{2}} \\ &= 5^5 \\ &= \underline{\underline{3125}} \end{aligned}$$

$$\begin{aligned} \text{c. } & \frac{32^{-\frac{2}{5}} \times 216^{\frac{2}{3}}}{81^{\frac{3}{4}} \times \sqrt[3]{8^0} \times \sqrt[3]{27^{-2}}} \\ &= \frac{(2^5)^{-\frac{2}{5}} \times 6^{3 \times \frac{2}{3}}}{3^{4 \times \frac{3}{4}} \times \sqrt[3]{1} \times [(3^3)^{-2}]^{\frac{1}{3}}} \\ &= \frac{2^{-2} \times 6^2}{3^3 \times 1 \times 3^{-2}} \\ &= \frac{\frac{1}{4} \times 36}{3^1} \\ &= \frac{9}{3} \\ &= \underline{\underline{3}} \end{aligned}$$

$$\begin{aligned} \text{d. } & \sqrt{\frac{18 \times 5^2}{8}} \\ &= \sqrt{\frac{9 \times 5^2}{4}} \\ &= \left(\frac{3^2 \times 5^2}{2^2}\right)^{\frac{1}{2}} \\ &= \left(\frac{3 \times 5}{2}\right)^{2 \times \frac{1}{2}} \\ &= \frac{15}{2} \\ &= \underline{\underline{7\frac{1}{2}}} \end{aligned}$$

$$\begin{aligned} \text{e. } & \left(\frac{1}{8}\right)^{-\frac{1}{3}} \times 5^{-2} \times 100 \\ &= 8^{\frac{1}{3}} \times \frac{1}{5^2} \times 100 \\ &= 2^{3 \times \frac{1}{3}} \times \frac{1}{25} \times 100 \\ &= 2 \times 4 \\ &= \underline{\underline{8}} \end{aligned}$$

$$\begin{aligned} \text{f. } & 27^{\frac{2}{3}} - 16^{\frac{3}{4}} \\ &= 3^{3 \times \frac{2}{3}} - 2^{4 \times \frac{3}{4}} \\ &= 3^2 - 2^3 \\ &= 9 - 8 \\ &= \underline{\underline{1}} \end{aligned}$$

2. සුළු කර ධන දර්ශක සහිතව ප්‍රකාශ කරන්න.

a.  $\sqrt{a^2 b^{-\frac{1}{2}}}$

b.  $(x^{-4})^{\frac{1}{2}} \times \sqrt{x^{-3}}$

c.  $(x^{\frac{1}{2}} - x^{-\frac{1}{2}})(x^{\frac{1}{2}} + x^{-\frac{1}{2}})$

d.  $(x \div \sqrt[n]{x})^n$

e.  $\left[ (\sqrt{a^3})^{-2} \right]^{\frac{1}{2}}$

$$\begin{aligned} \text{a. } & \sqrt{a^2 b^{-\frac{1}{2}}} \\ &= (a^2 b^{-\frac{1}{2}})^{\frac{1}{2}} \\ &= a^{2 \times \frac{1}{2}} b^{-\frac{1}{2} \times \frac{1}{2}} \\ &= a \times b^{-\frac{1}{4}} \\ &= \frac{a}{\underline{\underline{b^{\frac{1}{4}}}}} \end{aligned}$$

$$\begin{aligned} \text{b. } & (x^{-4})^{\frac{1}{2}} \times \sqrt{x^{-3}} \\ &= x^{-4 \times \frac{1}{2}} \times \frac{1}{x^{-3 \times \frac{1}{2}}} \\ &= x^{-2} \times \frac{1}{x^{-\frac{3}{2}}} \\ &= x^{-2} \times x^{\frac{3}{2}} \\ &= x^{-2 + \frac{3}{2}} \\ &= x^{-\frac{1}{2}} \\ &= \frac{1}{\underline{\underline{x^{\frac{1}{2}}}}} \end{aligned}$$

$$\begin{aligned} \text{c. } & (x^{\frac{1}{2}} - x^{-\frac{1}{2}})(x^{\frac{1}{2}} + x^{-\frac{1}{2}}) \\ &= (x^{\frac{1}{2}})^2 - (x^{-\frac{1}{2}})^2 \\ &= x^{\frac{1}{2} \times 2} - x^{-\frac{1}{2} \times 2} \\ &= x - x^{-1} \\ &= x - \frac{1}{x} \\ &= \frac{x^2 - 1}{\underline{\underline{x}}} \end{aligned}$$

$$\begin{aligned} \text{d. } & (x \div \sqrt[n]{x})^n \\ &= (x^1 \div x^{\frac{1}{n}})^n \\ &= x^n \div x^{\frac{1}{n} \times n} \\ &= x^n \div x^1 \\ &= \underline{\underline{x^{n-1}}} \end{aligned}$$

$$\begin{aligned} \text{e. } & [(\sqrt{a^3})^{-2}]^{\frac{1}{2}} \\ &= \left\{ (a^3)^{\frac{1}{2}} \right\}^{-2} \\ &= a^{-\frac{3}{2}} \\ &= \frac{1}{\underline{\underline{a^{\frac{3}{2}}}}} \end{aligned}$$

### 3. සත්‍යාපනය කරන්න.

a.  $\lg \left( \frac{217}{38} \div \frac{31}{266} \right) = 2 \lg 7$

b.  $\frac{1}{2} \lg 9 + \lg 2 = 2 \lg 3 - \lg 1.5$

c.  $\log_3 24 + \log_3 5 - \log_3 40 = 1$

d.  $\lg 26 + \lg 119 - \lg 51 - \lg 91 = \lg 2 - \lg 3$

e.  $2 \log_a 3 + \log_a 20 - \log_a 36 = \log_a 10 - \log_a 2$

a.  $\lg \left( \frac{217}{38} \div \frac{31}{266} \right) = 2 \lg 7$

$$\begin{aligned} \text{ව.පැ.} &= \lg \left( \frac{217}{38} \div \frac{31}{266} \right) \\ &= \lg \left( \frac{217}{38} \times \frac{266}{31} \right) \\ &= \lg 7^2 \\ &= 2 \lg 7 \\ &= \text{ද.පැ.} \end{aligned}$$

$\therefore \lg \left( \frac{217}{38} \div \frac{31}{266} \right) = 2 \lg 7$

b.  $\frac{1}{2} \lg 9 + \lg 2 = 2 \lg 3 - \lg 1.5$

$$\begin{aligned} \text{ව.පැ.} &= \frac{1}{2} \lg 9 + \lg 2 & \text{ද.පැ.} &= 2 \lg 3 - \lg 1.5 \\ &= \lg 9^{\frac{1}{2}} + \lg 2 & &= \lg 3^2 - \lg 1.5 \\ &= \lg 3^{2 \times \frac{1}{2}} + \lg 2 & &= \lg \frac{9}{1.5} \\ &= \lg 3 + \lg 2 & &= \lg 6 \\ &= \lg 6 \end{aligned}$$

$\therefore \frac{1}{2} \lg 9 + \lg 2 = 2 \lg 3 - \lg 1.5$

c.  $\lg_3 24 + \lg_3 5 - \lg_3 40 = 1$

$$\begin{aligned} \text{ව.පැ.} &= \lg_3 24 + \lg_3 5 - \lg_3 40 \\ &= \lg_3 \left( \frac{24 \times 5}{40} \right) \\ &= \lg_3 3 \\ &= 1 \\ &= \text{ද.පැ.} \end{aligned}$$

$\therefore \lg_3 24 + \lg_3 5 - \lg_3 40 = 1$

d.  $\lg 26 + \lg 119 - \lg 51 - \lg 91 = \lg 2 - \lg 3$

$$\begin{aligned} \text{ව.පැ.} &= \lg 26 + \lg 119 - \lg 51 - \lg 91 \\ &= \lg \left( \frac{26 \times 119}{51 \times 91} \right) \\ &= \lg \frac{2}{3} \end{aligned}$$

$$\begin{aligned} \text{ද.පැ.} &= \lg 2 - \lg 3 \\ &= \lg \frac{2}{3} \\ &= \text{ව.පැ.} \end{aligned}$$

$\therefore \lg 26 + \lg 119 - \lg 51 - \lg 91 = \lg 2 - \lg 3$

e.  $2 \lg_a 3 + \lg_a 20 - \lg_a 36 = \lg_a 10 - \lg_a 2$

$$\begin{aligned} \text{ව.පැ.} &= 2 \lg_a 3 + \lg_a 20 - \lg_a 36 \\ &= \lg_a 3^2 + \lg_a 20 - \lg_a 36 \\ &= \lg_a \frac{9 \times 20}{36} \\ &= \lg_a 5 \end{aligned}$$

$$\begin{aligned} \text{ද.පැ.} &= \lg_a 10 - \lg_a 2 \\ &= \lg_a \frac{10}{2} \\ &= \lg_a 5 \\ &= \text{ව.පැ.} \end{aligned}$$