

Given $\frac{2 \cdot 401^{k+1}}{343^{n-2}} = 49$, express n in terms of k .

Diberi $\frac{2 \cdot 401^{k+1}}{343^{n-2}} = 49$, ungkapkan n dalam sebutan k .

[3 marks/3 markah]

Answer/Jawapan:

$$\log_p 5625 - \log_{\sqrt{p}} 3p = 2$$

$$\log_p 5625 - \frac{\log_p 3p}{\log_p \sqrt{p}} = 2$$

$$\log_p 5625 - \frac{\log_p 3p}{\log_p p^{\frac{1}{2}}} = 2$$

$$\log_p 5625 - \frac{\log_p 3p}{\frac{1}{2}} = 2$$

$$\log_p 5625 - 2 \log_p 3p = 2$$

$$\log_p 5625 - \log_p (3p)^2 = 2$$

$$\log_p \frac{5625}{9p^2} = 2$$

$$\frac{5625}{9p^2} = p^2$$

$$p^4 = 625$$

$$p = 5$$

Solve the equation:
Selesaikan persamaan:

$$\log_y 2 - \log_y 16 = 3$$

[3 marks/3 markah]

Answer/Jawapan:

$$\log_y 2 - \log_y 16 = 3$$

$$\log_y \frac{2}{16} = 3$$

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

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

Given $\log_x 5 = y$, express in terms of y

Diberi $\log_x 5 = y$, ungkapkan dalam sebutan y

(a) $\log_x 625$.

(b) $\log_5 25x^7$.

[4 marks/4 markah]

$$\begin{aligned} \text{(a)} \quad & \log_x 625 \\ &= \log_x 5^4 \\ &= 4 \log_x 5 \\ &= 4y \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & \log_5 25x^7 \\ &= \log_5 25 + \log_5 x^7 \\ &= 2 + 7 \log_5 x \\ &= 2 + 7 \left(\frac{1}{\log_x 5} \right) \\ &= 2 + \frac{7}{y} \end{aligned}$$

Solve the equation: $\log_3 (12x + 5) - \log_{27} x^6 = 2$
Selesaikan persamaan:

[4 marks/4 markah]

Answer/ Jawapan:

$$\log_3 (12x + 5) - \log_{27} x^6 = 2$$

$$\log_3 (12x + 5) - 6 \log_{27} x = 2$$

$$\log_3 (12x + 5) - 6 \frac{\log_3 x}{\log_3 27} = 2$$

$$\log_3 (12x + 5) - 6 \frac{\log_3 x}{3} = 2$$

$$\log_3 (12x + 5) - \log_3 x^2 = 2$$

$$\log_3 \frac{12x + 5}{x^2} = 2$$

$$\frac{12x + 5}{x^2} = 3^2$$

$$9x^2 - 12x - 5 = 0$$

$$(3x - 5)(3x + 1) = 0$$

$$x = \frac{5}{3} \text{ atau } x = -\frac{1}{3}$$

Solve the equation $1 + \log_a (7x - 6a) = \log_a 2 + 2 \log_a x$, such that a is a constant. Express your answer in terms of a .

Selesaikan persamaan $1 + \log_a (7x - 6a) = \log_a 2 + 2 \log_a x$, dengan keadaan a ialah suatu pemalar. Ungkapkan jawapan anda dalam sebutan a .

[3 marks]

[3 markah]

Answer/Jawapan:

$$1 + \log_a (7x - 6a) = \log_a 2 + 2 \log_a x$$

$$\log_a a + \log_a (7x - 6a) = \log_a 2 + \log_a x^2$$

$$\log_a a(7x - 6a) = \log_a 2x^2$$

$$2x^2 = 7ax - 6a^2$$

$$2x^2 - 7ax + 6a^2 = 0$$

$$(2x - 3a)(x - 2a) = 0$$

$$2x - 3a = 0$$

$$2x = 3a$$

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

$$x - 2a = 0$$

$$x = 2a$$

Given $\log_{27} (x + 2) = \log_3 6$, find the value of x .

Diberi $\log_{27} (x + 2) = \log_3 6$, cari nilai x .

[3 marks / markah]

Answer / Jawapan :

$$\log_{27}(x + 2) = \log_3 6$$

$$\frac{\log_3(x + 2)}{\log_3 3^3} = \log_3 6$$

$$\log_3(x + 2) = 3 \log_3 6$$

$$\log_3(x + 2) = \log_3 6^3$$

$$(x + 2) = 6^3$$

$$\begin{aligned} x &= 216 - 2 \\ &= 214 \end{aligned}$$

Solve the equation:

Selesaikan persamaan :

$$2 \log_k 256 - \log_{\sqrt{k}} 4k = 1$$

Answer / Jawapan :

[3 marks / markah]

$$2 \log_k 256 - \log_{\sqrt{k}} 4k = 1$$

$$2 \log_k (2^4)^2 - \frac{\log_k 4k}{\log_k \sqrt{k}} = \log_k k$$

$$\log_k 2^{16} - \log_k (4k)^2 = \log_k k$$

$$\log_k \frac{2^{16}}{16k^2} = \log_k k$$

$$\frac{2^{16}}{16k^2} = k$$

$$2^4 k^3 = 2^{16}$$

$$k^3 = 2^{16-4}$$

$$k = \sqrt[3]{4096}$$

$$= 16$$

Show that $\log_5 pq = 2 \log_{25} p + 2 \log_{25} q$.

Tunjukkan bahawa

Hence, find the values of p and of q that satisfy the equations

Seterusnya, cari nilai p dan nilai q yang memuaskan persamaan-persamaan

$$\log_5 pq = 6 \text{ and /dan } \frac{\log_{25} p}{\log_{25} q} = 5.$$

Answer / Jawapan :

[4 marks / markah]

$$\begin{aligned}
\text{B. } \log_5 pq &= \log_5 p + \log_5 q \\
&= \frac{\log_{25} p}{\log_{25} 5} + \frac{\log_{25} q}{\log_{25} 5} \\
&= \frac{\log_{25} p}{\frac{1}{2}} + \frac{\log_{25} q}{\frac{1}{2}} \\
&= 2 \log_{25} p + 2 \log_{25} q \quad (\text{shown})
\end{aligned}$$

$$\log_5 pq = 6 \quad \text{and} \quad \frac{\log_{25} p}{\log_{25} q} = 5$$

$$\begin{aligned}
\log_5 pq &= 6 \\
2 \log_{25} p + 2 \log_{25} q &= 6 \\
2(5 \log_{25} q) + 2 \log_{25} q &= 6 \\
\log_{25} q &= \frac{1}{2} \\
q &= 25^{\frac{1}{2}} \\
&= 5
\end{aligned}$$

$$\begin{aligned}
\frac{\log_{25} p}{\log_{25} q} &= 5 \\
\log_{25} p &= 5 \log_{25} q \\
q &= 5 \\
\log_{25} p &= 5 \log_{25} 5 \\
&= 5 \log_{25} 25^{\frac{1}{2}} \\
&= \frac{5}{2}(1) \\
&= \frac{5}{2} \\
\log_{25} p &= \frac{5}{2} \\
p &= 25^{\frac{5}{2}} \\
&= 3125
\end{aligned}$$

Solve the equation:
Selesaikan persamaan :

$$\log_x 8 + \frac{1}{3} \log_{\sqrt{x}} 8 = 5$$

Answer / Jawapan :

[3 marks / markah]

$$\log_x 8 + \frac{1}{3} \log_{\sqrt{x}} 8 = 5$$

$$\log_x 2^3 + \log_{\sqrt{x}} 8^{\frac{1}{3}} = \log_x x^5$$

$$\log_x 2^3 + \frac{\log_x 2}{\log_x x^{\frac{1}{2}}} = \log_x x^5$$

$$\log_x 2^3 + \log_x 2^2 = \log_x x^5$$

$$\log_x (2^3 \times 2^2) = \log_x x^5$$

$$2^5 = x^5$$

$$x = 2$$