



Powers Ex 2.2 Q12

Answer :

(i) We have:

$$\begin{aligned}\left(\frac{1}{4}\right)^{-4} \times \left(\frac{1}{4}\right)^{-8} &= \left(\frac{1}{4}\right)^{-4x} \\ \left(\frac{1}{4}\right)^{-12} &= \left(\frac{1}{4}\right)^{-4x} \quad (a^m \times a^n = a^{m+n}) \\ -12 &= -4x \\ 3 &= x\end{aligned}$$

$$x = 3$$

(ii) We have:

$$\begin{aligned}\left(\frac{-1}{2}\right)^{-19} \times \left(\frac{-1}{2}\right)^8 &= \left(\frac{-1}{2}\right)^{-2x+1} \\ \left(\frac{-1}{2}\right)^{-11} &= \left(\frac{-1}{2}\right)^{-2x+1} \quad (a^m \times a^n = a^{m+n}) \\ -11 &= -2x + 1 \\ -12 &= -2x \\ 6 &= x\end{aligned}$$

$$x = 6$$

(iii) We have:

$$\begin{aligned}\left(\frac{3}{2}\right)^{-3} \times \left(\frac{3}{2}\right)^5 &= \left(\frac{3}{2}\right)^{2x+1} \\ \left(\frac{3}{2}\right)^2 &= \left(\frac{3}{2}\right)^{2x+1} \\ 2 &= 2x + 1 \\ 1 &= 2x \\ \frac{1}{2} &= x\end{aligned}$$

$$x = 1/2$$

(iv) We have:

$$\begin{aligned}\left(\frac{2}{5}\right)^{-3} \times \left(\frac{2}{5}\right)^{15} &= \left(\frac{2}{5}\right)^{2+3x} \\ \left(\frac{2}{5}\right)^{12} &= \left(\frac{2}{5}\right)^{2+3x} \\ 12 &= 2 + 3x \\ 10 &= 3x \\ \frac{10}{3} &= x\end{aligned}$$

$$x = 10/3$$

(v) We have:

$$\begin{aligned}\left(\frac{5}{4}\right)^{-x} \div \left(\frac{5}{4}\right)^{-4} &= \left(\frac{5}{4}\right)^5 \\ \left(\frac{5}{4}\right)^{-x+4} &= \left(\frac{5}{4}\right)^5 \\ -x + 4 &= 5 \\ -x &= 1 \\ x &= -1\end{aligned}$$

$$x = -1$$

(vi) We have:

$$\begin{aligned}\left(\frac{8}{3}\right)^{2x+1} \times \left(\frac{8}{3}\right)^5 &= \left(\frac{8}{3}\right)^{x+2} \\ \left(\frac{8}{3}\right)^{2x+6} &= \left(\frac{8}{3}\right)^{x+2} \\ 2x + 6 &= x + 2 \\ x &= -4\end{aligned}$$

$$x = -4$$

***** END *****