CONTOH SOAL EKSPONEN

1. Bila x=36x=36 dan y=125y=125 maka nilai $\frac{x^{-\frac{3}{2}}\sqrt[3]{y^2}}{y^{\frac{1}{3}}-x^{\frac{1}{2}}}=\cdots$

Dengan sifat bilangan berpangkat dan sedikit catatan dari bentuk akar $\sqrt[n]{a^m}=a^{\frac{m}{n}}$.

Dengan $x=36=6^2$ dan $y125=5^3$, maka dapat kita tuliskan:

$$\frac{x^{-\frac{3}{2}}\sqrt[3]{y^2}}{y^{\frac{1}{3}}-x^{\frac{1}{2}}}$$
$$=\frac{(6^2)^{-\frac{3}{2}}(5^3)^{\frac{2}{3}}}{(5^3)^{\frac{1}{3}}-(6^2)^{\frac{1}{2}}}$$
$$=\frac{(6^{-3})\ (5^2)}{(5^1)-(6^1)}$$
$$=\frac{25}{6^3(-1)}$$
$$=-\frac{25}{216}$$

2. Jika nn memenuhi $\underbrace{25^{0.25}\times 25^{0.25}\times\cdots\times 25^{0.25}\times 25^{0.25}}_{n\ faktor}=125$

Maka (n – 3)(n + 2) = …

$$\begin{aligned}
25^{0.25}\times 25^{0.25}\times\cdots\times 25^{0.25}\times 25^{0.25}&=125\\
5^{2(0.25)}\times 5^{2(0.25)}\times\cdots\times 5^{2(0.25)}\times 5^{2(0.25)}&=125\\
5^{0.5}\times 5^{0.5}\times\cdots\times 5^{0.5}\times 5^{0.5}&=5^3\\
(5^{0.5})^n&=5^3\\
5^{\frac{1}{2}n}&=5^3\\
\hline
0.5n&=3\\
n&=6\\
(n-3)(n+2)&=(6-3)(6+2)\\
&=24
\end{aligned}$$

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3. Nilai xX yang memenuhi persamaan $3^{2x+3} = \sqrt[3]{27^{x+5}}$ adalah…

$$
\begin{aligned}
3^{2x+3} &= \sqrt[3]{27^{x+5}} \\
3^{2x+3} &= 27^{\frac{x+5}{3}} \\
3^{2x+3} &= (3^3)^{\frac{x+5}{3}} \\
3^{2x+3} &= 3^{x+5} \\
&\Rightarrow 2x+3 = x+5 \\
&\Rightarrow 2x - x = 5 - 3 \\
&\Rightarrow x = 2
\end{aligned}
$$

4. Jika diketahui xX dan yY adalah bilangan real dengan $x > 1$ dan $y > 0$. Jika $xy = x^y$ dan $\frac{x}{y} = x^{5y}$,

maka $x^2 + 3y = \ldots$

$$
\begin{aligned}
xy &= x^y \\
y &= \frac{x^y}{x} \\
y &= x^{y-1}
\end{aligned}
$$

$$
\begin{aligned}
\frac{x}{y} &= x^{5y} \\
\frac{x}{x^{y-1}} &= x^{5y} \\
x &= x^{5y} \cdot x^{y-1} \\
x &= x^{6y-1} \\
&\Rightarrow 1 = 6y - 1 \\
&\Rightarrow 2 = 6y \\
&\Rightarrow y = \frac{1}{3}
\end{aligned}
$$

Jika kita substitusikan pers.(1) dan pers.(2) maka kita peroleh;

$$
\begin{aligned}
y - 1 &= 1 - 5y \\
6y &= 2 \\
y &= \frac{1}{3}
\end{aligned}
$$

$$
\begin{aligned}
xy &= x^y \\
x \cdot \frac{1}{3} &= x^{\frac{1}{3}} \\
x &= 3x^{\frac{1}{3}} \\
x \cdot x^{-\frac{1}{3}} &= 3 \\
x^{\frac{2}{3}} &= 3 \\
x^2 &= 3^3
\end{aligned}
$$

$$x^2 + 3y = 3^3 + 3 \cdot \frac{1}{3} = 28$$