

02. Tentukanlah nilai x jika $\sqrt{27^{2x-5}} = 3(9^{6x-8})$

Jawab

$$\sqrt{27^{2x-5}} = 3(9^{6x-8})$$

$$\sqrt{(3^3)^{2x-5}} = 3((3^2)^{6x-8})$$

$$\sqrt{3^{6x-15}} = 3(3^{12x-16})$$

$$[3^{6x-15}]^{1/2} = 3^1 \cdot 3^{12x-16}$$

$$3^{\frac{6x-15}{2}} = 3^1 \cdot 3^{12x-16}$$

$$3^{\frac{6x-15}{2}} = 3^{1+12x-16}$$

$$3^{\frac{6x-15}{2}} = 3^{12x-15}$$

Maka $\frac{6x-15}{2} = 12x-15$

$$6x-15 = 24x-30$$

$$6x-24x = 15-30$$

$$-18x = -15$$

$$x = 15/18$$

$$x = 5/6$$

03. Tentukanlah nilai x yang memenuhi persamaan $\sqrt[4]{32^{x+1}} = \sqrt[3]{4^{2x-3}}$

Jawab

$$\sqrt[4]{32^{x+1}} = \sqrt[3]{4^{2x-3}}$$

$$\sqrt[4]{(2^5)^{x+1}} = \sqrt[3]{(2^2)^{2x-3}}$$

$$\sqrt[4]{2^{5x+5}} = \sqrt[3]{2^{4x-6}}$$

$$(2^{5x+5})^{1/4} = (2^{4x-6})^{1/3}$$

$$2^{\frac{5x+5}{4}} = 2^{\frac{4x-6}{3}}$$

Maka $\frac{5x+5}{4} = \frac{4x-6}{3}$

$$3(5x+5) = 4(4x-6)$$

$$15x+15 = 16x-24$$

$$15x-16x = -15-24$$

$$-x = -39$$

$$x = 39$$

04. Tentukanlah himpunan penyelesaian dari $7^8 \cdot 3^{x^2-8} = 3^{2x} \cdot 7^{x^2-2x}$

Jawab

$$7^8 \cdot 3^{x^2-8} = 3^{2x} \cdot 7^{x^2-2x}$$

$$\frac{3^{x^2-8}}{3^{2x}} = \frac{7^{x^2-2x}}{7^8}$$

$$3^{x^2-2x-8} = 7^{x^2-2x-8}$$

$$\text{Maka : } x^2 - 2x - 8 = 0$$

$$(x-4)(x+2) = 0$$

$$\text{Jadi } x = -2 \text{ dan } x = 4$$

05. Tentukanlah himpunan penyelesaian dari $25 \cdot 8^x = 4 \cdot 125^x$

Jawab

$$25 \cdot 8^x = 4 \cdot 125^x$$

$$\frac{8^x}{4} = \frac{125^x}{25}$$

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

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

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

$$\text{Maka : } 3x - 2 = 0$$

$$3x = 2$$

$$x = 2/3$$

06. Tentukanlah himpunan penyelesaian dari $(2x-5)^{4x+3} = (2x-5)^{2x-7}$

Jawab

$$\text{Kemungkinan 1 : } 4x + 3 = 2x - 7$$

$$4x - 2x = -3 - 7$$

$$2x = -10$$

$$x = -5$$

$$\text{Kemungkinan 2 : } 2x - 5 = 1$$

$$2x = 6$$

$$x = 3$$

$$\text{Kemungkinan 3 : } 2x - 5 = 0$$

$$2x = 5$$

$$x = 5/2$$

$$\text{Uji : } 4(5/2) + 3 > 0$$

$$2(5/2) - 7 < 0 \quad (\text{tidak memenuhi})$$

$$\text{Kemungkinan 4 : } 2x - 5 = -1$$

$$2x = 4$$

$$x = 2$$

$$\text{Uji : } 4(2) + 3 = 11 \text{ ganjil}$$

$$2(2) - 7 = -3 \text{ ganjil (memenuhi)}$$

$$\text{Jadi } H = \{-5, 2, 3\}$$

07. Tentukanlah nilai x jika $2^{2x} - 3 \cdot 2^{x+2} + 32 = 0$

Jawab

$$2^{2x} - 3 \cdot 2^{x+2} + 32 = 0$$

$$(2^x)^2 - 3(2^x) \cdot 2^2 + 32 = 0$$

$$(2^x)^2 - 12(2^x) + 32 = 0 \quad \text{Misal } 2^x = p$$

$$p^2 - 12p + 32 = 0$$

$$(p - 8)(p - 4) = 0$$

$$\text{Jadi } p = 8 \quad \text{atau} \quad p = 4$$

$$2^x = 2^3 \quad \text{atau} \quad 2^x = 2^2$$

$$x = 3 \quad \text{atau} \quad x = 2$$