

# HW41

A2

$$1. \begin{aligned} x+2 &= 3x \\ 2 &= 2x \\ \boxed{1} &= \boxed{x} \end{aligned}$$

$$2. \begin{aligned} 2x+2 &= 4 \\ 2x &= 2 \\ \boxed{x} &= \boxed{1} \end{aligned}$$

$$3. \begin{aligned} 25^{25} &= 5^x \\ (5^2)^{25} &= 5^x \\ \boxed{50} &= \boxed{x} \end{aligned}$$

$$4. \begin{aligned} (2^4)^{12} &= 2^x \\ \boxed{48} &= \boxed{x} \end{aligned}$$

$$5. \begin{aligned} (3^3)^4 &= 3^{x+3} \\ 12 &= x+3 \\ \boxed{9} &= \boxed{x} \end{aligned}$$

$$6. \begin{aligned} (5^3)^{30} &= 5^{x+10} \\ 90 &= x+10 \\ \boxed{80} &= \boxed{x} \end{aligned}$$

$$7. \begin{aligned} (2^3)^{4-x} &= (2^2)^{3x} \\ 12-3x &= 6x \\ 12 &= 9x \\ \boxed{4/3} &= \boxed{x} \end{aligned}$$

$$8. \begin{aligned} (2^3)^{2x+3} &= (2^4)^{x+4} \\ 10x+15 &= 4x+16 \\ 6x &= 1 \\ \boxed{x} &= \boxed{1/6} \end{aligned}$$

$$9. \begin{aligned} (3^2)^{4x} &= \frac{1}{3^3} \\ 8x &= -3 \\ \boxed{x} &= \boxed{-3/8} \end{aligned}$$

$$10. \begin{aligned} 2^{x+2} &= (2^2)^{3x} \\ x+2 &= 6x \\ 2 &= 5x \\ \boxed{2/5} &= \boxed{x} \end{aligned}$$

$$11. \begin{aligned} (2^2)^{3x} &= (2^3)^{x+6} \\ 6x &= 3x+6 \\ 3x &= 6 \\ \boxed{x} &= \boxed{2} \end{aligned}$$

$$12. \begin{aligned} (7^2)^{-x-3} &= \left(\frac{1}{7^3}\right)^{8x} \\ -2x-6 &= -24x \\ -6 &= -22x \\ \boxed{3/11} &= \boxed{x} \end{aligned}$$

$$13. \begin{aligned} (2^3)^{x+3} &= (2^4)^{5-2x} \\ 3x+9 &= -20+8x \\ 29 &= 5x \\ \boxed{29/5} &= \boxed{x} \end{aligned}$$

$$14. \begin{aligned} 2^{x+1} \cdot 2^{3x-7} &= (2^2)^x \cdot (2^2)^{7x+5} \\ 4x-6 &= 16x+10 \\ -16 &= 12x \\ -16/12 &= \boxed{-4/3} = \boxed{x} \end{aligned}$$

$$15. \frac{16x^{20}}{1296x^4} = \boxed{\frac{x^{16}}{81}}$$

$$16. \begin{aligned} \left(\frac{5x^3}{25x^{-7}}\right)^2 &= \left(\frac{x^{10}}{5}\right)^2 \\ \boxed{\frac{x^{20}}{25}} \end{aligned}$$

$$17. \begin{aligned} \left(\frac{8x^0y^2}{6xy^5}\right)^5 &= \left(\frac{4}{3xy^3}\right)^5 \\ \boxed{\frac{1024}{243x^5y^{15}}} \end{aligned}$$

18. 1

$$19. \begin{aligned} \left(\frac{x^{-8}y^8}{81x^8}\right) \left(\frac{1}{xy}\right) &= \frac{x^{-8}y^8}{81x^9y} \\ \boxed{\frac{y^7}{81x^{17}}} \end{aligned}$$

$$20. \begin{aligned} \left(\frac{4y^{-2}}{16x^2y^{-5}}\right)^2 &= \frac{16y^{-4}}{256x^4y^{-10}} \\ \boxed{\frac{y^6}{16x^4}} \end{aligned}$$

$$21. \left( \frac{8a^4 b^{-3}}{32a^{-2}b} \right)^2$$

$$\left( \frac{a^6}{4b^4} \right)^2$$

$$\boxed{\frac{a^{12}}{16b^8}}$$

$$22. \left( \frac{18d^9 f^2 g^{-4}}{24d^7 f^{-5} g^3} \right)^3$$

$$\left( \frac{3d^2 f^7}{4g^7} \right)^3$$

$$\boxed{\frac{27d^6 f^{21}}{64g^{21}}}$$

$$23. \left( \frac{2x^3 (y^3 z^{-4})}{6(x^{-8} y^{10} z^{-3})} \right)^2 \cdot \left( \frac{6}{x^2 y z^{-4}} \right)$$

$$\left( \frac{x^3 y^3 z^{-4}}{3x^{-8} y^{10} z^{-3}} \right)^2 \cdot \left( \frac{6}{x^2 y z^{-4}} \right)$$

$$\left( \frac{x^{11}}{3y^3 z^3} \right)^2 \cdot \left( \frac{6}{x^2 y z^{-4}} \right)$$

$$\frac{x^{22}}{9y^{27} z^6} \cdot \frac{6}{x^2 y z^{-4}}$$

$$\frac{6x^{22}}{9x^2 y^{27} z^2} = \boxed{\frac{2x^{20}}{3y^{27} z^2}}$$