



Name: Answers

Gr 10

Date:

Term 1

Time:

1 HR

CAPS Reference

Exponents

Topic

Exponential equations

$$\begin{aligned}2.1 \quad 3 \cdot 2^x &= 12 \\ 2^x &= 12 \div 3 \\ 2^x &= 4 \\ 2^x &= 2^2 \\ x &= 2\end{aligned}$$

$$\begin{aligned}2.2 \quad 6^{x+3} &= 1 \\ 6^{x+3} &= 6^0 \\ x + 3 &= 0 \\ x &= -3\end{aligned}$$

$$\begin{aligned}2.3 \quad 7^{x+4} &= 49 \\ 7^{x+4} &= 7^2 \\ x + 4 &= 2 \\ x &= 2 - 4 \\ x &= -2\end{aligned}$$

$$\begin{aligned}2.4 \quad 9^{x+2} &= \frac{1}{81} \\ 9^{x+2} &= \frac{1}{9^2} \\ 9^{x+2} &= 9^{-2} \\ x + 2 &= -2 \\ x &= -2 - 2 \\ x &= -4\end{aligned}$$

$$\begin{aligned}2.5 \quad (5^{2x})^2 &= 125 \\ 5^{4x} &= 5^3 \\ 4x &= 3 \\ x &= \frac{3}{4}\end{aligned}$$

$$\begin{aligned}2.6 \quad 4^{x+5} &= 16^{x-2} \\ 4^{x+5} &= (4^2)^{x-2} \\ 4^{x+5} &= 4^{2x-4} \\ x + 5 &= 2x - 4 \\ 5 + 4 &= 2x - x \\ 9 &= x\end{aligned}$$

$$\begin{aligned}2.7 \quad 5^x + 5^{x+1} &= 30 \\ 5^x(1 + 5^1) &= 30 \\ 5^x(6) &= 30 \\ 5^x &= 30 \div 6 \\ 5^x &= 5 \\ x &= 1\end{aligned}$$

$$\begin{aligned}2.8 \quad 3^{x+2} - 3^x &= 72 \\ 3^x(3^2 - 1) &= 72 \\ 3^x(9 - 1) &= 72 \\ 3^x(8) &= 72 \\ 3^x &= 72 \div 8 \\ 3^x &= 9 \\ 3^x &= 3^2 \\ x &= 2\end{aligned}$$

$$\begin{aligned}2.9 \quad (2^x)^{x-2} &= 8 \\ 2^{x^2-2x} &= 2^3 \\ x^2 - 2x - 3 &= 0 \\ (x-3)(x+1) &= 0 \\ x-3 = 0 \quad \text{or} \quad x+1 = 0 \\ x = 3 \quad \quad \quad x = -1\end{aligned}$$

$$\begin{aligned}2.10 \quad 4^{x^2} &= 16^{x-4} \\ 4^{x^2} &= (4^2)^{x-4} \\ 4^{x^2} &= 4^{2x-8} \\ x^2 &= 2x - 8 \\ x^2 - 2x + 8 &= 0 \\ (x+2)(x-4) &= 0 \\ x+2 = 0 \quad \text{or} \quad x-4 = 0 \\ x = -2 \quad \quad \quad x = 4\end{aligned}$$