



Revision of Algebra



1. Solve for x : $\frac{1}{x} - \frac{1}{4} = \frac{1}{x+2}$ (Revise)
2. Simplify: $x\sqrt{4 + \frac{12}{x} + \frac{9}{x^2}}$
3. Simplify the following expressions:
 - (a) $\frac{3}{x+5} - \frac{2}{x+7} + \frac{1}{2}$
 - (b) $\frac{5}{x} + \frac{1}{x^2+3x} - \frac{2}{x+3}$ (Revise)
4. Use algebraic long division to find the three factors of $x^3 + 6x^2 + 12x + 8$ (Revise)
Hence, or otherwise, simplify the expression $x\sqrt[3]{1 + \frac{6}{x} + \frac{12}{x^2} + \frac{8}{x^3}}$
5. If $x = \frac{2}{3}$ and $x = -2$ are roots of the equation $ax^2 + bx - 4 = 0$, find the value of a and b .
6. Solve the following system of equations:

$$\begin{aligned} x + y + 2z &= 7 \\ 3x + 2y - z &= 1 \\ 2x - 3y + z &= 10 \end{aligned}$$
 (Revise)
7. Solve for x : $\sqrt{4x+9} = \sqrt{2x+1} + 2$ (Revise)
8. Solve for x : $\frac{12}{x+1} - 4 = \frac{3}{2x-9}$ (Revise)
9. Solve for x and y :

$$\begin{aligned} x + y &= 5 \\ x^2 + xy + y^2 &= 19 \end{aligned}$$
 (Revise)
10. If $(x-2)$ and $(x+1)$ are factors of the expression $x^3 + px^2 + qx - 6$, find the value of p and q .
Hence find the third factor of the expression. (Revise)
11. Solve for x : $\sqrt{3x+4} - 3 = \sqrt{x-3}$ (Revise)





12. Solve the following system of equations:
- $$\frac{x}{3} + \frac{y}{2} + z = 5$$
- $$x + \frac{y}{4} + \frac{z}{3} = 4$$
- $$\frac{x}{2} - y + \frac{3z}{4} = 10 \quad (\text{Revise})$$
13. Solve the equation: $9(3^{x^2}) = 27^x$ (Revise)
14. Solve the following system of equations:
- $$2x + 3y = -1$$
- $$x^2 + 2xy + y^2 = 1 \quad (\text{Revise})$$
15. If $(x + 3)$ and $(x - 2)$ are factors of the expression $ax^3 + bx^2 - 15x + 18$, find the value of a and b .
Hence solve the equation $ax^3 + bx^2 + -15x + 18 = 0$ (Revise)
16. Solve each of the following equations for the correct range of values of x : (Revise)
- (a) i. $x^2 + 2x - 15 > 0$
ii. $18 - 25x \geq 3x^2$
iii. $x^2 - 9 < 0$
iv. $x^2 > 5x$
- (b) i. $\frac{x+1}{x-2} < 2, \quad x \neq 2$
ii. $\frac{1-2x}{x-4} \leq -\frac{3}{4}, \quad x \neq 4$
- (c) i. $|2x+1| < 3$
ii. $|x-1| \geq 2|x+2|$
iii. $|3x+2| > \frac{5}{2}$
17. Solve the equation: $\log_2 x + \log_2(x - 2) = 3$ (Revise)
18. Show that $x^2 - 10x + 30 \geq 0$ for all $x \in R$. (Revise)
19. If $(x - 3)^2$ is a factor of $x^3 + ax^2 - 15x + b$, find the values of a and b . (Revise)
Hence solve the equation $x^3 + ax^2 - 15x + b = 0$
20. Solve the equation: $\frac{2^{x^2}}{64} = 2^x$ (Revise)
21. Solve the following equations:
- i. $2 \log x = \log 2 + \log(4 - x)$
ii. $\log_2(x - 3) + \log_2(x - 1) = 3$ (Revise)
22. By letting $2^x = y$, represent the following equations in terms of y . Then solve each equation fully for the correct values of x .
- i. $2^{2x} - 17(2^x) + 16 = 0$





- ii. $2^{2x+3} - 33(2^x) + 4 = 0$ (Revise)
23. $x^2 + ax + b$ is a factor of $px^3 + 3apx^2 + 2bpx + c$.
Show that:
- $b = 2a^2$
 - $4a^3 = \frac{c}{p}$
24. Show that $2x^2 - 7x + 10 \geq 0$ for all $x \in R$
25. Let $\log_2 3 = a$ and $\log_2 5 = b$. Express the following in terms of a and b .
- i. $\log_2 \left(\frac{3}{5}\right)$
 - ii. $\log_2 15$
 - iii. $\log_2 9$
 - iv. $\log_2 25$
 - v. $\log_2 \left(\frac{27}{25}\right)$
 - vi. $\log_2 \sqrt{15}$
26. By letting $3^x = y$, represent the following equation in terms of y .
 $3^{x+1} + 3^{2-x} = 28$
Then solve the equation fully for the correct value of x .

