

C1 Test A: Final Revision Test

1. Expand and simplify $(x-1)(x+2)$
2. Factorise
 - i) $x^2 - 16$
 - ii) $x^2 - 3x - 10$
3. Simplify
 - i) $\frac{3}{4}(-\frac{2}{3})^3$
 - ii) $3^{\frac{x}{2}} \times 3^{\frac{x}{2}}$
4. Rationalise and simplify $\frac{1}{1-\sqrt{5}}$
5. a) Solve $x^2 - 3x - 28 = 0$ by i) the quadratic formula.
ii) completing the square.
b)† Solve $3x^2 - 5x + 2 = 0$ by completing the square.
6. Calculate the discriminant for $y = x^2 - 3x + 2$. **Hence** determine the nature of the roots of $x^2 - 3x + 2 = 0$.
7. Solve the simultaneous equations $y = x^2 + 5x - 3$ and $y = 2x - 3$.
8. Solve $x^2 + 5x - 3 > 2x - 3$
9. Sketch the curve of $y = \frac{4}{x}$
10. State the equations of the asymptotes of the curve in Q9.
11. i) Determine by sketch graphs how many solutions there are to the equation $x^2 - 10 = \frac{2}{x}$
ii)† The graphs of $y = mx - 1$ & $y = x^2$ touch but do not cross. Find the two possible values of m .
12. i) For $y = f(x)$ where $f(x) = x^3$, state where $f(x)$ and $f(x+4)$, cross the x -axis.
ii) For $y = f(x)$ where $f(x) = (x+1)(x-2)$ state where $f(x)$ and $f(2x)$, cross the x -axis & y -axis.
13. What is the gradient and y -intercept of $y = 4x+3$?
14. Write $\frac{y-3}{x-5} = 6$ in the form $y = mx + c$.
15. Which pair of lines from i) $y = 5x + 2$
ii) $y = -10x - \frac{1}{2}$ iii) $y = -10x + 2$ iv) $y + \frac{x}{5} = \frac{1}{2}$ are parallel, and which are perpendicular?
16. i) Find the 5th term of the sequence with n^{th} term $4n + 2$
ii) Find the n^{th} term of the sequence 2, -2, 2, -2...
17. Given that $x_1 = 1$ and $x_{n+1} = 2x_n - 2$, then find x_n for n up to 3.
18. What is the n^{th} term and the sum to n terms of the series $-1 + 3 + 7 + 11 \dots$?
19. Prove that the formula for the sum of an arithmetic series: $a, a+d, a+2d, \dots, a+(n-2)d, a+(n-1)d$ is:
 $S_n = \frac{n}{2}[2a + (n-1)d]$
20. What is the sum of the first n natural numbers?
21. Calculate $\sum_{r=2}^5 3r + 2$
22. Two points on a graph are (4, 8) and (4.001, 8.004). Estimate the gradient at the point (4, 8).
23. What is the gradient of $y = x^3 + x + 2$ at (0,2)?
24. i) Given that $y = x^3 + 4x^2 + 7$, find $\frac{d^2y}{dx^2}$
ii) Given that $y = \frac{1+x^3}{x^2}$ find $\frac{dy}{dx}$
25. Find the gradient of the tangent to the curve $y = \frac{1}{3}x^3 + \frac{5}{2}x^2 + 4x$ at the point (-3, 1.5).
26. Given that $\frac{dy}{dx} = 3x^2 + 4$, find y as a function of x .
27. Calculate $\int 6x^3 + 3x + 4 dx$.
28. Given that $f'(x) = 6x^2 + 10x$, and $f(2) = 19$, find $y = f(x)$.