

Part I

Short answer. No partial credit. There will be 8 problems like this on the exam, worth 5 points each.

2.1 If $x^3 + 4x^2 - 2x + 5$ is divided by $x - 2$ the remainder is .

2.2 The graph of $y = \frac{1}{x^2 - 5}$ has vertical asymptotes at .

2.3 The solution of the inequality $|x - 3| < 5$, written in interval notation, is .

2.4 If $f(x) = 2x + 3$ then $f^{-1}(x) =$.

2.5 Express $\sqrt{\frac{x^3 x^{0.5}}{x^{-6}}}$ as a single power of x : .

2.6 An exponential equation (not involving logs) equivalent to $\ln Q = 2P$ is .

2.7 If $\log_b 2 = 1.8$ then $\log_b 16b^2$ is the number .

2.8 Express $2\ln(x^3) - \ln(\sqrt{x}) + \ln(\frac{1}{x})$ as a single logarithm: .

2.9 The solution(s) of $\sqrt{x + 2} = 3x$ are $x =$.

2.10 If $2^x = 3^{x+1}$ then $x =$.

Part II

Show all your work for problems in this part. Partial credit will be given. There will be 6 problems like this, worth 10 point each.

2.11 Find a rational function whose graph has a vertical asymptote at $x = -2$ and a horizontal asymptote at $y = 3$. Sketch its graph.

2.12 Solve these inequalities: a) $\frac{x+1}{x-3} \leq 5$ b) $x^3 + x^2 \geq 4x + 4$.

2.13 Sketch the graph of $y = \frac{x^2}{x^2 - 9}$ showing all asymptotes.

2.14 If $f(x) = \frac{2}{x+1}$ find a formula for $f^{-1}(x)$.

2.15 Divide $x^4 + 6x^2 + 10$ by $x^2 + 2$. Give the quotient and the remainder.

2.16 Express each of the following as a *single* algebraic fraction in simplest form.

a) $\frac{x}{x-y} + \frac{x^2}{x+y} - \frac{y^3}{x^2-y^2}$

b) $\frac{\frac{a}{b} - \frac{b}{a}}{a^2 - \frac{1}{b^2}}$

2.17 Is $g(x) = \ln(x/3)$ the inverse of the function $f(x) = e^{3x}$? Explain your answer.