Math Analysis Practice Final Exam Problems

Free Response Samples:

1. Graph $f(x)=\dfrac{2x^2+5x+2}{x^2-x-2}$ showing all asymptotes and intercepts

2. Graph $f(x)=-8x^4+32x^2$ showing all intercepts and correct end behavior

3. Solve for x: $\log_3(x+2)-\log_3 x=3$

4. Solve for x: $x^4-6x^3+9x^2+6x-10=0$

5. Graph each function:

   a. $f(x)=(x+2)^3-2$

   b. $f(x)=2|x-3|+5$

   c. $f(x)=-\sqrt{x+5}$

   d. $f(x)=x^2+2x-8$ (Show vertex and y-intercept).

   e. $f(x)=\log_3(x-3)-5$

   f. $f(x)=3^{x-3}+2$

Chapter 1A, 1B Samples:

1. Simplify: $\left(\dfrac{16}{625}\right)^{\frac{3}{4}}$

2. Simplify: $\sqrt[4]{32x^8y^{13}}$

3. Factor: $x^3-4x^2-3x+12$

4. Factor: $64y^3-1000$

5. Solve: $\left|\dfrac{2x+3}{3}\right|\le 5$

6. Solve for x: $\sqrt{2x+3}=1-\sqrt{x+1}$

7. Simplify: $\dfrac{2}{x-3}+\dfrac{1}{x}-\dfrac{x}{x^2-2x-3}$

8. If you invest \$20,000, part at 6% and part at 7% interest, how much would you invest at 6% to have a total return on the investment of \$1260?

9. Solve for x: $x^4-29x^2+100=0$

10. Solve for x: $\dfrac{2}{x+3}-\dfrac{3}{x+1}=\dfrac{6}{x^2+4x+3}$

11. Solve for x: $\dfrac{3x}{2}-\dfrac{2x}{x-1}=x-3$

12. Solve for x: $3x+\sqrt{x}-4=0$

13. Solve: $\dfrac{x^2-4}{x-1}\le 0$

Multiple Choice Samples, Chapters 1C, 2, 3:

1. Find the vertex of the following given parabola: $y = x^2 - 4x - 5$

   A (5, -1) B (2,-9) C (4,-5) D (2,-5)

2. Determine the left and right behavior of the graph: $f(x) = -x^5 + 2x^2 - 1$

   A Up, Down ↑↓ B Down, Up ↓↑ C Up, Up ↑↑ D Down, Down ↓↓

3. Divide $(6x^3 + 7x^2 - 15x + 6) \div (x - 2)$

   A $6x^2 - 5x - 25 - \dfrac{44}{x-2}$ B $3x^2 + 13x + 9 + \dfrac{24}{x-2}$

   C $6x^2 + 19x + 23 + \dfrac{52}{x-2}$ D $6x^2 - 5x + 5 - \dfrac{4}{x-2}$

4. Write as a product of linear factors: $f(x) = x^4 - 3x^2 - 28$.

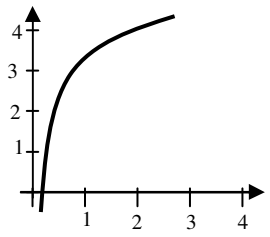
   A $(x^2 + 4)(x^2 - 7)$ B $(x - 2i)(x + 2i)\left(x - \sqrt{7}\right)\left(x + \sqrt{7}\right)$

   C $(x + 2i)(x + 2i)\left(x + \sqrt{7}\right)\left(x - \sqrt{7}\right)$ D $(x - 2i)(x - 2i)\left(x - \sqrt{7}\right)\left(x + \sqrt{7}\right)$

5. Match the graph with the correct function.

   A $f(x) = 3 + \log x$ B $f(x) = \log(x + 3)$

   C $f(x) = \frac{1}{3}\log x$ D $f(x) = 3\log x$



6. Write the function in exponential form: $\log_b 7 = 13$.

   A $7^{13} = b$ B $b^{13} = 7$ C $b^7 = 13$ D $7^b = 13$

7. Solve for x: $\ln(7 - x) + \ln(3x + 5) = \ln(24x)$

   A $\frac{6}{11}$ B $\frac{7}{3}$ C $\frac{7}{3}, -5$ D $\frac{6}{11}, 5$

8. Solve for x: $3x^2 - 4x + 2 = 0$.

   A $x = \dfrac{2 \pm \sqrt{2}i}{3}$ B $x = \dfrac{2 \pm 2\sqrt{10}}{3}$ C $x = \dfrac{2 \pm 2\sqrt{2}i}{3}$ D $x = \dfrac{2 \pm \sqrt{10}}{3}$

9. Find the y-intercept(s): $f(x) = \dfrac{x^2 - 1}{x^2 + 9}$.

   A (0, 1) (0, -1) B $\left(0, -\frac{1}{9}\right)$ C $(0, -1)$ D (0, 9)

10. Find the x-intercept(s): $f(x) = 3x^3 - 12x$

A (3, 0) (4, 0) (-4, 0) B (3, 0) (2, 0) (2, 0) C (0, 0) (3, 0) (4, 0) D (0, 0) (2, 0) (-2, 0)

11. Find the domain: $f(x) = \sqrt{x-5} + 7$

A $[5, \infty]$ B $(-\infty, 5]$ C $[5, 7]$ D $(-\infty, \infty)$

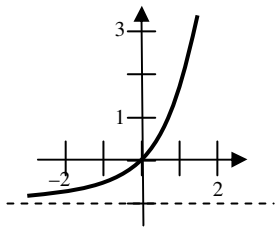
12. Find an equation of the line that passes through (–1, –3) and is parallel to the line $2x + y = 19$.

A $y = -2x - 3$ B $y = -2x - 5$ C $y = 2x - 1$ D $y = -\frac{1}{2}x - \frac{7}{2}$

13. Given $f(x) = x^2 - 2x$ and $g(x) = 3 + 2x$, find $(f \circ g)(x)$.

A $4x^2 + 8x + 3$ B $4x^2 + 10x + 9$ C $2x^2 - 4x + 3$ D $3x^2 + x$

14. Match the graph with the correct function.



A $y = 3^{x-1}$ B $y = 3^x - 1$

C $y = 3^{1-x}$ D $y = 3^{-x} - 1$

15. Solve for x: $18 = 3e^{2x}$

A $\frac{\ln 6}{2}$ B $\frac{\ln 18}{3}$ C 3 D $\frac{\ln 15}{2}$

16. Solve for x: $f(x) = \log_2(2x+5) - \log_2(x+1) = 3$

A 2 B $-\frac{1}{2}$ C 1 D -4

17. Find the domain for the function $f(x) = \frac{x-5}{x^2 - 4x - 12}$

A all real numbers B all real numbers except 5, 6, and -2

C all real numbers except 5 D all real numbers except 6 and -2

18. Find all the real roots: $x^3 - 7x + 6 = 0$

A –1, 1, 6 B –3, 1, 2 C –2, –2, 3 D –6, –1, 1