Intermediate Algebra
Final Exam Practice, Calculator Allowed

I. **Solve the following quadratic equations.**

1. $x^2 - 4x - 32 = 0$ 2. $2x^2 + 11x - 40 = 0$
3. $x^2 + 5x - 150 = 0$ 4. $25x^2 = 81$

II. **Solve using the quadratic formula.**

5. $2x(x - 3) = -3$ 6. $3x^2 + 6x = -2$
7. $x^2 - 4x + 5 = 0$ 8. $x(2x - 3) = 1$
9. $-2x(x + 1) = 3$

III. **Simplify the expressions. Write the result using positive exponents. Perform any possible numerical calculations.**

10. $x^3 \cdot y^{-4} \cdot y^{10}$ 11. $\left(\dfrac{4x^3}{6xy^{-2}}\right)^{-2}$ 12. $\dfrac{x^5 y^{-7}}{x^2 y^4}$

IV. **Formulas.**

13. The median price of a single-family home from 1980 to 1990 can be approximated by $P(x) = 3421x + 61{,}000$, where $x = 0$ corresponds to 1980 and $x = 10$ corresponds to 1990. Find the median price of a single-family home in 1985.

V. **Evaluate.**

14. Find the slope of the line passing through the points $\left(-2, \frac{1}{3}\right)$ and $(-1, 2)$.

15. Find the slope-intercept form of a line parallel to $y = 2 + 3x$, passing through the point $\left(\frac{1}{3}, 8\right)$.

16. Find the slope-intercept form of a line perpendicular to $y = \frac{2}{3}x + 1$, passing through $(-2, 3)$.

VI. **Sketch the following graphs.**
Shade the solution set in the xy-plane. Use a test point to help check your graph.

17. $x - 2y > 5$ 18. $\begin{array}{l} x - 2y > 4 \\ 2x + y \le -3 \end{array}$

Show any vertical asymptotes as dashed lines:

19. $f(x) = \dfrac{3.2}{x^2 - 1}$

VII. **Solve for x. Write your answers in interval notation.**

20. $2x - 4 < 2$ and $2x \ge x + 2$ 21. $2x - 3 \le 2$ or $3x < x + 4$

VIII. **Solve the problem.**

22. The area A of a rectangle is $5x^2 + 13x - 6$ and its width W is $x + 3$. Find the length L of the rectangle.

IX. **Simplify the following expressions by performing the indicated operations. Write all answers in simplified standard form. Write all fractions in lowest terms.**

23. $(4y + 3)(y^2 + 2y + 3)$ 24. $\dfrac{x^2 + 4}{x^2 - 4} \cdot \dfrac{x + 2}{x - 2}$

25. $\dfrac{2x - 6}{6x^2 - 15x} \div \dfrac{4x - 12}{18x^2 - 45x}$ 26. $4\sqrt[3]{16} - 5\sqrt[3]{2}$

27. $\sqrt{5} + 3\sqrt{2} - 7\sqrt{5}$ 28. $\dfrac{3 + 4i}{2i}$ 29. $\dfrac{2 + 3i}{4 - 2i}$

X. **Solve the following equations.**

30. $2x^2 + 2 = 5x$ 31. $\dfrac{x + 1}{5} = \dfrac{x}{3}$

XI.   Quadratic Applications.

   32.   Suppose that a cannon is launched upward with an initial velocity of 128 feet per second and is released 4 feet above the ground. Its height h in feet after t seconds is modeled by $h(t) = -16t^2 + 128t + 4$. When does the cannon reach its maximum height? What is this maximum height?

   33.   On wet pavement a safe braking distance d in feet for a car traveling x miles per hour is $d = \frac{s^2}{9}$. What speed corresponds to a stopping distance of 121 feet?

ANSWERS:

1.	$x = -4, x = 8$	2.	$x = -8, x = \frac{5}{2}$	3.	$x = -15, x = 10$
4.	$x = \frac{\pm 9}{5}$	5.	$x = \frac{3 \pm \sqrt{3}}{2}$	6.	$x = \frac{-3 \pm \sqrt{3}}{3}$
7.	$x = 2 \pm i$	8.	$x = \frac{3 \pm \sqrt{17}}{4}$	9.	$x = \frac{-1 \pm i\sqrt{5}}{2}$
10.	$x^3 y^6$	11.	$\frac{9}{4x^4 y^4}$	12.	$\frac{x^3}{y^{11}}$
13.	$\$78,105$	14.	$m = \frac{5}{3}$	15.	$y = 3x + 7$
16.	$y = \frac{-3}{2}x$	20.	$[2, 3)$	21.	$\left(-\infty, \frac{5}{2}\right]$
22.	$5x - 2$	23.	$4y^3 + 11y^2 + 18y + 9$	24.	$\frac{x^2 + 4}{(x-2)^2}$
25.	$\frac{3}{2}$	26.	$3\sqrt[3]{2}$	27.	$3\sqrt{2} - 6\sqrt{5}$
28.	$\frac{-4 + 3i}{-2}$	29.	$\frac{1 + 8i}{10}$	30.	$x = \frac{1}{2}, x = 2$
31.	$x = \frac{3}{2}$	32.	$t = 4 \, sec, h = 260 \, ft$	33.	$s = 33mph$