

MATH 11100 PRACTICE FINAL EXAM (Form B)

**Do all your work in the space provided. Show all necessary steps to receive full credit.
Place your final simplified answer in the space provided and/or circle your answer.**

1. For the compound inequality, give the solution set in both interval and graph the solution set.

$$7x + 6 \leq 48 \text{ and } -4x \geq -24$$

2.6(#30)



2. Solve the inequality. $|2x + 1| + 3 > 8$

2.7(#67)

3. Find the slope of the line through the pair of points, $(-2, -3)$ and $(-1, 5)$. 3.2(#21)

4. Decide whether the pair of lines is parallel, perpendicular, or neither.

$$x + 4y = 7 \text{ and } 4x - y = 3$$

3.2(#67)

5. Find an equation of the line that through $(8,5)$ and perpendicular to $2x - y = 7$. Write the equation in (a) slope-intercept form and in (b) standard form. 3.3(#67)

6. Let $f(x) = -3x + 4$ and $g(x) = -x^2 + 4x + 1$. Find $f(x+h)$. 3.5(#57)

7. Solve the system by substitution. If the system is inconsistent or has dependent equations, say so.

$$\begin{aligned}\frac{1}{2}x + \frac{1}{3}y &= 3 \\ -3x + y &= 0\end{aligned}$$

4.1(#29)

8. Pure acid is to be added to a 10% acid solution to obtain 54L of a 20% acid solution. What amounts of each should be used? 4.3(#19)

9. Simplify the expression so that no negative exponents appear in the final result. Assume that all variables represent nonzero real numbers.

$$\left(\frac{2p}{q^2}\right)^3 \left(\frac{3p^4}{q^{-4}}\right)^{-1} \quad 5.1(\#117)$$

10. For the pair of functions $f(x) = 4x^2 + 8x - 3$ and $g(x) = -5x^2 + 4x - 9$, find **(a)** $(f + g)(x)$ and **(b)** $(f - g)(x)$. 5.3(#15)

11. Divide. $(x^4 - 4x^3 + 5x^2 - 3x + 2) \div (x^2 + 3)$ 5.5(#43)

12. Factor the trinomial. $6x^2z^2 + 5xz - 4$ 6.2(#29)

13. Factor the polynomial. $64g^3 - 27h^3$ 6.3(#51)

14. Solve the equation. $(2x+1)(x-3) = 6x+3$ 6.5(#33)

15. A student tried to solve the equation, $9t^3 = 16t$ by first dividing each side by t , obtaining $9t^2 = 16$. She then solved the resulting equation by the zero-factor property to get the solution set $\left\{-\frac{4}{3}, \frac{4}{3}\right\}$. **WHAT WENT WRONG?** Give the correct solution set. 6.5(47)

16. Add or subtract as indicated. Write answers in lowest form.

$$\frac{2x+4}{x+3} + \frac{3}{x} - \frac{6}{x^2+3x} \quad 7.2(\#71)$$

17. Solve the formula for the specified variable.

$$\frac{PV}{T} = \frac{pv}{t} \text{ for } v \quad 7.5(\#13)$$

18. Find the root that is a real number.

$$\sqrt[3]{-64}$$

8.1(#17)

19. Evaluate the exponential.

$$\left(\frac{125}{27}\right)^{-\frac{2}{3}}$$

8.2(#35)

20. Simplify the expression. Write all answers with positive exponents. Assume that all variables represent positive real numbers.

$$p^{\frac{2}{3}}\left(p^{\frac{1}{3}} + 2p^{\frac{4}{3}}\right)$$

8.2(#83)

21. Express the radical in simplified form. Assume that all variables represent positive real numbers.

$$-\sqrt[3]{-125a^6b^9c^{12}}$$

8.3(#71)

22. Simplify. Assume that all variables represent positive real numbers.

$$3 \sqrt[3]{\frac{m^5}{27}} - 2m \sqrt[3]{\frac{m^2}{64}} \quad 8.4(\#55)$$

23. Solve the equation. $\sqrt[3]{x-8} + 2 = 0$ 8.6(\#45)

24. Solve the formula for the indicated variable.

$$V = \sqrt{\frac{2K}{m}} \text{ for } K \quad 8.6(\#65)$$

25. Find the quotient. $\frac{-7+4i}{3+2i}$ 8.7(\#61)

26. Solve the equation by completing the square.

$$5x^2 - 10x + 2 = 0$$

9.1(#57)

27. Find the value of a so that the equation, $am^2 + 8m + 1 = 0$ will have exactly one rational solution.

9.2(#57)

28. Solve the equation.

$$\frac{2}{x+1} + \frac{3}{x+2} = \frac{7}{2}$$

9.3(#21)

29. Solve the equation.

$$3x = \sqrt{16 - 10x}$$

9.3(#47)

30. Two ships leave port at the same time, one heading due south and the other heading due east. Several hours later, they are 170 miles apart. If the ship traveling south traveled 70 miles farther than the other ship, how many miles did they each travel? 9.4(#31)

31. A ball is projected upward from the ground. Its distance in feet from the ground in t seconds is given by $s(t) = -16t^2 + 128t$. At what times will the ball be 213 feet from the ground. 9.4(#45)

32. (a) Find the vertex of the following parabola. For the parabola, (b) decide whether the graph opens up, down, to the left, or to the right, and (c) whether it is wider, narrower, or the same shape as the graph of $y = x^2$. If it is a parabola with vertical axis, (d) find the discriminant and (e) use it to determine the number of x-intercepts.

$$f(x) = 2x^2 + 4x + 5 \qquad 9.6(\#11)$$

33. Solve the inequality, write the solution in interval form and graph the solution set.

$$(x - 4)(2x + 3)(3x - 1) \geq 0 \qquad 9.7(\#31)$$

34. If the function is one-to-one, find its inverse. $f(x) = 2x + 4$ 10.1(#13)

35. Solve the equation. $16^{2x+1} = 64^{x+3}$ 10.2(#19)

36. Solve the equation. $\log_x 125 = -3$ 10.3(#25)

37. Solve the equation. $\log_4(2x+4) = 3$ 10.3(#39)

38. The concentration of a drug injected into the bloodstream decreases with time. The intervals of time T when the drug should be administered are given by $T = \frac{1}{k} \ln \frac{C_2}{C_1}$, where k is a constant determined by the drug in use, C_2 is the concentration at which the drug is harmful, and C_1 is the concentration below which the drug is ineffective. Thus, if $T = 4$, the drug should be administered every 4 hours. For a certain drug, $k = \frac{1}{3}$, $C_2 = 5$, and $C_1 = 2$. How often should the drug be administered? 10.5(#42)

39. Solve the equation. Give solution to three decimals.

$$2^{x+3} = 5^x$$

10.6(#11)

BONUS:

40. Solve the equation. Give the exact solution.

$$\log_2 x + \log_2(x-7) = 3$$

10.6(#39)