

MATH11100 PRACTICE FINAL EXAM (Form A)

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. Solve the inequality. Give the solution set in both interval and graph form.

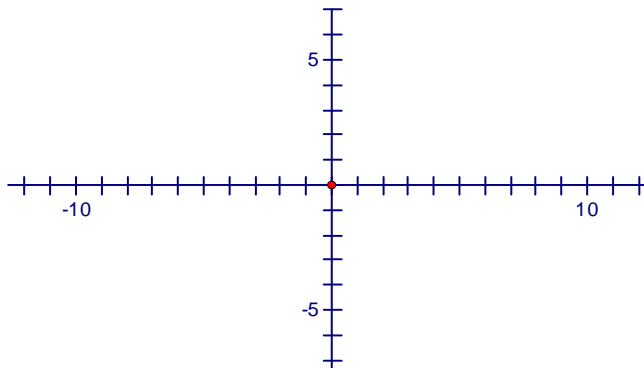
$$4 \leq -9x + 5 < 8 \qquad 2.5(\#59)$$

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

$$x + 1 > 3 \text{ or } -4x + 1 > 5 \qquad 2.6(\#43)$$

3. Find the x- and y-intercepts. Then graph the equation.

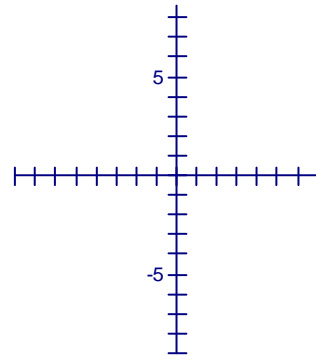
$$\frac{2}{3}x - 3y = 7 \qquad 3.1(\#41)$$



4. Find the slope of the line and sketch the graph.

$$5x - 2y = 10$$

3.2(#43)



5. Find an equation of the line through $(-5, 4)$ with a slope of $\frac{1}{2}$. Write the equation in (a) standard form and in (b) slope-intercept form. 3.3(#37)

6. Find an equation of the line passing through the points $(6, 1)$ and $(-2, 5)$. Write the equation in (a) standard form and in (b) slope-intercept form. 3.3(#53)

7. Decide whether the relation, $y = \sqrt{4x + 2}$, defines y as a function of x . Give the domain. 3.5(#35)

8. Solve the system by elimination. If the system is inconsistent or has dependent equations, say so.

$$3x + 3y = 0$$

$$4x + 2y = 3$$

4.1(#43)

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

$$7k^2(-2k)(4k^{-5})^0$$

5.1(#101)

10. Add or subtract as indicated.

$$(2a^2 + 3a - 1) - (4a^2 + 5a + 6)$$

5.2(#59)

11. Let $f(x) = x^2 + 4$, $g(x) = 2x + 3$, and $h(x) = x + 5$. Find $(h \circ g)(x)$.

5.3(#45)

12. Find the product. $(5r - s)^3$

5.4(#81)

13. Factoring by grouping. $m^3 + 4m^2 - 6m - 24$ 6.1(#49)

14. Factor the trinomial. $3(m + p)^2 - 7(m + p) - 20$ 6.2(#51)

15. Factor the polynomial. $x^5 + 3x^4 - x - 3$ 6.4(#69)

16. For the function, find all numbers that are not in the domain. Then give the domain in set notation.

$$f(x) = \frac{3x+1}{2x^2+x-6} \quad 7.1(\#15)$$

17. Multiply or divide as indicated. $\frac{6x^2 + 5x - 6}{12x^2 - 11x + 2} \div \frac{4x^2 - 12x + 9}{8x^2 - 14x + 3}$ 7.1(#91)

18. Simplify the complex fraction. $\frac{\frac{x^2 - 16y^2}{xy}}{\frac{1}{y} - \frac{4}{x}}$ 7.3(#15)

19. Solve the equation. $\frac{6}{w+3} + \frac{-7}{w-5} = \frac{-48}{w^2 - 2w - 15}$ 7.4(#33)

20. Dixie can paint a room in 3 hours working alone. Trixie can paint the same room in 6 hours working alone. How long after Dixie starts to paint the room will it be finished if Trixie joins her 1 hour later?

7.5(#55)

21. Simplify. $\sqrt[6]{(-2)^6}$ 8.1(#53)

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

$$\frac{\left(x^{\frac{1}{4}}y^{\frac{2}{5}}\right)^{20}}{x^2}$$

8.2(#71)

23. Simplify the radical. Assume that all variables represent positive real numbers.

$$\sqrt[3]{\frac{r^2}{8}}$$

8.3(#33)

24. Multiply, and then simplify the product. Assume that all variables represent positive real numbers.

$$(3\sqrt{x} - \sqrt{5})(2\sqrt{x} + 1)$$

8.5(#31)

25. Rationalize the denominator in the expression. Assume that all variables represent positive real numbers and no denominators are 0.

$$\frac{m-4}{\sqrt{m+2}}$$

8.5(#91)

26. Solve the equation. $\sqrt{3p+4} - \sqrt{2p-4} = 2$ 8.6(#53)

27. Add or subtract as indicated. $(-3-4i) - (-1-4i)$ 8.7(#33)

28. Use the quadratic formula to solve the equation
 $4x^2 - 4x = -7$ 9.2(#33)

29. Solve the equation for the indicated variable. (Leave \pm in your answer.)
 $S = 2\pi rh + \pi r^2$ for r 9.4(#16)

30. A rectangular piece of sheet metal has a length that is 4 in. less than twice the width. A square piece 2 in. on a side is cut from each corner. The sides are then turned up to form an uncovered box of volume 256 cu. in. Find the dimensions of the original piece of metal. 9.4(#41)

31. Identify the vertex of the parabola. $f(x) = (x+3)^2 - 4$

9.5(#9)

32. After experimentation, two Pacific Institute physics students find that when a bottle of California wine is shaken several times, held upright, and uncorked, its cork travels according to the function defined by $s(t) = -16t^2 + 64t + 3$, where s is its height in feet above the ground t seconds after being released. After how many seconds will it reach its maximum height? What is the maximum height?

9.6(#39)

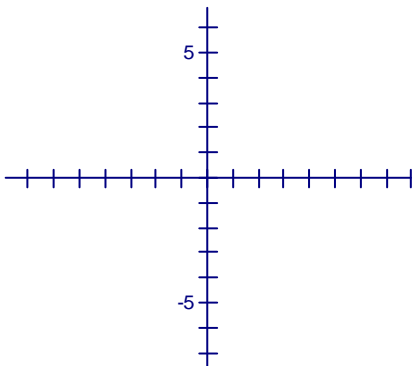
33. Solve the inequality, write the solution in interval form and graph the solution set.

$$\frac{x-3}{x+2} \geq 2$$

9.7(#41)

34. Graph the exponential function. $f(x) = 3^x$

10.2(#5)



35. Write in logarithmic form. $\left(\frac{1}{2}\right)^{-3} = 8$ 10.3(#5)

36. Solve the equation. $\log_8 32 = x$ 10.3(#33)

37. Use the properties of logarithms to write the expression as a single logarithm. Assume that all variables are defined in such a way that the variable expressions are positive, and bases are positive numbers not equal to 1.

$$(\log_a r - \log_a s) + 3\log_a t \quad 10.4(\#25)$$

38. Use the change-of-base rule to find the logarithm to four decimal places.

$$\log_{\pi} e \quad 10.5(\#53)$$

39. Solve the equation using natural logarithms. if appropriate, give solution to three decimal place accuracy.

$$\ln e^{3x} = 9$$

10.6(#19)

BONUS:

40. (a) What will be the amount A in an account with initial principal \$4000 if interest is compounded continuously at an annual rate of 3.5% for 6 years?

(b) To one decimal place, how long will it take for the initial amount to double?

10.6(#47)