



**Math 172 Practice Final**  
**Department of Mathematics**

Name (please print clearly): \_\_\_\_\_

Mark:

\_\_\_\_\_  
100

Signature: \_\_\_\_\_

Instructor: Patricia Wrean

Instructions:

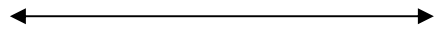
- Please fill out the above information but do not open this examination until told to begin. When told to begin, check that your exam is complete. There should be 12 pages in total, including this title page. This final exam is 3 hours long.
- No calculators are allowed.
- Show all of your work. Full marks will only be given when work is shown.

**GOOD LUCK!**

1. If  $A = \{1, 3, 5, 7, 9\}$ ,  $B = \{2, 4, 6, 8\}$ , and  $C = \{1, 2, 3, 4, 5\}$ , find  $A \cap (B \cup C)$ . (1 point)
  
2. For the set  $\left\{-6, \sqrt{3}, \frac{5}{2}, -1, 0, 1, 0.025, 0.3, 2.131313\dots\right\}$ , list all rational numbers which are NOT integers. (1 point)
  
3. Evaluate  $|2 - 6| - 2|4 - 11|$ . (1 point)
  
4. Evaluate  $-3 + 5 - 6 \times 3 - 4 + 8 \div 2$ . (1 point)
  
5. State whether the following is T (true) or F (false) for all non-zero real numbers. (1 point)  
$$2a^{-1} = \frac{1}{2a}$$
  
6. If  $x = 3$ ,  $y = -2$ , and  $z = -5$ , evaluate  $3x - \frac{1}{y} + 2z$ . (1 point)
  
7. Solve for  $x$ :  $2(x - 3) - 5 = 5 - (3 - 2x)$  (1 point)
  
8. Solve for  $x$ :  $\frac{1}{4}x - \frac{1}{5} = \frac{1}{5}x - \frac{4}{5}$  (2 points)

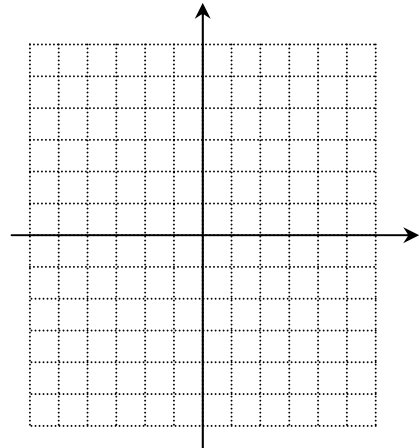
9. Solve for  $w$ :  $\frac{1}{x} + \frac{1}{w} = \frac{1}{z}$  (2 points)

10. Solve  $3 - 2x > 5x + 24$ . Graph the solution on the real number line and express it in interval notation. (2 points)



11. Determine the slope of a line passing through the points  $(0, -5)$  and  $(2, -2)$ . (1 point)

12. Graph  $\frac{1}{2}y - 2 = x$ . (2 points)

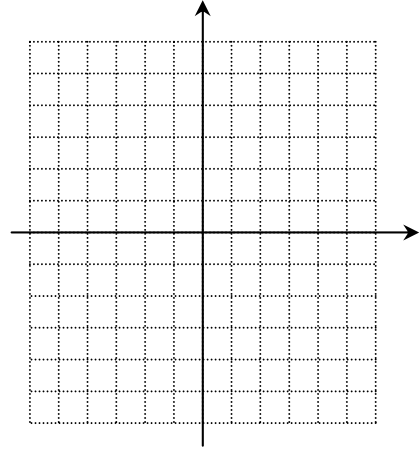


13. Determine the  $x$ - and  $y$ -intercepts for the line: (1 point)

$$\frac{3}{4}y = x + 2$$

14. Graph  $3x + 2y \leq 6$ .

(3 points)



15. Determine the equation of the line which passes through  $(2, -5)$  and is parallel to the line  $x = 2y - 5$ . Express your answer in slope-intercept form. (3 points)

16. Simplify the following and write your answer using only positive exponents. (3 points)

$$\frac{(a^2b^{-3})(2ab^2)^2}{(4a^5b^{-4})^{-2}}$$

17. Simplify  $(x^{-1} + y^{-1})^{-1}$ .

(2 points)

18. Simplify  $3^{2n-3} \cdot 3^{4-2n}$ . (1 point)

19. Evaluate the following. Leave your answer in scientific notation. (1 point)

$$\frac{25(4 \times 10^{-11})}{5 \times 10^{-3}}$$

20. Simplify  $(7 - x^2 - 2x) - (x^2 + 5x - 6)$ . (1 point)

21. Find the product  $2(3x - 5)(x + 3)$ . (1 point)

22. Determine the domain of  $\frac{3x}{x^2 - 4}$ . (1 point)

23. Use long division to determine  $(3x^3 - x^2 + 4x - 1) \div (x + 4)$ . Express your answer in the form quotient +  $\frac{\text{remainder}}{\text{divisor}}$ . (3 points)

24. Factor the following completely.

(4 points)

a)  $5x^2 + 13x + 6$

b)  $4x^4 + 32xy^3$

c)  $(t^2 - 1)^2 - 11(t^2 - 1) + 24$

25. Reduce to lowest terms:  $\frac{5b - 10a}{2a - b}$ .

(1 point)

26. Simplify  $\frac{18a^3b^4}{c^9} \div \frac{12ab^6}{7c^2}$ .

(2 points)

27. Write as a single fraction:  $\frac{3}{x} + \frac{x-2}{xy^2}$ .

(1 point)

28. Simplify  $\frac{2x^2 + 7x - 15}{4x^2 - 100} \cdot \frac{2x^2 - 9x - 5}{4x^2 - 1}$ . (3 points)

29. Simplify  $\frac{3}{x^2 + 7x + 6} - \frac{x + 2}{x + 6}$ . (2 points)

30. Simplify  $\frac{\frac{x-1}{x+2} - \frac{x-2}{x+3}}{\frac{x-3}{x+3} + \frac{x+1}{x+2}}$ . (3 points)

31. Solve for  $x$ :  $\frac{5}{4x-2} - \frac{1}{1-2x} = \frac{7}{3x+6}$ . (3 points)

32. Evaluate  $\frac{(3^{-6})^{1/2}}{2^{-6}}$ . (1 point)

33. Simplify  $\sqrt[4]{80x^{12}y^7}$ . Assume that all variables are non-negative. (2 points)

34. Simplify  $\frac{3ab\sqrt[5]{2b}}{\sqrt[5]{24a^2}}$ . (3 points)

35. Simplify  $(3\sqrt{3}-\sqrt{2})(\sqrt{2}+\sqrt{3})$ . (2 points)



36. Simplify  $\sqrt{45x^3} - \sqrt{18x^2} + \sqrt{50x^2} - \sqrt{20x^3}$ . Assume that all variables are non-negative. (2 points)

37. Rationalize the denominator of the following expression and simplify. (2 points)

$$\frac{2 - \sqrt{3}}{\sqrt{2} - \sqrt{6}}$$

38. Solve for  $m$ . (2 points)

$$(m - 2)^{3/4} = 2$$

39. Write in the form  $a + bi$ : (2 points)

$$\frac{2 + i}{3 - 2i}$$

40. Solve by factoring: (3 points)

$$(x + 15)^2 - 3(x + 15) - 18 = 0$$

41. Solve using the even-root property:

(3 points)

$$\left(w + \frac{2}{3}\right)^2 = \frac{5}{9}$$

42. Solve by completing the square:

(3 points)

$$2x^2 - x = 3$$

43. Solve using the quadratic formula:

(2 points)

$$v^2 + v + 6 = 0$$

44. How many real solutions does  $2x^2 - 5x + 6$  have?

(1 point)

45. Solve the following system:

(3 points)

$$\begin{cases} 2x - y = 4 \\ x - 3 = y \end{cases}$$

46. While riding his bike home from Camosun last week, Darrell got a flat tire after 20 minutes and had to walk the rest of the way, which took him another half an hour. His walking speed is one-third of his cycling speed. If his total trip was 7.5 km, what is Darrell's speed while cycling? (3 points)

47. Find two real numbers that have a sum of 8 and a product of 2. (3 points)

48. How many litres of 6% acid solution should be mixed with 20 litres of 20% acid solution to obtain a 16% acid solution? (4 points)

49. Dorothy has \$7000 in total to invest for one year, which she splits into three investments paying 5%, 8%, and 10% per year. The income from the 5% and 10% investments added together is \$500, while the income from the 8% and 10% investments added together is \$480. How much did she invest at each rate? (4 points)