

Math 71A – Final Exam Review Exercises

Note: It is important to understand that these review exercises are not guaranteed to cover all of the potential problems on the final exam. Please review the notes, practice problems, tests, and homework problems to fully prepare for the final exam. Now, take a deep breath, and get to it! 😊

1. Find the solution set for each of the following equations.

- a. $2|x - 3| - 7 = 10$
- b. $|3x - 4| + 10 = 2$
- c. $|5x - 1| = |2 - 3x|$
- d. $12x^3 - 10x^2 - 12x = 0$
- e. $(x + 3)(x + 2) = 2$
- f. $\frac{x}{x+1} + \frac{5}{x} = \frac{1}{x^2+x}$
- g. $\frac{2x-1}{x^2+2x-8} + \frac{2}{x+4} = \frac{1}{x-2}$
- h. $\frac{2x+7}{x+5} - \frac{x-8}{x-4} = \frac{1}{x^2+x-20}$

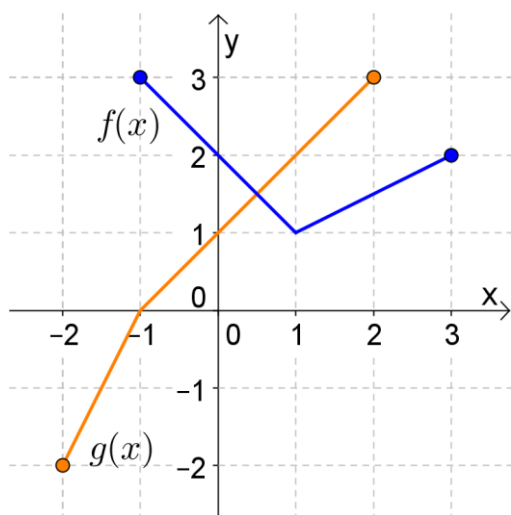
2. Solve $d = ab + bc$ for b .

3. Solve the formula for t : $\frac{ct}{1+t} = p$

4. Find the domain of $f(x) = \frac{1}{x+8} + \frac{3}{x-7}$ and write your answer using interval notation.

5. Find the domain of $f(x) = \frac{(x-2)^2}{x^2-13x+36}$ and write your answer using interval notation.

6. Find each of the following for the graph below.



- a. $(f + g)(-1)$
- b. $(g - f)(1)$
- c. $(fg)(-2)$
- d. $\left(\frac{g}{f}\right)(0)$
- e. The domain of $f(x)$.
- f. The domain of $g(x)$.
- g. The domain of fg .

7. Given that $f(x) = -2x^2 + 1$, find $f(x - 1) - f(3x)$ and simplify.

8. Given that $f(x) = 3x^2 + 2x$, find $f(a + h) - f(a)$ and simplify.

9. Suppose $f(x) = \frac{2+x}{3}$ and $g(x) = 3x - 2$. Find $\left(\frac{g}{f}\right)(0)$ and $(fg)(1)$.

10. Suppose $f(x) = \frac{9x}{x-4}$ and $g(x) = \frac{7}{x+8}$. Find $\left(\frac{f}{g}\right)(1)$ and $(g - f)(2)$.

11. Find and graph the solution set for each of the following inequalities. Write your solution using interval notation.

a. $1 - \frac{4x+7}{6} < \frac{1-x}{3}$

b. $6 - 5x > 1 - 3x$ and $4x - 3 \geq x - 9$

c. $6 - 5x > 1 - 3x$ or $4x - 3 \geq x - 9$

d. $-3|x - 2| + 1 \leq -8$

e. $-2|3x - 5| > 2$

12. Solve the system. Write the solution as a set.

$$x + y + z = 5$$

$$2x + z = 8$$

$$3y + 2z = 5$$

13. Write the slope-intercept form of the equation for the line passing through $(-2, 2)$ and parallel to the line whose equation is $2x - 3y = 7$.

14. Write the slope-intercept form of the equation for the line passing through $(1, 3)$ and perpendicular to the line whose equation is $3x + 2y = 6$.

15. Graph the equation $y = |x| - 2$. Be sure to plot the points on the graph at $x = -2, -1, 0, 1,$ and 2 .

16. Graph the solution set of the following system of inequalities:

$$x - 2y \leq 4$$

$$2y \geq 4x - 2$$

17. Graph the solution set of the following system of inequalities:

$$3x + y \leq 6$$

$$x \geq -2$$

$$y \leq 4$$

18. Factor completely, or state that the polynomial is prime.

a. $-5x^5 - 40x^2$

b. $8x^3y^4z - 6x^2y^5z^3 + 2xy^3z^2$

c. $16x^6 - 20x^5 - 6x^4$

d. $15x^4 - 39x^3 + 18x^2$

e. $9x^4 + 16y^4$

f. $81x^4 - 16y^4$

g. $2ax + 6ay - bx - 3by$

h. $-x^3 + 2x^2 + 4x - 8$

i. $x^2 + x + 1$

j. $54 - 2y^3$

19. Perform the indicated operation and simplify.

a. $(10x^4y^3 - 3x^2y^3 + 2xy) + (-16x^4y^3 - 4x^2y - xy)$

b. $(13x^5 + 9x^4 - 7x^2 + 3x + 6) - (-9x^5 - 7x^3 + 8x^2 + 11)$

c. $(x^2 - 2x + 3)(x^2 + x + 1)$

$$d. \frac{x}{x^2-5x+6} + \frac{3}{3-x}$$

$$e. \frac{7}{3y^2+y-4} - \frac{9y+2}{3y^2-2y-8}$$

$$f. \frac{x^2-4}{x^2+3x+2} \cdot \frac{x^2-5x+4}{4x^2-24x+32}$$

$$g. \frac{2y-2x}{15y^3} \div \frac{x^2-y^2}{3x^2+6xy+3y^2}$$

20. Simplify:

$$\frac{\frac{5y}{y^2-5y+6}}{\frac{3}{y-3} + \frac{2}{y-2}}$$

21. Simplify:

$$\frac{\frac{6}{2x-8} + \frac{10}{x^2-4x}}{\frac{1}{x^2-x-12} - \frac{2}{x^2-16}}$$

22. Divide.

$$a. (x^3 - 2x^2 + 2x - 5) \div (x + 1)$$

$$b. \frac{5x^4-2x^3+x^2+7x-12}{x^2-3}$$

23. What is the degree of the following polynomial?

$$3xy^3 + 3x^2y^4 - 4x^5 + 2y - 1$$

24. The length of a rectangular carpet is 4 feet greater than twice its width. If the area is 48 square feet, find the carpet's length and width.

25. Suppose you wanted to mix a 10% acid solution with a 60% acid solution to make 50 ounces of a 30% acid solution. How many ounces of the 10% solution and how many ounces of the 60% solution should be mixed?

26. A company called Snacks R Us decides to mix peanuts (which are \$0.75 per pound) and dried banana slices (which are \$1.50 per pound). How many pounds of peanuts and how many pounds of dried banana slices do they need to make a 20-pound mixture that would cost \$1.05 per pound?

27. Working alone, you can mow the lawn in 3 hours. Working with your friend, you can do it in 2 hours. How long would it take your friend to do the job alone?

28. Working together, you and your friend can vacuum a house in 45 minutes. If you can vacuum twice as fast as your friend, how long would it take your friend to vacuum the house?