

Math 95 Final Review (Fall 2024)

This final review is formatted to be similar to the final exam. The final exam will have 50 questions. You will be able to bring one 3" × 5" index card (front and back) and a scientific calculator for the exam.

Multiple Choice: Choose the best possible answer.

1. Solve the equation: $-\frac{2}{3}(w + 3) = \frac{1}{3}(w + 2)$
 - a. $w = -\frac{8}{3}$
 - b. $w = \frac{4}{3}$
 - c. $w = \frac{5}{6}$
 - d. $w = \frac{8}{3}$

2. Simplify $6^2 + 4^{-1} - 7^0$
 - a. $\frac{145}{4}$
 - b. 39
 - c. 40
 - d. $\frac{141}{4}$

3. Solve for x: $x(18x - 1) = 5$
 - a. $x = -\frac{5}{9}, \frac{1}{2}$
 - b. $x = -\frac{5}{9}, -\frac{1}{2}$
 - c. $x = \frac{5}{9}, \frac{1}{2}$
 - d. $x = \frac{5}{9}, -\frac{1}{2}$

4. Simplify $\left(\frac{-2x^2y^{-1}}{4x^{-2}y^2}\right)^0$
 - a. $\frac{-1x^4}{2y^3}$
 - b. 0
 - c. $\frac{-1}{2y}$
 - d. 1

5. Which of the following polynomials is not factorable?
 - a. $x^3 + 1$
 - b. $4x^2 + 12x + 9$
 - c. $5x^2 + 9x + 8$
 - d. $64x^2 - 9$

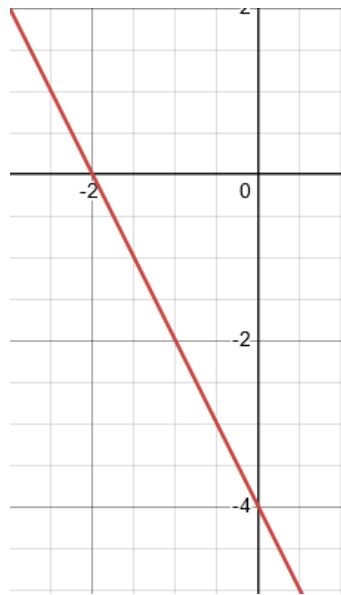
6. If $f(x) = 2x^2 - 7x + 6$, evaluate $f(-1)$.
 - a. -3
 - b. 15
 - c. 1
 - d. 11

7. Determine the equation of the line containing the points (4, -5) and (7, 1)
 - a. $y = 2x - 13$
 - b. $y = -6x + 1$
 - c. $y = \frac{1}{2}x - 7$
 - d. $y = -\frac{1}{6}x - \frac{13}{3}$

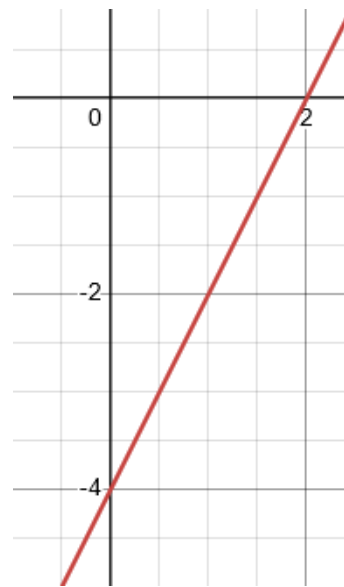
8. Determine the slope of the lines parallel and perpendicular to $y = 3x - 5$.

- a. Parallel slope is 3 and the perpendicular slope is $-\frac{1}{3}$
- b. Parallel slope is -3 and the perpendicular slope is $\frac{1}{3}$
- c. Parallel slope is $-\frac{1}{3}$ and the perpendicular slope is 3
- d. Parallel slope is $\frac{1}{3}$ and the perpendicular slope is -3

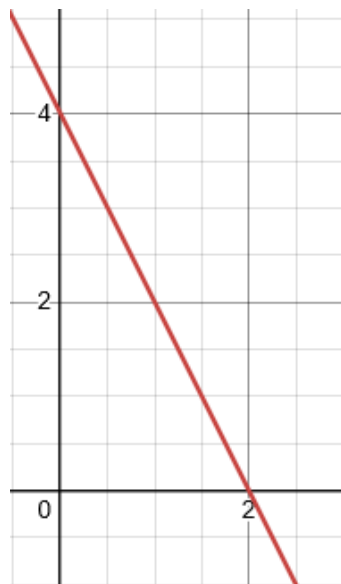
9. Determine the graph for the given equation: $6x + 3y = 12$



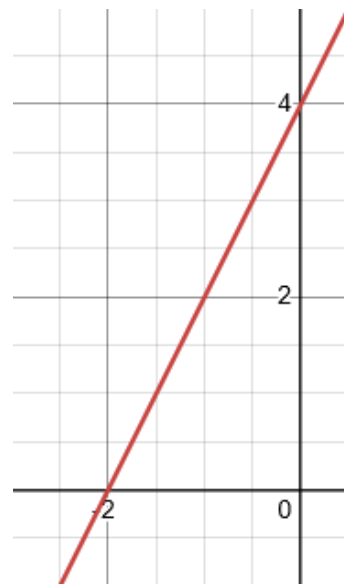
a.



b.

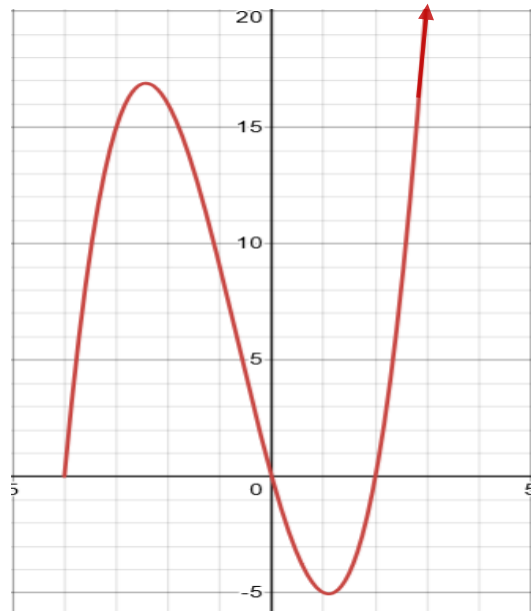


c.



d.

Use the following graph for problems 10 – 12.



10. Find the domain and range of $f(x)$.

- | | | | | | |
|----|---------|---------------------|----|---------|----------------|
| a. | Domain: | $(-\infty, \infty)$ | b. | Domain: | $[-4, \infty)$ |
| | Range: | $(-\infty, \infty)$ | | Range: | $[-5, \infty)$ |
| c. | Domain: | $[-5, \infty)$ | d. | Domain: | $(-4, \infty)$ |
| | Range: | $[-4, \infty)$ | | Range: | $(-5, \infty)$ |

11. Evaluate $f(0)$.

- | | | | | | | | |
|----|----|----|---|----|----------|----|---|
| a. | -4 | b. | 2 | c. | -4, 0, 2 | d. | 0 |
|----|----|----|---|----|----------|----|---|

12. Find the values of x for which $f(x) = 0$.

- | | | | | | | | |
|----|----------|----|---------|----|----------------|----|-------------|
| a. | $x = -4$ | b. | $x = 0$ | c. | $x = -4, 0, 2$ | d. | $x = -4, 2$ |
|----|----------|----|---------|----|----------------|----|-------------|

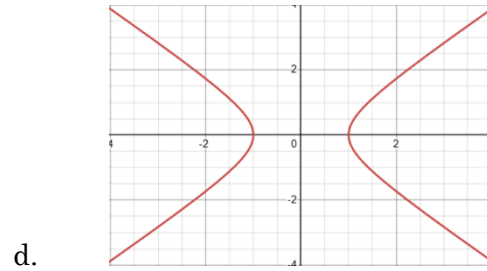
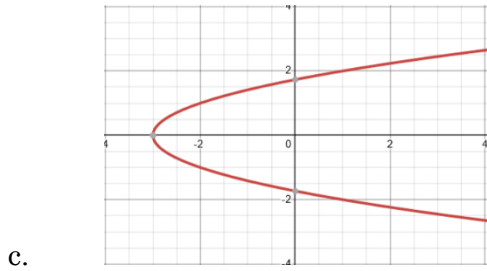
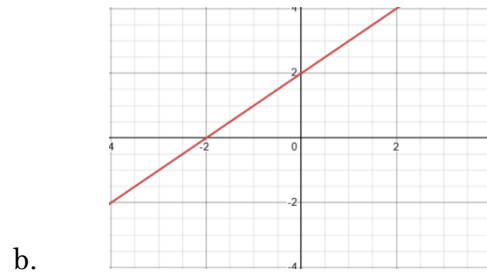
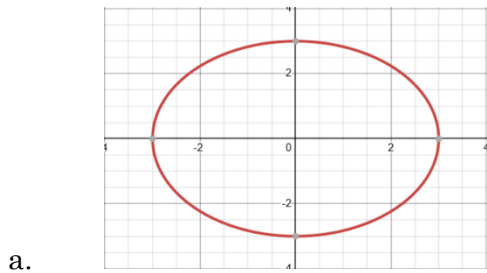
13. Solve the equation: $9 - (c + 2) + 3c = 9c + 28$

- | | | | | | | | |
|----|----------|----|---------|----|----------------------|----|--------------|
| a. | $c = -3$ | b. | $c = 5$ | c. | $c = -\frac{21}{11}$ | d. | $c = -314$. |
|----|----------|----|---------|----|----------------------|----|--------------|

14. Solve for a : $5a^3 - 5a^2 - 60a = 0$

- | | | | | | | | |
|----|----------------|----|---------|----|-------------|----|----------------|
| a. | $a = 3, 0, -4$ | b. | $a = 0$ | c. | $a = -3, 4$ | d. | $a = -3, 0, 4$ |
|----|----------------|----|---------|----|-------------|----|----------------|

15. Which graph represents a function?



16. Find the x and y intercepts of the line: $2y = 3x + 12$

a. x-intercept: $(-4, 0)$
y-intercept: $(0, 6)$

b. x-intercept: $(0, -4)$
y-intercept: $(6, 0)$

c. x-intercept: $(6, 0)$
y-intercept: $(0, 4)$

d. x-intercept: $(4, 0)$
y-intercept: $(0, 6)$

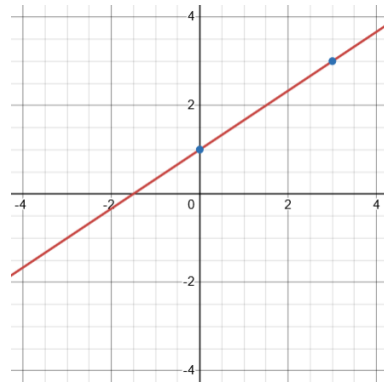
17. Find the equation of the line shown:

a. $y = -\frac{2}{3}x - 1$

b. $y = \frac{2}{3}x + 1$

c. $y = \frac{3}{2}x + 1$

d. $y = \frac{3}{2}x - 1$



18. Solve the system: $x + y = 0$

$$3x - 2y = 10$$

a. $(-2, 2)$

b. $(2, -2)$

c. $(-13, 13)$

d. $(-5, 5)$

19. Solve the system: $-2x + 3y = -9$
 $6x - 9y = -27$
- a. $(-3, 9)$ b. *No Solution* c. $(0, 0)$ d. $\{(x, y) \mid 2x - 3y = 9\}$
20. Solve the inequality: $3(x - 2) \geq 9(x + 2)$
- a. $(-\infty, -4]$ b. $[4, \infty)$ c. $(-\infty, -4)$ d. $(-\infty, -2]$
21. Solve the compound inequality: $\frac{x}{3} - 2 \geq 1$ or $5 + \frac{3}{4}x \leq -4$
- a. $[-12, 9]$ b. $(-\infty, -3) \cup (3, \infty)$
c. $(-\infty, -12] \cup [9, \infty)$ d. $(-\infty, \infty)$
22. Solve the compound inequality: $4x + 2 \geq 10$ and $2x - 6 < 4$
- a. $[2, 5)$ b. $(2, 5)$ c. $(5, 2]$ d. *No Solution*
23. Factor completely: $2m^3 - 5m^2 - 8m + 20$
- a. $(2m - 5)(m + 4)(m - 4)$ b. $(2m - 5)(m^2 + 4)$
c. $(2m - 5)(m + 2)(m - 2)$ d. *No Solution*
24. Determine whether $36x^2 + 48x + 16$ is a perfect square. If so, choose the correct factorization.
- a. Yes; $(6x - 4)^2$ b. Yes; $(6x - 4)(6x + 4)$
c. Yes; $(6x + 4)^2$ d. No
25. Subtract: $-4x^2 + 2x - (-5x^2 + 2x + 3)$
- a. $-9x^2 - 3$ b. $-9x^2 + 4x - 3$
c. $x^2 - 3$ d. $x^2 + 3$
26. Multiply: $(3x - 4)^2$
- a. $9x^2 - 16$ b. $9x^2 + 24x + 16$
c. $9x^2 - 24x + 16$ d. $9x^2 + 16$
27. Multiply: $(2a + 5)(a^2 - 3a + 2)$
- a. $2a^3 + a^2 - 11a + 10$ b. $2a^3 - a^2 - 11a + 10$
c. $a^2 - 11a + 10$ d. $2a^3 - 11a^2 - 9a + 10$

28. Factor completely: $5t^2 - 21t + 18$

a. $(t - 3)(5t - 6)$

b. $(5t - 3)(t - 6)$

c. $(t + 3)(5t + 6)$

d. *Does not factor*

29. Factor completely: $16a^2 - 81b^2$

a. $(4a - 9b)(4a - 9b)$

b. $(4a + 9)(4a - 9)$

c. $(4a + 9b)(4a - 9b)$

d. $(16a + 81b)(16a - 81b)$

30. Multiply and simplify, if possible: $\frac{4v-8}{5v} \cdot \frac{15v^2}{4v^2-16v+16}$

a. $-\frac{60v^3}{20v^3-80v^2+80v}$

b. $\frac{3v^2}{v^2-2v}$

c. $\frac{3v}{v-2}$

d. $\frac{3v}{v+2}$

31. Where is the rational expression $\frac{2x^2+11x+5}{x+6}$ undefined?

a. $x = -6$

b. $x = -2, -\frac{1}{2}$

c. $x = 2, \frac{1}{2}$

d. $x = 6$

32. Divide by using long division: $(3x^4 + x^3 - 8x^2 + 3x + 3) \div (x^2 - 3)$

a. $3x^2 + x + 1 + \frac{6x+6}{x^2-3}$

b. $3x^2 + x + 1 - \frac{6}{x^2-3}$

c. $3x^2 + x + 1$

d. $3x^2 + 1$

33. Subtract and simplify, if possible: $\frac{8p}{p^2-16} - \frac{p}{p-4}$

a. $\frac{p}{p+4}$

b. $\frac{7p}{p^2-p-12}$

c. $-\frac{p}{p-4}$

d. $-\frac{p}{p+4}$

34. Simplify the rational expression:

$$\frac{\frac{x-8}{8} - \frac{x}{1}}{\frac{1}{8} + \frac{1}{x}}$$

a. $x - 8$

b. $x + 8$

c. $\frac{x-8}{x+8}$

d. $\frac{x+8}{x-8}$

35. Solve the rational equation: $\frac{3}{x} + \frac{3}{x-6} = \frac{3x-15}{x-6}$

a. $x = 1$

b. $x = 1, 6$

c. $x = -\frac{5}{2}, \frac{1}{3}$

d. *No solution*

36. Simplify $\frac{2x^2+9x+4}{x^2+x-12}$
- a. $x + 4$ b. $\frac{2x+1}{x-3}$ c. $\frac{2x+1}{x+4}$ d. $\frac{2x-1}{x+3}$
37. Solve for x: $\sqrt{5x-6} + 10 = 12$
- a. $x = \frac{8}{5}$ b. $x = 2$ c. $x = 5$ d. $x = -2$
38. Simplify: $\sqrt[3]{-125x^4y^6}$
- a. $-5xy^2\sqrt[3]{x}$ b. $5x^2y^3\sqrt[3]{5}i$ c. $-125x^{\frac{4}{3}}y^2$ d. $5xy^2\sqrt[3]{x}i$
39. Express using radical notation and simplify $x^{\frac{7}{3}}y^{\frac{4}{3}}$
- a. $x^2y^3\sqrt[3]{xy}$ b. $x^2y^3\sqrt[3]{xy}$ c. $(xy)^{\frac{11}{3}}$ d. $\sqrt[7]{x^3}\sqrt[4]{y^3}$
40. Simplify: $\sqrt[4]{\frac{3x^6}{16y^8x}}$
- a. $\frac{3x^4\sqrt[4]{x}}{16y^2}$ b. $\frac{x^3}{4y^4}\sqrt[4]{\frac{3}{x}}$ c. $\frac{x^4\sqrt[4]{3x^3}}{2y^2}$ d. $\frac{x^4\sqrt[4]{3x}}{2y^2}$
41. Simplify: $-121^{\frac{1}{2}}$
- a. $11i$ b. -11 c. $-\frac{121}{2}$ d. $\frac{121}{2}i$
42. Simplify: $2\sqrt{12} + 3\sqrt{75} - \sqrt{3}$
- a. $4\sqrt{3}$ b. $18\sqrt{3}$ c. $4\sqrt{84}$ d. $8\sqrt{21}$
43. Multiply: $(3 + \sqrt{x})(4 - 2\sqrt{x})$
- a. $12 - 2x$ b. $6x$ c. $12 - 2\sqrt{x} - 2x$ d. $24x - 12$
44. Rationalize the following denominator: $\frac{\sqrt{3}}{1-\sqrt{3}}$
- a. $\frac{3+3\sqrt{3}}{-2}$ b. $-\frac{3\sqrt{3}}{2}$ c. $\frac{3+\sqrt{3}}{-2+2\sqrt{3}}$ d. $\frac{-(3+\sqrt{3})}{2}$

45. Find the domain of $f(x) = \sqrt{x-9}$ in interval notation.
a. $(-\infty, -9]$ b. $[9, \infty)$ c. $[-9, \infty)$ d. $(9, \infty)$
46. Simplify: $(27a^{-6}b^9)^{\frac{5}{3}}$ Express your answer with all positive powers
a. $\frac{243a^{10}}{b^{15}}$ b. $\frac{243b^{10}}{a^{15}}$ c. $\frac{243b^{15}}{a^{10}}$ d. $243a^{10}b^{15}$
47. Solve by using the square root property: $225x^2 + 81 = 0$
a. $x = \frac{9}{15}i$ b. $x = \pm 9i$ c. $x = \pm \frac{9}{15}i$ d. $x = \pm \frac{9}{125}i$
48. Solve by using the quadratic formula: $x^2 + 8x - 4 = 0$
a. $x = -4, 8$ b. $x = -2, -4$ c. $x = -4 \pm 4\sqrt{5}$ d. $x = -4 \pm 2\sqrt{5}$
49. If you were to complete the square for the equation $x^2 + 16x = -20$, what value would you add to both sides of the equation?
a. 16 b. 8 c. 64 d. -64
50. Simplify: $(-128)^{\frac{4}{7}}$
a. 16 b. 4 c. -4 d. -16

Answer Key

- | | | | |
|-----|---|-----|---|
| 1. | A | 26. | C |
| 2. | D | 27. | B |
| 3. | D | 28. | A |
| 4. | D | 29. | C |
| 5. | C | 30. | C |
| 6. | B | 31. | A |
| 7. | A | 32. | A |
| 8. | A | 33. | D |
| 9. | C | 34. | A |
| 10. | B | 35. | A |
| 11. | D | 36. | B |
| 12. | C | 37. | B |
| 13. | A | 38. | A |
| 14. | D | 39. | A |
| 15. | B | 40. | D |
| 16. | A | 41. | B |
| 17. | B | 42. | B |
| 18. | B | 43. | C |
| 19. | B | 44. | D |
| 20. | A | 45. | B |
| 21. | C | 46. | C |
| 22. | A | 47. | C |
| 23. | C | 48. | D |
| 24. | C | 49. | C |
| 25. | C | 50. | A |