

Math 0702 Review Problems – Final Exam

The following set of problems is only a sample of the type of problems that might appear on the Final Exam. In addition to working through the problems in this review, you should retake your quizzes and tests from the semester and review the exercises that were assigned.

Evaluate problems 1 - 6.

1. $(-3)^4$

2. -3^4

3. -3^{-4}

4. $(-3)^{-4}$

5. $\frac{1}{-3^{-4}}$

6. $\left(\frac{1}{-3}\right)^{-4}$

7. Solve these equations.

a. $7x + 7 = -14$

b. $0.7(y - 14) - 0.5y = 32.2$

c. $(z + 5) - 7 = (z - 7) + 5$

d. $-(y + 5) - (2 + 7y) + 8y = 3y - 8$

e. $10x - 5(x + 4) + 9 = -11 + 5x + 21$

f. $-8b + 6 + 6b = -3b + 11 + b$

g. $-\frac{1}{2}(2x - 4) = \frac{3}{5}(5x - 10)$

h. $\frac{x}{3} + \frac{2 - 3x}{6} = \frac{5}{18}$

8. Solve these inequalities and use interval notation to define the solution sets.

a. $-13 + x > -12$

b. $-3(4 - 2x) \leq 18$

c. $3x - 4(2 - x) < 3(x - 2) - 4$

d. $-4 < 2x + 5 \leq 19$

9. Solve these compound inequalities and use interval notation to define the solution sets.

a. $\frac{1}{6} < \frac{4x - 3}{3} \leq \frac{4}{5}$

b. $x \geq 2$ and $x < -5$

c. $3x - 5 > 6$ or $-x < -5$

d. $x \leq 2$ or $x > -5$

e. $-2x \leq 6$ and $-2x + 3 < -7$

10. Solve each absolute value equation.

a. $|x - 8| - 19 = 0$

b. $\left|\frac{x}{2} - 7\right| = \frac{5}{2}$

c. $|4x + 11| + 8 = 3$

d. $|1 - 3x| = 0$

e. $4|x - 5| + 10 = 18$

f. $\left|\frac{1}{2}x + 6\right| = \left|8 - \frac{2}{3}x\right|$

11. Solve these absolute value inequalities. Write the solution sets using interval notation.

a. $|2x - 4| < 6$

b. $\left|\frac{4x - 4}{5}\right| \geq 8$

c. $|5x + 2| \leq 0$

d. $|3x - 2| + 2 > 6$

e. $|2x - 3| \geq -5$

f. $|2 - 3x| - 7 < -2$

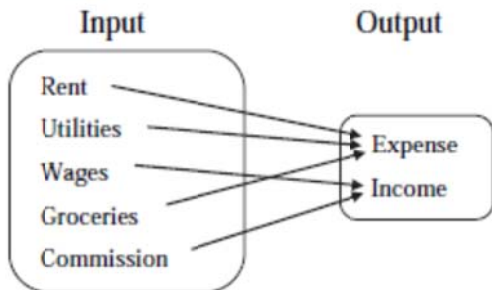
12. Find the domain and range of each relation. Determine whether each relation is a function.

a. $\{(0, 3), (1, 1), (2, 2), (1, -2)\}$

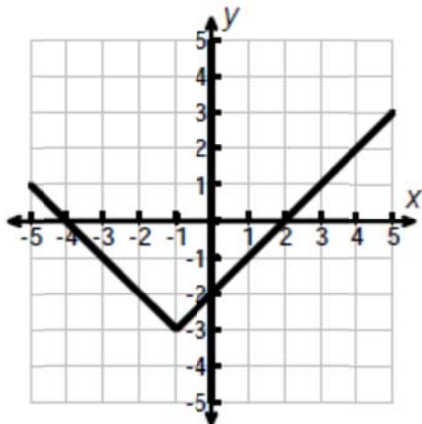
b. $\{(-4, 3), (-2, 2), (0, 1), (2, 0)\}$

c. $\{(5, 3), (7, 3), (4, 2), (-1, 2)\}$

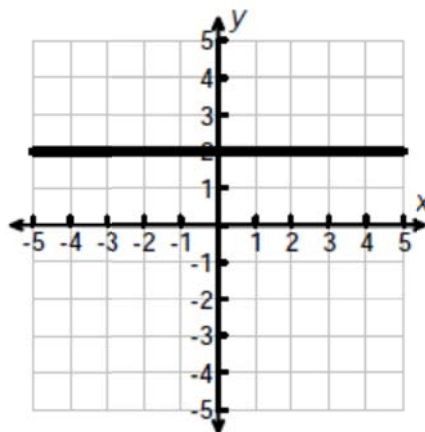
d.



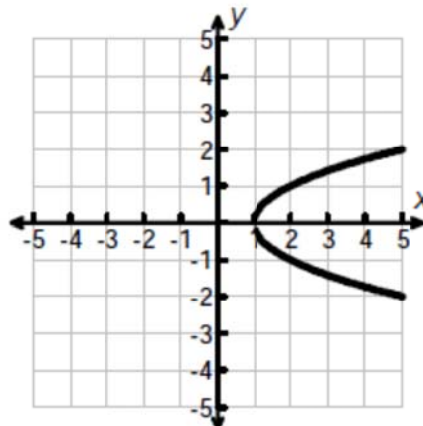
e.



f.



g.



13. Find the domain.

a. $f(x) = 3x^2 - \frac{1}{2}x + 5$

b. $g(x) = \frac{-8}{|4+x|}$

c. $g(x) = \frac{x+5}{4x-12}$

d. $f(x) = |x-6|$

14. Decide whether or not the given ordered pair is a solution for the given equation.

a. $y = \frac{3}{4}x - 2$; $(-12, -11)$

b. $5x + 3y = 35$; $(4, 5)$

15. Given the following functions, find the indicated values. Show the step of substituting.

a. $f(x) = 4x - 6$; $f(-3)$

b. $g(x) = 5x^2 + 12x - 3$; $g(3)$

c. $h(x) = 5$; $h(-2)$

d. $R(x) = \frac{9}{x-3}$; $R(-12)$

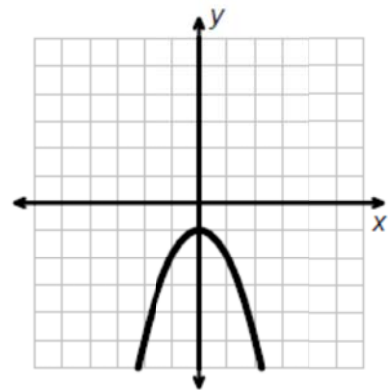
16. Answer the following questions. The function $y = g(x)$ is graphed below. Use it to answer questions pertaining to the function g .

a. If $f(-2) = 7$, write the corresponding ordered pair.

b. Find $g(1)$.

c. Find all values of x such that $g(x) = -1$.

d. Find all values of x such that $g(x) = -5$.



17. Find the x - and y -intercepts for the graphs of the following equations, then graph them.

a. $x - 2y = 5$

b. $2x + 3y = 6$

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

18. Determine the slope and y -intercept of the graphs of these equations.

a. $f(x) = \frac{3}{5}x - 2$

b. $4x - 3y = 7$

c. $y = -5$

19. Graph these linear equations by the method of your choosing.

- a. $-4x - 16y = -20$
- b. $f(x) = 2x + 4$
- c. $3x - 8 = y$
- d. $2x + 5 = 0$
- e. $y = 3x$

20. Determine the slope of the line through the given points.

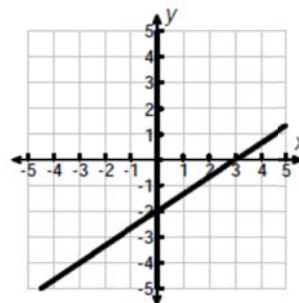
- a. $(-4, 2)$ and $(-3, -5)$
- b. $(5, 3)$ and $(7, 3)$

c. Find the slope in this problem.

What is the slope of a road that rises 25 feet vertically for every 200 feet of Horizontal distance?

d. Match the graph with its equation.

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



21. Write the equation of the line using the information given in the indicated form.

- a. $m = \frac{1}{4}$; y -intercept is -3 ; slope-intercept form
- b. $m = -\frac{3}{7}$; y -intercept $(0, 5)$; use function notation
- c. through the points $(2, -6)$ and $(-3, -5)$; use function notation
- d. through the points $(3, 2)$ and $(4, 5)$; slope-intercept form

22. Determine whether the graphs of the equations are parallel lines, perpendicular lines, or neither. Show work justifying your responses.

- a. $3x - 8y = 14$
 $32x + 12y = 14$
- b. $y = 4x - 4$
 $16x + 4y = 6$

23. Write the equation of the line in slope-intercept form through the point $(-2, 4)$ and perpendicular to the line, $2x + y = -4$.

24. Solve the following systems of equations graphically. Then classify the system as consistent or inconsistent and the equations as dependent or independent.

- a. $\begin{cases} y = 3x + 7 \\ 3x + 2y = -4 \end{cases}$
- b. $\begin{cases} y = 3x + 4 \\ y = 3x - 2 \end{cases}$
- c. $\begin{cases} y - 3x = 6 \\ 6x - 2y = -12 \end{cases}$

25. Solve these systems of equations by substitution or elimination.

- a. $\begin{cases} 4x + 3y = -1 \\ y = 2x - 7 \end{cases}$
- b. $\begin{cases} 3y = x - 2 \\ 2x - 6y = 4 \end{cases}$
- c. $\begin{cases} \frac{1}{2}x - \frac{3}{4}y = -\frac{1}{2} \\ \frac{1}{8}x + \frac{3}{4}y = \frac{19}{8} \end{cases}$
- d. $\begin{cases} 2x - 4y = 22 \\ 5x - 10y = 15 \end{cases}$

26. Use systems of equations to solve these problems.

- A pharmacist needs 70 liters of a 50% alcohol solution. She has available a 30% alcohol solution and an 80% alcohol solution. How many liters of each solution should she mix to obtain the solution she desires.
- A train leaves a station and travels north at a speed of 105 mph. Two hours later, a second train leaves on a parallel track and travels north at 135 mph. How far from the station will they meet?
- An airplane flew for 5 hours with a 20 km/hr tailwind and returned in 7 hours against the same wind. Find the speed of the plane in still air.

Evaluate problems 27 - 40 by performing the indicated operation and simplifying. Your answers should be expressed without negative exponents.

27. 3^{-2}

28. $\left(\frac{3}{2}\right)^{-3}$

29. $x \cdot x^{-8}$

30. $x^{12} \div x^3$

31. $\frac{p^2}{p^{-7}}$

32. $\frac{x^2}{x^{-3}}$

33. $(-4x^5)(-5x^3)$

34. $(4x^7y^2)(-6xy^3)$

35. $(-2x^0y^3)(4x^2y^4) + (2y^5)(3xy)^2$

36. $(-2x^{-2}y^3)^{-4}$

37. $(2^3a)^5$

38. $\left(\frac{x^5}{y^5z^8}\right)^3$

39. $\frac{(2y)^{-3}}{y^{-1} \cdot y^3}$

40. $\frac{(3a)^{-3}}{(a^{-5}b^3)^{-2}}$

Combine the polynomials in problems 41 - 50 according to the operation indicated and simplify.

41. $(3x^2 - 8x + 2) + (4x^2 - 2x - 9)$

42. $(-5x^2 + 7x - 9) - (-2x^2 - 8x + 6)$

43. $(-5x^5 + 7x^7 + 9 + 6x^6) - (-2 + 3x^6 + 9x^7 - 8x^5)$

44. $-3a^3(2a^4 + 5a - 7)$

45. $\left(\frac{1}{7}x^8\right)\left(-\frac{1}{4}x^2\right)$

46. $(3x - 5)(4x + 7)$

47. $(7x - 3)^2$

48. $\left(x + \frac{1}{6}\right)\left(x - \frac{1}{6}\right)$

49. $(x - 7)(2x^2 + 3x - 4)$

50. $(x + 7)(x - 7)(x^2 + 49)$

51. If $f(x) = 2x^2 - x$, find the following.

a. $f(n - 2)$

b. $f(a + h) - f(a)$

Completely factor the polynomials in problems 52 - 69.

52. $6y - 18$

53. $4x^2y^3 - 12x^3y^2$

54. $x^2 - 12x + 35$

55. $x^2 - 5x - 36$

56. $2p^5 + 54p^2$

57. $10a^2 - 19a + 6$

58. $4x^2 - 28x + 49$

59. $x^2 - 25$

60. $8x^2 + 14x - 15$

61. $x^4 - 81$

62. $-4x^2 + 64$

63. $2 - 18a^2$

64. $mn + mp - 7n - 7p$

65. $5x^3 + 10x^2 - 75x$

66. $y^2 - \frac{1}{144}$

67. $36 + x^2$

68. $x^3 - y^3$

69. $r^6 + t^9$

Solve the equations given in problems 70 - 76.

70. $x(x - 4) = 0$

71. $\left(\frac{3}{8}z\right)\left(z - \frac{1}{3}\right) = 0$

72. $y^2 = 4y + 12$

73. $6x^2 - 7x = 5$

74. $3b^3 - 9b^2 = 54b$

75. $a(3a + 16) = -16$

76. $x^3 + 4x^2 = x + 4$

Solve application problem 77.

77. Suppose an object is thrown upwards with an initial velocity of 64 feet per second off the edge of a 960-foot Cliff. The height $h(t)$ in feet of the object after t seconds is given by the function, $h(t) = -16t^2 + 64t + 960$.

- a. Determine the height of the object after 2 seconds.
- b. Determine how long it takes the object to strike the ground.

78. Evaluate the rational expression, $f(x) = \frac{3x - 5}{x^2 - 4}$, for the given values of x .

- a. $f(3)$
- b. $f(0)$
- c. $f(-2)$

79. Find the value(s) of the variable for which the following are defined. State the domain of each function using interval notation.

a. $R(x) = \frac{3x - 5}{x + 3}$

b. $Q(x) = \frac{x^2 - 36}{x^2 - 5x - 24}$

80. Reduce the following rational expressions to lowest terms.

a. $\frac{-8r^5s^2t^7}{12r^{10}st^3}$

b. $\frac{7x - x^2}{x^2 - 10x + 21}$

c. $\frac{a^3 + b^3}{a^2 - b^2}$

d. $\frac{y^2 - 5y - 14}{y^2 + 11y + 18}$

Find the following sums, differences, products, or quotients. Express answers reduced to lowest terms and assume all variables have nonzero values. (Problems 81 - 88)

81. $\frac{3m^2n}{9x^2y} \cdot \frac{27x^4y^3}{6mn}$

85. $\frac{r^2 + 6r + 9}{r^2 + 7r + 12} \cdot \frac{r^2 + 4r}{r^2 - 3r - 18}$

82. $\frac{12x^5y^4}{7a^3b^2} \div \frac{4x^2y}{21a^2b}$

86. $\frac{a^2 - 36}{a^2 - 8a + 16} \div \frac{3a - 18}{a^2 - a - 12}$

83. $\frac{3xy - 6x}{a^3} \div \frac{2x - xy}{a^4}$

87. $\frac{8y^3 + 27}{64y^3 - 1} \div \frac{4y^2 - 9}{16y^2 + 4y + 1}$

84. $\frac{8x^2 - 4x}{2x^2 + 5x - 3} \cdot \frac{x^2 - 9}{2x}$

88. $\frac{9x^2}{x^2 - 16y^2} \div \frac{1}{x^2 + 4xy} \cdot \frac{x - 4y}{3x}$