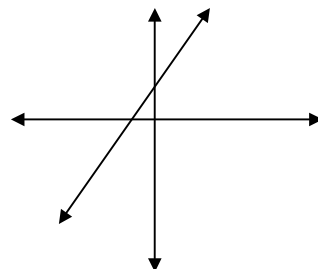


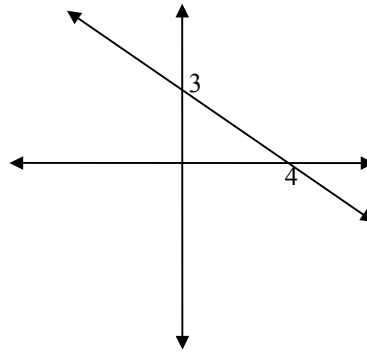
MATH 111: Algebra
PRACTICE PROBLEMS (ENTIRE COURSE)

1. Simplify: $-3(4m - 2) + 2(3m - 1) - (4m + 1)$
a) $-10m - 7$ b) $-10m + 3$ c) $-10m + 5$ d) $-10m - 2$ e) other _____
2. Simplify: $7 - 4[x - 5(4 - 2x)]$
a) $33x - 60$ b) $-27x - 60$ c) $36x + 87$ d) $-44x + 87$ e) other _____
3. Solve: $7(2x - 3) - 4(3x - 5) = 4 + 6x - 13$
a) - 8 b) 1 c) 2 d) - 2 e) other _____
4. Solve: $2x + 4 - x = 4x - 5$ The solution is:
a) - 1/3 b) 1/3 c) - 3 d) 3 e) other _____
5. Solve: $.13y - .08(y + 6) = 1.02$ The solution is:
a) 300 b) 30 c) .3 d) .03 e) other _____
6. A blouse is on sale for 45% off. The sale price is \$33. Find the regular price of the blouse.
a) \$47.85 b) \$55 c) \$60 d) \$65 e) other _____
7. The John Hancock Center in Chicago has a rectangular base. The length of the base measures 65 feet less than twice the width. The perimeter is 860 feet. What is the width of the base?
a) 121.67 ft. b) 247.5 ft. c) 154 ft. d) 165 ft. e) other _____
8. Ed sold his house for \$99,000. He got this amount knowing he would have to pay a 6% commission to his agent. What amount did he have after the agent was paid?
a) \$93,060 b) \$92,500 c) \$95,743 d) \$104,940 e) other _____
9. Solve the inequality: $-14 - (2x + 1) \leq 3x + 2(x - 4)$
a) $x \leq 1$ b) $x \geq 1$ c) $x \leq -1$ d) $x \geq -1$ e) other _____
10. For which equation is this the graph?
a) $y = x - 1$ b) $y = x + 1$
c) $y = -x + 1$ d) $y = -x - 1$
e) other _____

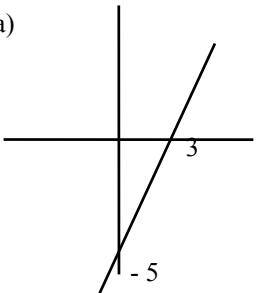
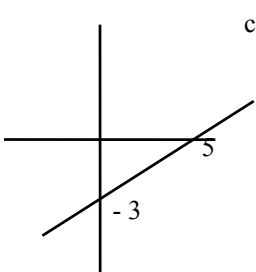
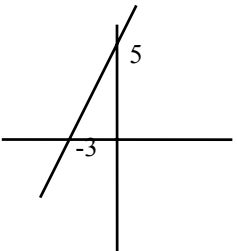
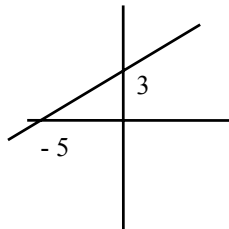


11. For which equation is this the graph?

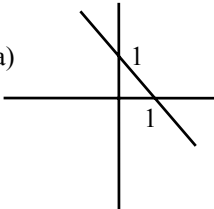
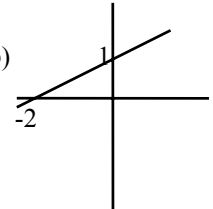
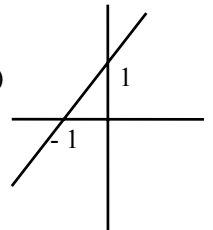
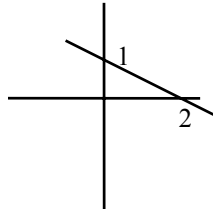
- a) $3x = 4y + 12$ b) $3x + 4y = 12$
 c) $4x + 3y = 12$ d) $4y = 3x + 12$
 e) other _____



12. Which of the following is a graph of $3x - 5y - 15 = 0$?

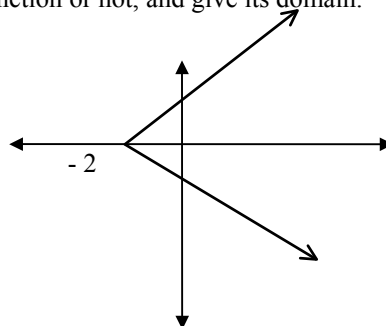
- a)  b)  c)  d) 
 e) other _____

13. Which of the following is a graph of $y = -\frac{1}{2}x + 1$?

- a)  b)  c)  d) 
 e) other _____

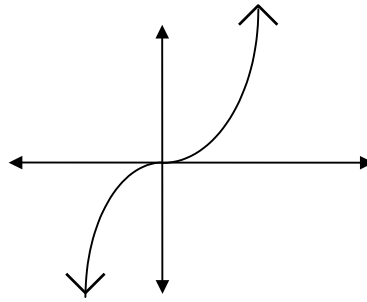
14. Decide whether the relation graphed below is a function or not, and give its domain.

- a) is a function, domain $(-\infty, \infty)$
 b) is not a function, domain $(-\infty, \infty)$
 c) is a function, domain $[-2, \infty)$
 d) is not a function, domain $[-2, \infty)$
 e) other _____



15. Decide whether the relation graphed below is or is not a function, and give the domain.

- a) is a function, domain $(-\infty, \infty)$
- b) is not a function, domain $(-\infty, \infty)$
- c) is a function, domain $(-3, 3)$
- d) is not a function, domain $(-3, 3)$
- e) other _____



16. For the function $f(x) = \sqrt{6x+7}$, find $f(-1)$.

- a) 0
- b) $\sqrt{13}$
- c) 13
- d) 1
- e) other _____

17. Suppose $f(x) = -3x + 4$ and $g(x) = -x^2 + 4x + 1$. Then find $f(g(-2))$.

- a) 10
- b) -9
- c) 31
- d) -59
- e) other _____

18. Gladis Herst invested \$6500 in two bank accounts, one paying 4% simple interest and the other paying 6%. If her annual interest from the two accounts is \$344, how much did she invest at 6%?

- a) \$2300
- b) \$3200
- c) \$4200
- d) \$2400
- e) other _____

19. Marco runs at 10 miles per hour. Sharon runs from the same place in the same direction at 12 miles per hour. How long will it take before Sharon has run 1 mile farther than Marco?

- a) 1 hour
- b) 1/2 hour
- c) 3/4 hour
- d) 2 hours
- e) other _____

20. Peanuts sell for \$2 a pound and cashews for \$8 a pound. If 5 pounds were sold for a total of \$22, how many pounds of peanuts were sold?

- a) 2 pounds
- b) 3 pounds
- c) 1.5 pounds
- d) 3.5 pounds
- e) other _____

21. It takes a boat 2 hours to travel 16 miles downstream and 8 hours for the return trip. Find the speed of the boat in still water.

- a) 3mph
- b) 8mph
- c) 10mph
- d) 5 mph
- e) other _____

22. Subtract: $(x^4 - 5x^3 + 8x - 3) - (-2x^4 - 3x + 4)$

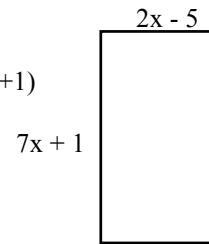
- a) $-x^4 - 5x^3 + 5x + 1$
- b) $3x^4 - 2x^3 + 8x - 7$
- c) $3x^8 - 5x^3 + 11x^2 + 1$
- d) $3x^4 - 5x^3 + 11x - 7$
- e) other _____

23. Multiply: $(4z - 2)(z^2 + 3z + 5)$

- a) $4z^3 + 10z^2 + 14z - 10$
- b) $z^2 + 12z - 10$
- c) $4z^2 + 12z - 12$
- d) $4z^3 - 10$
- e) other _____

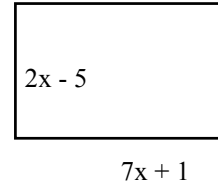
24. What polynomial expression represents the perimeter of this rectangle?

- a) $(2x - 5) + (7x + 1)$ b) $18x - 4$ c) $9x - 4$ d) $2(2x - 5) + 2(7x + 1)$
 e) other _____



25. What polynomial expression represents the area of this rectangle ?

- a) $(2x - 5)(7x + 1)$ b) $14x - 5$ c) $14x^2 - 5$ d) $14x - 4$
 e) other _____



26. When $30n^2 + 65n + 25$ is factored completely, one factor is:

- a) $(6n^2 + 13n + 5)$ b) $(3n + 1)$ c) $(2n + 5)$ d) $(2n + 1)$ e) other _____

27. Factor completely: $25a^2 + 30ab + 9b^2$

- a) $(5a + 3b)^2$ b) $(5a + 9b)(5a + b)$ c) $(5a - 3b)^2$ d) prime e) other _____

28. Solve: $-5x - 3 = -12x^2$. One of the solutions is:

- a) $4/3$ b) $-4/3$ c) $1/3$ d) $-1/3$ e) other _____

29. A building has a floor area of 140 square meters. The building is rectangular with length 4 meters more than the width. Find the perimeter of the building.

- a) 10 meters b) 140 meters c) 70 meters d) 196 meters e) other _____

30. Divide: $\frac{r^2 - r - 12}{r^2 - 2r - 8} \div \frac{3r^2 + 10r + 3}{2r^2 + 3r - 2}$

- a) $\frac{2r - 1}{3r + 1}$ b) $\frac{2r + 1}{3r - 1}$ c) $\frac{2r - 1}{3r - 1}$ d) $\frac{r + 2}{r + 3}$ e) other _____

31. Add: $\frac{8}{x^2 - 6x} + \frac{-1}{2x - 12}$

- a) $\frac{8 - x}{2x(x - 6)}$ b) $\frac{16 - x}{2x(x - 6)}$ c) $\frac{-8}{x - 6}$ d) $\frac{-8}{2x(x - 6)}$ e) other _____

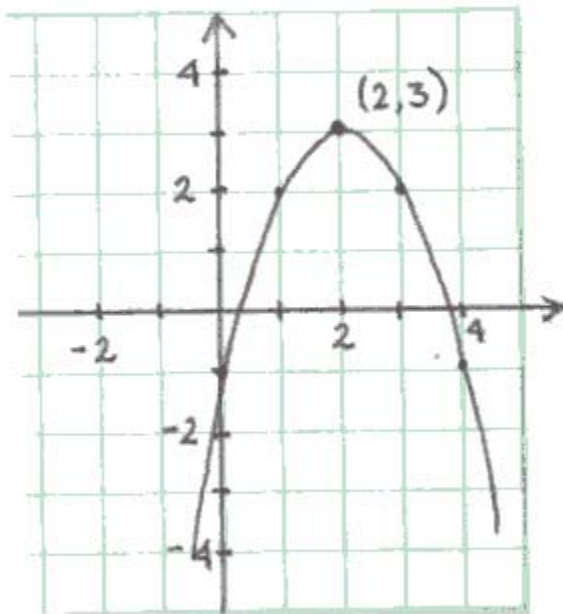
32. Solve: $\frac{3}{x + 4} = \frac{2}{x - 9}$

- a) 9 b) 35 c) 4 d) -4 e) other _____

33. Solve: $\frac{3}{k+2} - \frac{2}{k^2-4} = \frac{1}{k-2}$
- a) 5 b) 2 c) 4 d) 6 e) other _____
34. David can process an order in 12 minutes. Martha can process an order in 9 minutes. How long would it take David and Martha to process an order together?
- a) 3 min. b) $5\frac{1}{7}$ min. c) 8 min. d) $10\frac{1}{2}$ min. e) other _____
35. If t varies inversely as s , and $t = 3$ when $s = 5$, find s when $t = 2$.
- a) $10/3$ b) 15 c) $6/5$ d) 30 e) other _____
36. $\sqrt[3]{5832}$
- a) 18 b) 16 c) 14 d) 12 e) other _____
37. Multiply and simplify: $\sqrt{6xy^2} \cdot \sqrt{12x^2y^2}$ You may assume all variables represent non-negative numbers.
- a) $72x^3y^4$ b) $6xy\sqrt{xy^2}$ c) $6xy^2\sqrt{x}$ d) $6xy^2\sqrt{2x}$ e) other _____
38. Simplify: $\left(\frac{3xy^{-1}z^2}{4x^{-2}yz^5}\right)^{-2}$
- a) $\frac{-6x^3}{8y^2z^3}$ b) $\frac{16y^4z^6}{9x^6}$ c) $\frac{4y^2z^3}{3x^3}$ d) $-\frac{9x^6}{16y^4z^6}$ e) other _____
39. Simplify: $\frac{16 \pm 4\sqrt{6}}{12}$
- a) 16 ± 2 b) $\frac{16 \pm \sqrt{6}}{3}$ c) $\frac{4 \pm \sqrt{6}}{3}$ d) $4 \pm \sqrt{6}$ e) other _____
40. Solve $x^2 + 3x + 1 = 0$. One solution is
- a) $\frac{-3 - \sqrt{5}}{2}$ b) $\frac{-3 + \sqrt{7}}{2}$ c) $-\frac{1}{2}$ d) $\frac{-3 + \sqrt{13}}{2}$ e) other _____
41. Find the decimal approximation, rounded to the nearest thousandth, for $\frac{7 \pm \sqrt{3}}{2}$.
- a) 7.866 and 6.134 b) 7.866 and -6.134 c) 2 and 5 d) 4.366 and 2.634 e) other _____
42. Simplify $-|6 - 9| - |-1|$
- a) -4 b) -2 c) 4 d) -14 e) other _____

43. Subtract $\frac{1}{t+6} - \frac{1}{t}$
- a) $-\frac{6}{t(t-6)}$ b) $-\frac{6}{t(t+6)}$ c) $-\frac{2t-6}{t(t-6)}$ d) $\frac{1}{6}$ e) other _____
44. Factor completely $a^4 - b^4$
- a) $(a^2 - b^2)^2$ b) $(a-b)(a+b)(a^2 + b^2)$ c) $(a^2 - b^2)(a^2 + b^2)$
d) $(a-b)^2(a+b)^2$ e) other _____
45. The legs of a right triangle measure 6 meters and 10 meters. Find the measure of the hypotenuse. (Round your answers to the nearest thousandth, if necessary.)
- a) 8 meters b) 11.662 meters c) 16 meters d) 18.974 meters e) other _____
46. It costs \$350 to get the well-digging company out, plus \$40 for each foot (deep) they drill. If we let d represent the depth (in feet) that they drill, which expression represents the total cost for the well?
- a) $40(350 + d)$ b) $40 + 350d$ c) $(40 + 350)d$ d) $350 + 40d$ e) other _____
47. Subtract $-3w^2 + 5w - 2$ from $5w^2 + 8w + 1$
- a) $2w^2 + 3w - 1$ b) $8w^2 + 3w + 3$ c) $8w^2 + 13w - 1$ d) $2w^2 + 13w + 3$ e) other _____
48. Mac can paint an entire house in 7 hours less than it would take Jack to paint the house. If they work together, they can get the house painted in 12 hours. How long would it take Jack to paint the house alone?
- a) 5 hours b) 19 hours c) 21 hours d) 28 hours e) other _____
49. Simplify: $\frac{\frac{3}{x-1} + \frac{1}{x}}{\frac{2}{x-1} + \frac{2}{x}}$
- a) $\frac{4x-1}{4x-2}$ b) $\frac{1}{2}$ c) 1 d) $\frac{3}{2}$ e) other _____

50. This is most likely the graph of which function?



- a) $y = (x - 2)^2 + 3$
- b) $y = -(x - 2)^2 + 3$
- c) $y = (x + 2)^2 + 3$
- d) $y = -(x + 2)^2 - 1$
- e) other _____

51. Given that $f(x) = x^2 - 3x + 7$, and k is a real number. Then $f(k) = ?$

- a) $\frac{k^2 - 3k + 7}{k}$
- b) $kx^2 - 3kx + 7$
- c) $k^2x^2 - 3kx + 7$
- d) $k^2 - 3k + 7$
- e) other _____

52. A triangular garden in a city park has an area of 60 square feet. Its height is 1 foot less than twice its width. Find its width.

- a) 7.5 ft
- b) 8 ft
- c) 12 ft
- d) 15 ft
- e) other _____

53. Solve the inequality and express the solution in interval form:

$$\frac{2x - 5}{x + 3} \geq 0$$

- a) $[-3, 2.5]$
- b) $(-\infty, -3) \cup [2.5, \infty)$
- c) $[-2.5, 3)$
- d) $(-3, 2.5]$
- e) other _____

54. Simplify: $(5 - 2i\sqrt{3})(1 + 2i\sqrt{3})$

- a) $5 + 4\sqrt{3}$
- b) 17
- c) $17 + 8i\sqrt{3}$
- d) $-7 + 8i\sqrt{3}$
- e) other _____

55. Solve: $2x^2 = x + 7$ The solutions are

- a) irrational, one positive and one negative
- b) both irrational and negative
- c) not real (both imaginary)
- d) both the same
- e) other _____

56. Solve and check: $\sqrt{x - 2} + 1 = \sqrt{x - 3}$ The solution set contains

- a) one positive number
- b) one negative number
- c) two positive numbers
- d) no solutions
- e) other _____

57. Solve and check: $\frac{3}{x-1} + \frac{x}{2x+1} = \frac{8x+1}{2x^2-x-1}$ The solution set contains

- a) one positive number only b) one positive number and one negative number c) two positive numbers
 d) no solutions e) other _____

58. Simplify: $\frac{2}{x-3} - \frac{1}{x+3}$

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

- a) $\frac{1}{x}$ b) $\frac{1}{3x+9}$ c) $\frac{1}{x+6}$ d) $\frac{1}{4x}$ e) other _____

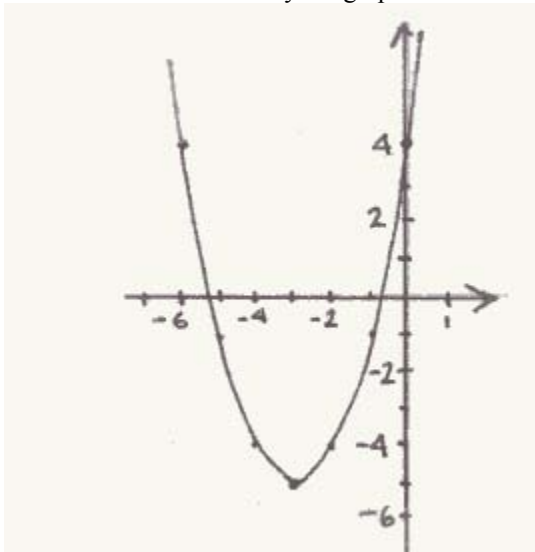
59. An oil tank is being filled by two pipes, but the oil is flowing at different rates. The first pipe alone could fill the tank in 4 hours less than it would take the second pipe alone. Together, both pipes can fill the tank in six hours. How long would it take the first pipe alone to fill the tank (rounded to nearest .1 hour)?

- a. 1.7 hours b) 2.0 hours c) 10.3 hours d) 14.3 hours e) other _____

60. Solve: $\frac{1}{6}x^2 + x + 9 = 0$ The two solutions are:

- a) not real (both imaginary) b) irrational, one positive and one negative c) rational, one positive and one negative
 d) irrational, both negative e) other _____

61. This is most likely the graph of:



- a) $f(x) = (x+3)^2 - 5$
 b) $f(x) = (x-3)^2 + 5$
 c) $f(x) = (x+3)^2 + 4$
 d) $f(x) = (x-3)^2 + 4$
 e) other _____

62. The length of a rectangle is 3.5 feet less than its width, and its area is 36 square feet. Find its perimeter.

- a) 8 ft b) 12.5 ft c) 24 ft d) 25 ft e) other _____

63. Solve and check $\sqrt{2x+5} + \sqrt{x+3} = 2$ The solution set contains
 a) one positive number only b) one positive number and one negative number c) two negative numbers
 d) no solutions e) other _____
64. Solve the inequality and write the solution in interval form: $\frac{3x-2}{x+4} \geq 1$
 a) $(-\infty, -4) \cup \left[\frac{2}{3}, \infty\right)$ b) $[-3, 4)$ c) $(-4, 3]$ d) $(-\infty, -4) \cup [3, \infty)$ e) other _____
65. Simplify $(\sqrt{3}-2i)(\sqrt{3}+3i)$
 a) $\sqrt{3}+6$ b) $\sqrt{3}-6$ c) $9+i\sqrt{3}$ d) $2\sqrt{3}+i$ e) other _____
66. Subtract $-5x^2+3-2x$ from $2x^2-4x+1$
 a) $-3x^2-6x+4$ b) $-3x^2-x-1$ c) $7x^2-6x-2$ d) $7x^2-2x-2$ e) other _____
67. A potter has fixed costs of \$740 per month, plus an average cost of \$13 for each piece she makes. If we let p be the number of pieces she made last month, then which expression represents her total cost last month? (There were 30 days last month.)
 a) $740+13p$ b) $740(12)+13p(30)$ c) $30(740+13p)$ d) $\frac{740+13p}{30}$ e) other _____
68. Given $f(x) = 2x^2 + 3x - 4$, find and simplify $f(x+h)$.
 a) $2x^2 + 4xh + 2h^2 + 3x + 3h - 4$ b) $2x^2 + 2h^2 + 3x + 3h - 4$ c) $5x^2 + 5h^2 - 4$
 d) $5x^3 + 5h^3 - 4$ e) other _____
69. Sam owns two classic cars, a '57 Chevy and a '59 Mustang. Because the Mustang is not in very good condition, he figures that the Chevy is worth about \$3,200 more than twice the value of the Mustang. If we let M represent the value of the Mustang, then which expression would represent how much his two cars are worth together?
 a) $m + 3200$ b) $2m + 3200$ c) $2m + 6400$ d) $3m + 3200$ e) other _____

Answers

1. b 2. d 3. c 4. d 5. b 6. c 7. d 8. a 9. d 10. b 11. b 12. b 13. d 14. d 15. a
 16. d 17. e:37 18. c 19. b 20. b 21. d 22. d 23. a 24. d 25. a 26. d 27. a 28. d 29. e: 48 meters
 30. a 31. b 32. b 33. a 34. b 35. d 36. a 37. d 38. b 39. c 40. a 41. d 42. a 43. b 44. b
 45. b 46. d 47. b 48. d 49. a 50. b 51. d 52. b 53. b 54. c 55. a 56. d 57. a 58. a 59. c
 60. a 61. a 62. d 63. e. one negative 64. d 65. c 66. d 67. a 68. a 69. d