

SUMMER WORK FOR ALGEBRA III

Show all work on the actual worksheet except for graphs. Circle your final answer. If your final answer is incorrect, erase your work and start over. **No Calculators** allowed for any problem!

I. Simplify each expression as much as possible.

1. $21 + (-33) + 7$

2. $6 + [-(8-14) + (-3)]$

3. $[8-(2-6)]-[-4+(-1+3)]$

4. $3x - 4y - (5x - 6y)$

5. $3 - 2(x - 3y) + 4(2x - 5y)$

6. $3 + 12 \div 4 - 6 \cdot 2 - 1$

7. $3 + 4 \cdot 8 \div 2 \cdot 4 - 3$

8. $|3 - 7| - 2|4 - 6|$

9.
$$\frac{|3-8| - |5+(-1)|}{-|6-5|}$$

10. $\sqrt{125}$

11. $2\sqrt{6} + 3\sqrt{8} - \sqrt{24} - 5\sqrt{18}$

12. $\frac{\sqrt{14}}{\sqrt{63}}$

13. $\sqrt{\frac{15}{35}}$

14. $\sqrt[3]{81}$

15. $\sqrt[3]{\frac{5}{4}}$

16. $\frac{3}{2 + \sqrt{2}}$

17. $\frac{6x^2 + 11x - 35}{3x - 5}$

18. $\frac{3x^2 - 2x - 16}{2x^2 + x - 6}$

19. $\frac{x^2 - x - 20}{12 - x - x^2} \cdot \frac{2x^2 - 5x - 3}{2x^2 - 9x - 5}$

$$20. \quad \frac{7}{3x} - \frac{3}{2x^2}$$

$$21. \quad \frac{xy}{x^2 - y^2} - \frac{x}{x - y}$$

$$22. \quad \frac{x^{-3}y^4}{x^5y^{-2}}$$

$$23. \quad \frac{(2x)^3y^{-3}}{3x^{-2}y^4}$$

$$24. \quad \left(\frac{27}{125}\right)^{\frac{2}{3}}$$

$$25. \quad \left(\frac{16}{81}\right)^{-\frac{3}{4}}$$

$$26. \quad (2x^2y^{-4})^0$$

$$27. \quad -2x(3 - x) - x(x - 1) + 3x$$

$$28. \quad \frac{2}{3}\left(\frac{1}{4}x - \frac{3}{5}y\right) + \frac{1}{3}\left(\frac{1}{2}x + \frac{3}{5}y\right)$$

II. Write the equation of the line in standard form, $Ax + By = C$ where $A, B,$ and C are integers and $A > 0$.

29. through $(2, -3)$ with slope -4

30. through $(4, -5)$ and $(-2, -6)$

31. through $(5, -6)$ with a slope of 0

32. through $(6, 8)$ and $(6, -10)$

33. slope $2/3$ with y -intercept -3

34. slope $-3/4$ with x -intercept 7

35. x -intercept 5 and y -intercept -4

36. through $(7, -1)$ and parallel to $3x - y = 8$

37. through $(-2, -4)$ and perpendicular to $4x + 3y = 6$

III. On graph paper, graph each of the following.

38. $y = -2x + 4$

39. $2x - 3y = 6$

$$40. x = -3$$

$$41. y = -5$$

$$42. y = |x + 4|$$

$$43. y = 2 + |x|$$

$$44. y = 3 - |x - 2|$$

$$45. y = 2(x - 3)^2 + 4$$

$$46. y = -3(x + 4)^2 - 5$$

$$47. y = 2x^2 - 8x + 14$$

IV. Solve the system of equations.

$$48. 2x + y = 4, 3x + 2y = 1$$

$$49. 2x - y = -1, 3x + 2y = 30$$

$$50. 8x + 2y = 2, 3x - 4y = -23$$

$$51. x = 2y - 3, 3x + y = -23$$

52. $3x - 5y = 14, 4x + 3y = 9$

V. Multiply

53. $(x - 3)(x + 5)$

54. $(2x - 7)(3x + 2)$

55. $(x - 2)(x + 4)(x - 1)$

VI. Factor completely

56. $x^2 + 4x + 3$

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

58. $x^2 - 8x - 48$

59. $5x^2 - 13x - 6$

60. $2x^2 + 3x - 35$

61. $10x^2 + 13x - 3$

62. $x^2 - 4y^2$

$$63. 36x^2 - 49y^2$$

$$64. x^4 - 1$$

$$65. x(x + 2) + 4(x + 2)$$

$$66. x^2(x + 4) - (x + 4)$$

$$67. 5a + 5b + ay + by$$

VII. Solve for x.

$$68. 3^x = \frac{1}{81}$$

$$69. \left(\frac{1}{2}\right)^x = \frac{1}{64}$$

$$70. \frac{-3 \pm \sqrt{37}}{2}$$

$$71. \sqrt{6x-4} = \sqrt{2x+10}$$

$$72. x^2 + 5x - 6 = 0$$

$$73. 2x^2 + 5x - 12 = 0$$

$$74. 4x^2 - 9 = 0$$

$$75. 6x^2 - 5x - 4 = 0$$

$$76. x^2 + 3x - 7 = 0$$

$$77. 2(x - 2)^2 - 18 = 0$$

VIII. Using synthetic division, find all roots (real and imaginary) for $f(x)$. Show all your work below.

$$78. f(x) = x^3 - 2x^2 - 5x + 6$$

$$79. f(x) = x^5 - x^4 - 16x + 16$$

IX. Solve for x.

80. $\log_3 81 = x$

81. $\log_2 64 = x$

82. $\log_2 x = 5$

83. $\log_2 \left(\frac{1}{16}\right) = x$

84. $\log_9 27 = x$

85. $\log 100,000 = x$

86. $\log .000001 = x$

Answers:

1. -5

2. 9

3. 14

4. $-2x+2y$

5. $3+6x-14y$

6. -7

7. 64

8. 0

9. -1

10. $5\sqrt{5}$

11. $-9\sqrt{2}$

12. $\frac{\sqrt{2}}{3}$

13. $\frac{\sqrt{21}}{7}$

14. $3\sqrt[3]{3}$

15. $\frac{\sqrt[3]{10}}{2}$

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

17. $2x+7$

18. $\frac{3x-8}{2x-3}$

19. -1

20. $\frac{14x-9}{6x^2}$

21. $\frac{-x^2}{x^2-y^2}$

22. $\frac{y^6}{x^8}$

23. $\frac{8x^5}{3y^7}$

24. $\frac{9}{25}$

25. $\frac{27}{8}$
26. 1
27. $x^2 - 2x$
28. $\frac{1}{3}x - \frac{1}{5}y$
29. $4x + y = 5$
30. $x - 6y = 34$
31. $y = -6$
32. $x = 6$
33. $2x - 3y = 9$
34. $3x + 4y = 21$
35. $4x - 5y = 20$
36. $3x - y = 22$
37. $3x - 4y = 10$
48. (7, -10)
49. (4, 9)
50. (-1, 5)
51. (-7, -2)
52. (3, -1)
53. $x^2 + 2x - 15$
54. $6x^2 - 17x - 14$
55. $x^3 + x^2 - 10x + 8$
56. $(x+1)(x+3)$
57. $(x-9)(x+4)$
58. $(x+4)(x-12)$
59. $(5x+2)(x-3)$
60. $(2x-7)(x+5)$
61. $(5x-1)(2x+3)$
62. $(x-2y)(x+2y)$
63. $(6x-7y)(6x+7y)$
64. $(x-1)(x+1)(x^2 + 1)$
65. $(x+2)(x+4)$
66. $(x+4)(x-1)(x+1)$
67. $(a+b)(5+y)$
68. -4
69. 6

70. 5

71. $\frac{7}{2}$

72. 1, -6

73. -4, $\frac{3}{2}$

74. $\frac{3}{2}$, $-\frac{3}{2}$

75. $\frac{4}{3}$, $-\frac{1}{2}$

76. $\frac{-3 \pm \sqrt{37}}{2}$

77. 5, -1

78. 1, 3, -2

79. 1, 2, -2, 2i, -2i

80. 4

81. 6

82. 32

83. -4

84. $\frac{3}{2}$

85. 5

86. -6