

Math 98
Final Exam Review

This review does not include all topics covered on your Final Exam. However, it will provide a good review of most of the topics. Your exam is 40 multiple choice.

Solve each absolute value equation.

1. $|t + 2| = 4$
(a) $\{2\}$ (b) $\{-6\}$ (c) $\{-6, 2\}$ (d) \emptyset
2. $|2d - 4| = 2$
(a) $\{3\}$ (b) $\{1\}$ (c) $\{1, 3\}$ (d) \emptyset
3. $|7 - \frac{1}{2}x| = -3$
(a) $\{20\}$ (b) $\{8\}$ (c) $\{8, 20\}$ (d) \emptyset

Solve each absolute value inequality.

4. $|x| \geq 9$
(a) $\{x | x \geq 9\}$ (b) $\{x | x \leq -9\}$ (c) $\{x | x \leq -9 \text{ or } x \geq 9\}$ (d) $\{x | -9 \leq x \leq 9\}$
5. $|3x - 5| \leq 8$
(a) $(-\infty, \frac{13}{3}]$ (b) $[-1, \frac{13}{3}]$ (c) $(-\infty, -1] \cup [\frac{13}{3}, \infty)$ (d) $(-\infty, -1]$
6. $|7 - 2x| > 1$
(a) $(-\infty, 3) \cup (4, \infty)$ (b) $(3, 4)$ (c) $(3, \infty)$ (d) $(-\infty, -3) \cup (4, \infty)$

Evaluate.

7. $(\frac{2}{3})^{-2}$
(a) $-\frac{4}{9}$ (b) $-\frac{9}{4}$ (c) $\frac{4}{9}$ (d) $\frac{9}{4}$
8. $(-7)^0$
(a) 7 (b) -7 (c) 1 (d) -1
9. $-4^2 + (-4)^3$
(a) 48 (b) -48 (c) 80 (d) -80
10. $(-6)^{-2}$
(a) 36 (b) -36 (c) $\frac{1}{36}$ (d) $-\frac{1}{36}$

Simplify. Write the answers with positive exponents only.

11. $7^3 \cdot 7^{-6}$

- (a) 7^3 (b) -7^3 (c) $\frac{1}{7^3}$ (d) $-\frac{1}{7^3}$

12. $(3x^2)(9x^{-6})$, $x \neq 0$

- (a) $\frac{1}{3x^4}$ (b) $\frac{3}{x^4}$ (c) $27x^4$ (d) $\frac{27}{x^4}$

13. $\frac{11^{-2}}{11^3 \cdot 11^{-1}}$

- (a) 1 (b) -11^4 (c) $\frac{1}{11^4}$ (d) $-\frac{1}{11^4}$

14. $(3^{-1}a^{-2}b)^{-2}$, $a \neq 0$, $b \neq 0$

- (a) $\frac{a^4}{3b^2}$ (b) $\frac{b^2}{3a^4}$ (c) $\frac{9a^4}{b^2}$ (d) $-\frac{3a^4}{b^2}$

15. $(4xy^{-2})^{-2}(2^{-1}x^{-1}y^3)^{-4}$, $x \neq 0$, $y \neq 0$

- (a) $\frac{x^2}{y^8}$ (b) $\frac{64x^5}{y^8}$ (c) $\frac{256x^2}{y^8}$ (d) $-\frac{256x^2}{y^8}$

16. $\frac{5^{-3}(x^2)^{-1}}{(x^2)^{-3}(x^{-1})^5}$

- (a) -125 (b) $\frac{1}{125x^2}$ (c) $\frac{x^{10}}{125}$ (d) $\frac{x^9}{125}$

17. Write .00048 in scientific notation.

- (a) 4.8×10^3 (b) 4.8×10^{-3} (c) 4.8×10^4 (d) 4.8×10^{-4}

18. Write 3.9×10^4 without scientific notation.

- (a) 390 (b) 3900 (c) 39,000 (d) 390,000

Completely factor each polynomial and select from the responses the polynomial which is one of the factors.

19. $2wx - 2xz + wy - yz$

- (a) $(2w + z)$ (b) $(2x - y)$ (c) $(w + z)$ (d) $(2x + y)$

20. $2x^2 - 7xy$

- (a) $(2x - 7y)$ (b) $(x - y)$ (c) $(x - 7y)$ (d) $(2x - y)$

21. $a^2 + 14a - 72$

- (a) $(a - 4)$ (b) $(a - 18)$ (c) $(a + 4)$ (d) Prime

22. $18x^2 + 9xy - 20y^2$

- (a) $(3x + 4y)$ (b) $(3x - 4y)$ (c) $(6x + 5y)$ (d) $(3x + 10y)$

23. $225t^2 - 64u^2$
(a) $(225t + 64u)$ (b) $(225t - 64u)$ (c) $(25t + 8u)$ (d) $(15t - 8u)$

24. $49x^4 - 42x^2y^2 + 9y^4$
(a) $(7x^2 + 3y^2)$ (b) $(7x^2 - 3y^2)$ (c) $(7x + 3y)$ (d) $(7x - 3y)$

25. $125c^3 - 8d^3$
(a) $(25c^2 + 20cd + 4d^2)$ (c) $(25c^2 + 10cd + 4d^2)$
(b) $(25c^2 - 20cd + 4d^2)$ (d) $(25c^2 - 10cd + 4d^2)$

26. $4x^2 + 25$
(a) $(2w - 5)$ (b) $(2x + 5)$ (c) $(4x + 5)$ (d) Prime

Solve each equation.

27. $1 - \frac{3}{2y} = \frac{7}{4}$
(a) $\{-1\}$ (b) $\{2\}$ (c) $\{-2\}$ (d) $\{1\}$

28. $\frac{2}{h+2} + \frac{1}{h-2} = \frac{4}{h^2-4}$
(a) $\{2\}$ (b) \emptyset (c) $\{-2\}$ (d) $\{0\}$

29. $\frac{1}{x} - \frac{1}{x+2} = \frac{1}{4x}$
(a) $\{6\}$ (b) $\{0\}$ (c) \emptyset (d) $\{-6\}$

Solve the following word problems.

30. Find the length of a rectangular lot with a perimeter of 218 meters if the length is 7 meters more than the width.
(a) 51 meters (b) 58 meters (c) 65 meters (d) 72 meters

31. In 1970, the average teacher's salary at Greenville Academy was \$16,000. If the average salary has increased by \$900 a year since 1970, in what year will the average teacher's salary reach \$35,800?
(a) 1922 (b) 1985 (c) 1992 (d) 2010

32. An equation that could be used to determine the number of gallons of a 20% salt solution which must be added to 10 gallons of a 12% salt solution to get a 15% solution is
(a) $.12x + .20(10) = .15(x + 10)$ (c) $.20x + .12(10) = .15(x + 10)$
(b) $.20x + .12(10) = .15x$ (d) $.12x + .15(10) = .20(x + 10)$

Simplify each of the following. Assume that all variables represent positive real numbers.

33. $625^{\frac{3}{4}}$
(a) 15 (b) 25 (c) 125 (d) 5

34. $4^{\frac{1}{2}} \cdot 4^{\frac{1}{2}}$
 (a) 32 (b) 16 (c) 8 (d) 64

35. $\frac{16^{-\frac{1}{2}}}{16^{-\frac{1}{2}}}$
 (a) 4 (b) $\frac{1}{2}$ (c) 8 (d) $\frac{1}{8}$

36. $\left(\frac{k^{-3} \cdot k^{-\frac{1}{2}}}{k^{\frac{1}{2}} \cdot k}\right)^{-1}, k \neq 0$
 (a) $k^{\frac{16}{3}}$ (b) k^2 (c) k^4 (d) $k^{\frac{13}{3}}$

37. $x^{\frac{1}{2}} \cdot (x^{\frac{1}{2}} + x^{\frac{3}{2}})$
 (a) $x^{\frac{1}{4}} + x^{\frac{3}{4}}$ (b) x (c) x^3 (d) $x + x^2$

Find each of the following roots. Assume that all variables represent non-negative real numbers.

38. $\sqrt[3]{-729}$
 (a) 9 (b) $9i$ (c) -9 (d) $-9i$

39. $-\sqrt{25a^{16}}$
 (a) $5a^4$ (b) $-5a^4$ (c) $5a^8$ (d) $-5a^8$

40. $-\sqrt[4]{16x^{12}z^8}$
 (a) $-2x^3z^2$ (b) $2x^3z^2$ (c) $4x^3z^2$ (d) $-4x^3z^2$

41. $\sqrt{-256}$
 (a) -16 (b) 16 (c) $-16i$ (d) $16i$

42. Approximate the following: $\sqrt[3]{12,516}$
 (a) 3.849 (b) 1788 (c) 111.875 (d) 4.8133×10^{21}

Simplify each of the following. Assume that all variables represent non-negative real numbers.

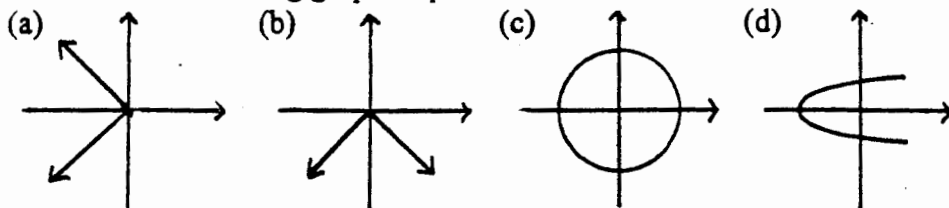
43. $\sqrt{450y^9}$
 (a) $30y^4\sqrt{5y}$ (b) $15y^4\sqrt{2y}$ (c) $2y^4\sqrt{15y}$ (d) $15y^3\sqrt{2}$

44. $\sqrt[4]{10,000w^8y^9}$
 (a) $101w^4y^4\sqrt[4]{y}$ (b) $10wy\sqrt[4]{y}$ (c) $10w^2y^2\sqrt[4]{y}$ (d) $100w^2y^2\sqrt[4]{y}$

45. $\sqrt[3]{108} \cdot \sqrt[3]{6}$
 (a) $6\sqrt[3]{3}$ (b) $\sqrt[3]{648}$ (c) $3\sqrt[3]{6}$ (d) $6\sqrt[3]{6}$

46. $\sqrt{75} - \sqrt{12} + \sqrt{27}$
 (a) $\sqrt{60}$ (b) $10\sqrt{3}$ (c) $2\sqrt{15}$ (d) $6\sqrt{3}$
47. $(\sqrt{5} - 1)(2\sqrt{5} + 7)$
 (a) $50 + 5\sqrt{5}$ (b) $3 - 5\sqrt{5}$ (c) $17 + 5\sqrt{5}$ (d) $3 + 5\sqrt{5}$
48. $(4\sqrt{3} - 6\sqrt{2})^2$
 (a) $120 - 24\sqrt{6}$ (b) $120 - 48\sqrt{6}$ (c) 120 (d) $48 - 48\sqrt{6}$
49. If $f(x) = x^2 - x - 5$, then $f(-2)$ is
 (a) -11 (b) -5 (c) -3 (d) 1

50. Which of the following graphs represents a function?



Perform the indicated operations. Give answers in standard form.

51. $(8 + 3i) - (6 - 2i)$
 (a) $2 - 5i$ (b) $2 - i$ (c) $2 + 5i$ (d) $14 + i$
52. $[(-4 - i) - (2 - 3i)] - 9i$
 (a) $-6 + 7i$ (b) $-6 - 7i$ (c) $6 + 7i$ (d) $-6 - 13i$
53. Find the distance between the points $(3, -4)$ and $(0, 7)$.
 (a) $\sqrt{130}$ (b) $\sqrt{31}$ (c) $\sqrt{14}$ (d) $3\sqrt{2}$

Solve each of the following equations.

54. $\sqrt{m^2 + 5m - 8} = m + 1$
 (a) {3} (b) $\left\{\frac{9}{5}\right\}$ (c) {-3} (d) {2}
55. $3a^2 - 26a = 9$
 (a) $\left\{\frac{1}{3}, 9\right\}$ (b) $\left\{-9, -\frac{1}{3}\right\}$ (c) $\left\{-9, \frac{1}{3}\right\}$ (d) $\left\{-\frac{1}{3}, 9\right\}$
56. $21y^2 = y + 10$
 (a) $\left\{\frac{2}{3}, \frac{5}{7}\right\}$ (b) $\left\{-\frac{5}{7}, -\frac{2}{3}\right\}$ (c) $\left\{-\frac{5}{7}, \frac{2}{3}\right\}$ (d) $\left\{-\frac{2}{3}, \frac{5}{7}\right\}$
57. $q^2 - 9q = 0$
 (a) {0, 9} (b) {0, -9} (c) {-3, 3} (d) {0, 3}
58. $9y^3 = y$
 (a) $\left\{-\frac{1}{3}, 0, \frac{1}{3}\right\}$ (b) {-3, 0, 3} (c) $\left\{0, \frac{1}{3}\right\}$ (d) $\left\{\pm \frac{1}{3}\right\}$

59. $w^2 = 128$
 (a) $\{\pm 2\sqrt{8}\}$ (b) $\{\pm 8\sqrt{2}\}$ (c) $\{\pm 8\sqrt{3}\}$ (d) $\{\pm 4\sqrt{5}\}$

60. $(2m + 3)^2 = 7$

(a) $\left\{\frac{-3 \pm \sqrt{7}}{2}\right\}$ (b) $\left\{\frac{3 \pm \sqrt{7}}{2}\right\}$ (c) $\left\{\frac{2 \pm \sqrt{7}}{3}\right\}$ (d) $\left\{\frac{-2 \pm \sqrt{7}}{3}\right\}$

61. Calculate the term that must be added to this binomial to make it a perfect square: $x^2 + 5x$

(a) $\frac{5}{2}$ (b) $\frac{1}{2}$ (c) 25 (d) $\frac{25}{4}$

Solve each of the following equations.

62. $k^2 - 4k = 6$
 (a) $\{2 \pm \sqrt{6}\}$ (b) $\{10, 14\}$ (c) $\{-2 \pm \sqrt{10}\}$ (d) $\{2 \pm \sqrt{10}\}$

63. The vertex of the parabola $y = (x - 1)^2 + 3$ is
 (a) (1, 3) (b) (-1, 3) (c) (1, -3) (d) (-1, -3)

64. Approximate the solutions of this quadratic equation to four decimal places. $2x^2 - 7x + 1 = 0$

(a) $\{0.1492, 3.3508\}$ (b) $\{-3.3508, -0.1492\}$ (c) $\{-4.6531, 8.1531\}$ (d) $\{0.0729, 3.4271\}$

Solve each of the following equations.

65. $2x^2 - x - 3 = 0$
 (a) $\left\{-1, -\frac{3}{2}\right\}$ (b) $\left\{-1, \frac{3}{2}\right\}$ (c) $\left\{1, \frac{3}{2}\right\}$ (d) $\left\{1, -\frac{3}{2}\right\}$

66. $3q^2 = 4q - 2$

(a) $\left\{\frac{2}{3} \pm \frac{2\sqrt{2}}{3}i\right\}$ (b) $\left\{\frac{2}{3} \pm \frac{\sqrt{2}}{3}i\right\}$ (c) $\left\{\frac{2}{3} \pm \frac{\sqrt{2}}{3}\right\}$ (d) $\left\{\frac{4}{3} \pm \frac{\sqrt{2}}{3}i\right\}$

67. $5x^2 - x = 1$

(a) $\left\{\frac{1}{10} \pm \frac{\sqrt{19}}{10}\right\}$ (b) $\left\{-\frac{1}{10} \pm \frac{\sqrt{19}}{10}i\right\}$ (c) $\left\{\frac{1}{10} \pm \frac{\sqrt{21}}{10}i\right\}$ (d) $\left\{\frac{1}{10} \pm \frac{\sqrt{21}}{10}\right\}$

68. $\frac{x}{2} - \frac{4}{x} = -\frac{7}{2}$

(a) $\{-1, 8\}$ (b) $\{-8\}$ (c) $\{-8, 1\}$ (d) \emptyset

69. $\sqrt{x+6} = x$

(a) $\{-2, 3\}$ (b) $\{-2\}$ (c) $\{3\}$ (d) \emptyset

70. $\sqrt{2x+13} + x = 1$
 (a) $\{-6, 2\}$ (b) $\{-2\}$ (c) $\{-2, 6\}$ (d) \emptyset

71. $m^4 - 2m^2 = 35$
 (a) $\{\pm\sqrt{5}, \pm\sqrt{7}i\}$ (b) $\{\pm 5, \pm 7\}$ (c) $\{7, -5\}$ (d) $\{\pm\sqrt{7}, \pm\sqrt{5}i\}$

72. $x^4 + 9x^2 + 20 = 0$
 (a) $\{\pm 2, \pm\sqrt{5}\}$ (b) $\{\pm 4, \pm\sqrt{5}\}$ (c) $\{\pm 2, \pm 5\}$ (d) $\{\pm 2i, \pm\sqrt{5}i\}$

73. $-6x^2 + 10x = 3$
 (a) $\left\{\frac{5}{6} \pm \frac{\sqrt{7}}{6}\right\}$ (b) $\left\{\frac{5}{6} \pm \frac{\sqrt{7}}{6}i\right\}$ (c) $\left\{-\frac{5}{6} \pm \frac{\sqrt{7}}{6}\right\}$ (d) $\left\{-\frac{5}{6} \pm \frac{\sqrt{7}}{6}i\right\}$

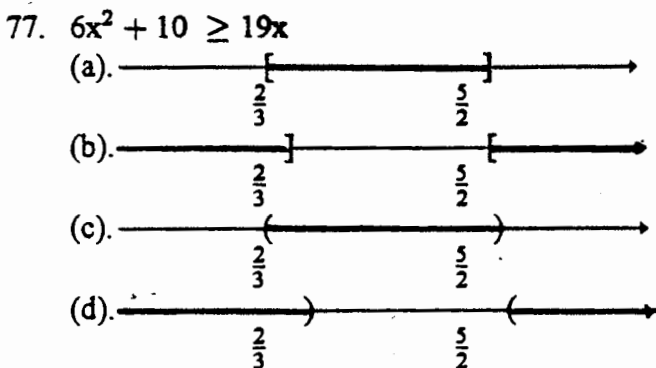
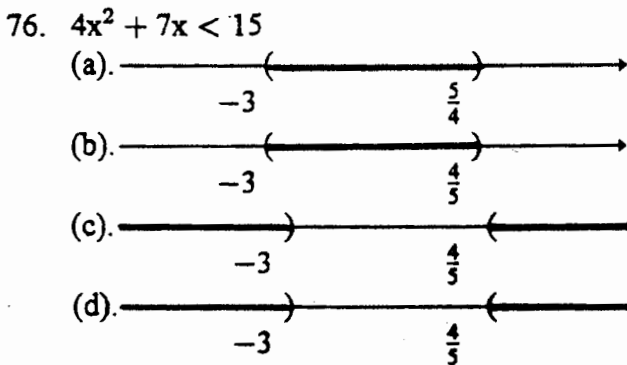
74. Use the discriminant to predict the number and type of solutions for this quadratic equation. $9k^2 = 12k - 4$

- (a) Two real solutions (b) One real solution of multiplicity two (c) Two non-real complex solutions

75. A dog pen is in the shape of a right triangle. The longer leg measures 15 feet. The hypotenuse is 7 feet shorter than three times the length of the shorter leg. How long is the shorter leg?

- (a) $2\frac{3}{4}$ feet (b) 8 feet (c) 17 feet (d) 64 feet

Solve each of the following inequalities. Graph each solution.



78. $x^4 - 10x^2 + 9 \leq 0$
 (a) $(-\infty, -3] \cup [-1, 1]$ (b) $[-3, -1] \cup [1, 3]$ (c) $[-1, 1] \cup [3, \infty)$ (d) $(-\infty, -3] \cup [3, \infty)$

79. Find the slope of the line through $(-2, 5)$ and $(-3, -1)$.
(a) 6 (b) $\frac{1}{6}$ (c) $-\frac{1}{6}$ (d) -6

In Questions 80-82: Find the slope and the y-intercept. Let m = slope. Let b = y-intercept.

80. $5x + 2y = 1$
(a) $m = \frac{2}{5}$, $b = -\frac{1}{2}$ (b) $m = -\frac{2}{5}$, $b = \frac{1}{2}$ (c) $m = \frac{5}{2}$, $b = -\frac{1}{2}$ (d) $m = -\frac{5}{2}$, $b = \frac{1}{2}$

81. $x = -3$
(a) Slope undefined, no y-intercept
(b) Slope undefined, $b = -4$
(c) $m = 0$, no y-intercept
(d) $m = 0$, $b = -3$

82. $y - 4 = 0$
(a) Slope undefined, no y-intercept
(b) Slope undefined, $b = -4$
(c) $m = 0$, no y-intercept
(d) $m = 0$, $b = 4$

83. Which of the following equations is in slope-intercept form?
(a) $y - 3 = \frac{2}{3}(x - 1)$ (b) $y = \frac{2}{3}x + \frac{13}{3}$ (c) $2x - 5y = -13$ (d) none of these

84. Determine which of the following points will lie on the line through the points $(-22, 2)$ and $(0, 4)$.
(a) $(0, -3)$ (b) $(11, -6)$ (c) $(44, 8)$ (d) $(66, -2)$

85. $5x - 10y = 1$ and $3y + 1 = 6x$ are
(a) parallel lines (b) perpendicular lines (c) neither

86. $1 - 4x = 10y$ and $15x = 6y + 1$ are
(a) parallel lines (b) perpendicular lines (c) neither

Find an equation of each line, and write it in standard form.

87. $m = -4$, through $(-1, -5)$
(a) $4x + y = -9$ (b) $4x - y = -9$ (c) $4x + y = 9$ (d) $4x - y = 9$

88. $m = -\frac{4}{7}$, through $(-6, -14)$
(a) $4x + 7y = -122$ (b) $4x + 7y = 122$ (c) $4x - 7y = 122$ (d) $4x - 7y = -122$

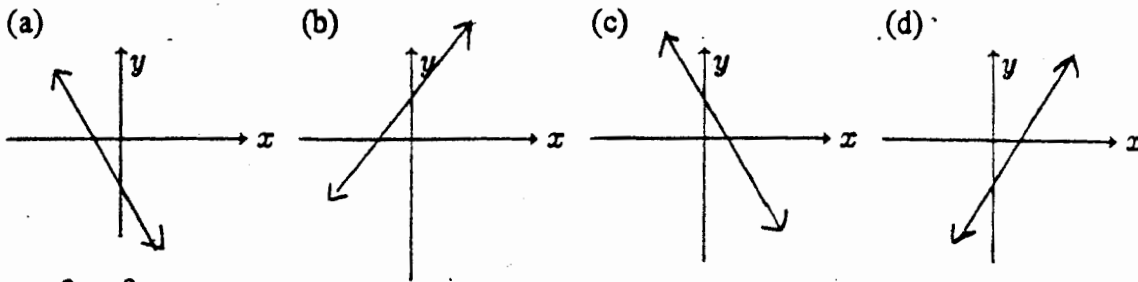
89. Through $(-7, 3)$ and $(-3, -3)$
(a) $x = -7$ (b) $3x + 2y = -15$ (c) $2x + 3y = -15$ (d) $3x + 2y = 5$

90. Vertical, through $(-9, 2)$
(a) $y = 2$ (b) $x = 9$ (c) $y = -9$ (d) $x = -9$

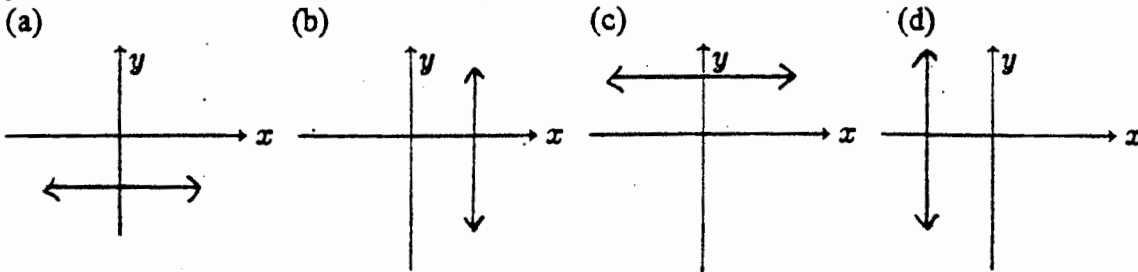
91. Perpendicular to $-x + 3y = 2$, through $(7, -4)$
 (a) $3x + y = 17$ (b) $3x - y = 25$ (c) $x - 3y = 19$ (d) $x + 3y = -5$

Choose the graph of each of the following lines.

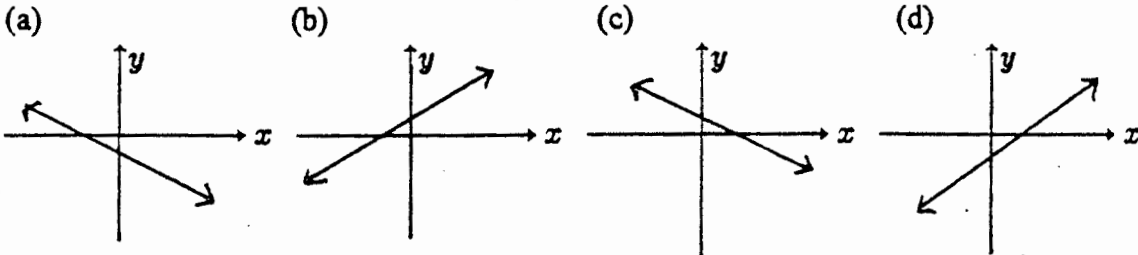
92. $3x + 2y = 4$



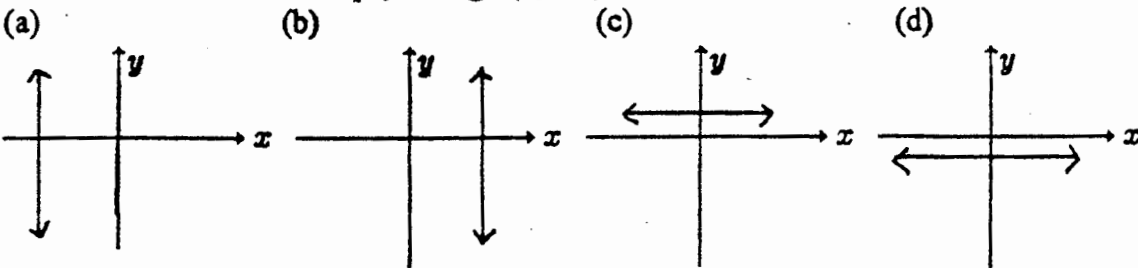
93. $y - 3 = 0$



94. The line through $(-1, 1)$ with slope $-\frac{1}{2}$



95. The line with undefined slope, through $(4, -1)$



Solve each system of equations. Then choose the only correct coordinate given.

$$96. \begin{cases} 8x - 7y = 19 \\ 9x - 2y = -8 \end{cases}$$

- (a) $x = 2$ (b) $y = 2$ (c) $y = -2$ (d) $x = -2$

$$97. \begin{cases} -5x + 2y = 23 \\ 3x + 2y = -1 \end{cases}$$

- (a) $x = 4$ (b) $y = 4$ (c) $x = 3$ (d) \emptyset

$$98. \begin{cases} 4x - y = 0 \\ y = -6 - 2x \end{cases}$$

- (a) $x = -4$ (b) $x = 1$ (c) $y = -4$ (d) $y = -1$

$$99. \begin{cases} 9x - 12y = 1 \\ -3x + 4y = 27 \end{cases}$$

- (a) $x = 3$ (b) $y = -3$ (c) $\{(x,y) \mid 9x - 12y = 1\}$ (d) \emptyset

100. Tomeka purchased 3 cans of green beans and 2 cans of corn for \$2.44. Sandra purchased 5 cans of green beans and 6 cans of corn for \$5.64 at the same store. What was the cost of a can of beans?

- (a) \$1.68 (b) \$0.59 (c) \$0.42 (d) \$0.21

Math 98
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Review
**ANSWER
KEY**

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|-------|-------|-------|--------|
| 1. c | 26. d | 51. c | 76. a |
| 2. c | 27. c | 52. b | 77. b |
| 3. d | 28. b | 53. a | 78. b |
| 4. c | 29. a | 54. a | 79. a |
| 5. b | 30. b | 55. d | 80. d |
| 6. a | 31. c | 56. d | 81. a |
| 7. d | 32. c | 57. a | 82. d |
| 8. c | 33. c | 58. a | 83. b |
| 9. d | 34. b | 59. b | 84. c |
| 10. c | 35. d | 60. a | 85. c |
| 11. c | 36. a | 61. d | 86. b |
| 12. d | 37. d | 62. d | 87. a |
| 13. c | 38. c | 63. a | 88. a |
| 14. c | 39. d | 64. a | 89. b |
| 15. a | 40. a | 65. b | 90. d |
| 16. d | 41. d | 66. b | 91. a |
| 17. d | 42. a | 67. d | 92. c |
| 18. c | 43. b | 68. c | 93. c |
| 19. d | 44. c | 69. c | 94. c |
| 20. a | 45. a | 70. b | 95. b |
| 21. a | 46. d | 71. d | 96. d |
| 22. a | 47. d | 72. d | 97. b |
| 23. d | 48. b | 73. a | 98. c |
| 24. b | 49. d | 74. b | 99. d |
| 25. c | 50. b | 75. b | 100. c |