Multiple Choice
*Identify the choice that best completes the statement or answers the question.*
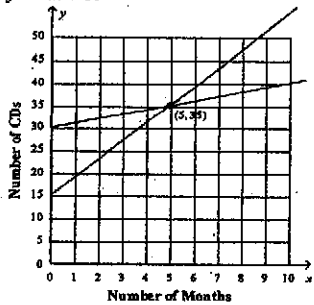
_____ 1. Tom has a collection of 30 CDs and Nita has a collection of 15 CDs. Tom is adding 1 CD a month to his collection while Nita is adding 4 CDs a month to her collection. Write and graph a system to find the number of months after which they will have the same number of CDs. Let x represent the number of months and y the number of CDs.
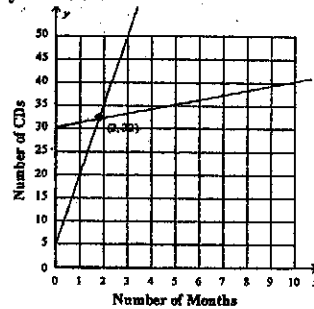
a. $y = -x + 30$
$y = 4x + 15$
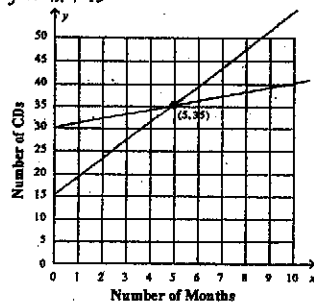

3 months
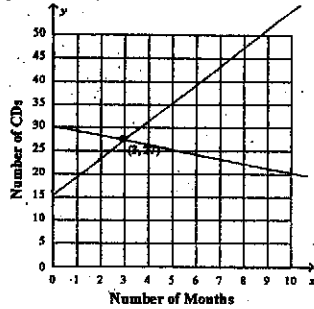
c. $y = x + 30$
$y = 15x + 4$

2 months

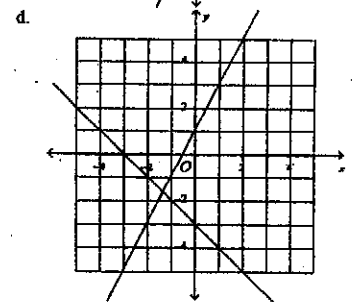b. $y = x + 15$
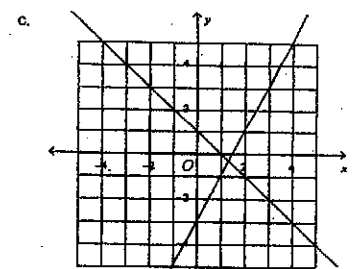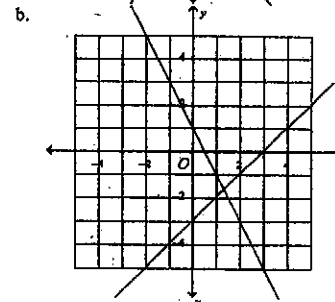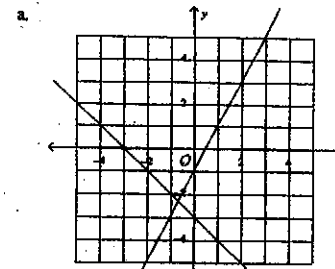$y = 4x + 30$

35 months

d. $y = x + 30$
$y = 4x + 15$

5 months

_____ 2. Which graph represents the following system of equations?
$y = 2x + 1$
$y = -x - 3$

a.

c.

b.

d.

_____ 3. What is the solution of the system of equations?
$y = -2x + 6$
$y = -x - 2$
a. $(-2.67, 11.33)$ b. $(8, -10)$ c. $(-10, 8)$ d. $(-4, 2)$

_____ 4. Find the value of b that makes the system of equations have the solution $(3, 5)$.
$y = 3x - 4$
$y = bx + 2$
a. 0   b. -1 c. 2   d. 1

_____ 5. The length of a rectangle is 3 centimeters more than 3 times the width. If the perimeter of the rectangle is 4 centimeters, find the dimensions of the rectangle.
a. length = 5 cm; width = 18 cm   c. length = 13 cm; width = 8 cm
b. length = 13 cm; width = 5 cm   d. length = 18 cm; width = 5 cm

Solve the system of equations using substitution.

_____ 6. $y = 4x - 1$
$y = 2x - 5$
a. $(1, -3)$ b. $(-2, -9)$ c. $(1, 3)$ d. $(3, 12)$

_____ 7. $y = x + 8$

$y = 2x$

a. $(2.7, 5.3)$ b. $(8, 16)$ c. $(-8, -16)$ d. $(-16, -8)$

8. The sum of two numbers is 71. Their difference is 31. Write a system of equations that describes this situation. Solve by elimination to find the two numbers.

a. $x - y = 71$
   $x + y = 31$
   50 and 21

c. $x + y = 71$
   $x - y = 31$
   46 and 15

b. $x + y = 31$
   $y - x = 71$
   46 and 21

d. $x + y = 71$
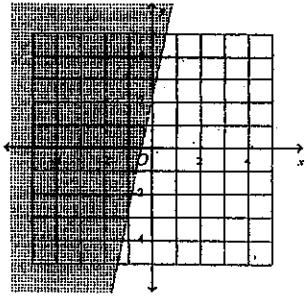 $x - y = 31$
   51 and 20

Solve the system using elimination.

9. $2x - 2y = -8$
   $x + 2y = -1$
a. $(-14, 1)$ b. $(1, 5)$ c. $(-3, 1)$ d. $(0, 4)$

10. $4x + 3y = -24$
   $5x + 6y = -39$
a. $(-3, 2)$ b. $(5, 4)$ c. $(-4, -3)$ d. $(-3, -4)$

11. $9x - 10y = 21$
   $5x - 4y = 7$
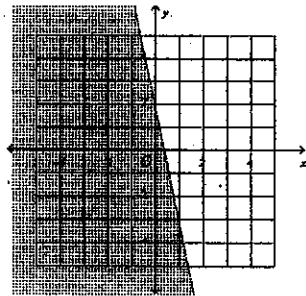a. $(5, 9)$ b. $(-3, -1)$ c. $(-4, -6)$ d. $(-1, -3)$
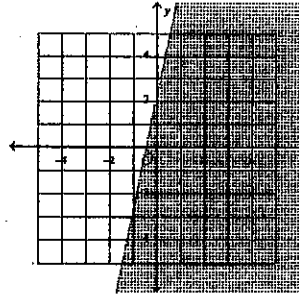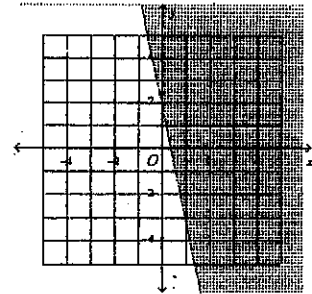
Graph the inequality.

12. $y > -5x + 2$

a.

c.

b.

d.

Write the linear inequality shown in the graph.

13.
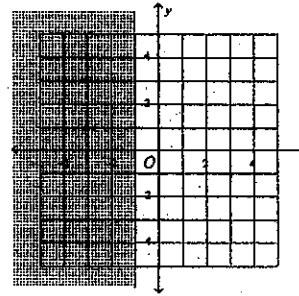
a. $y < -1$ b. $y \le -1$ c. $x < -1$ d. $x \le -1$

Solve the system of linear inequalities by graphing.

14. $y \le x + 4$
   $2x + y \le -4$

a.

c.

b.

d.

___ 15. $y \leq -x - 1$
$y \geq 2x + 4$

a.

c.

b.

d.
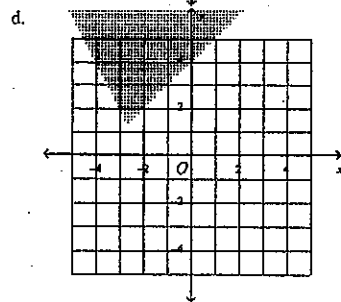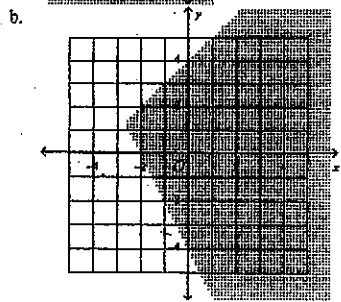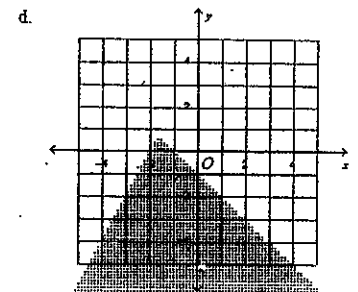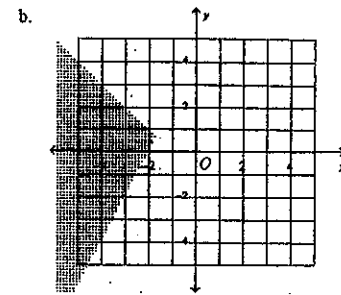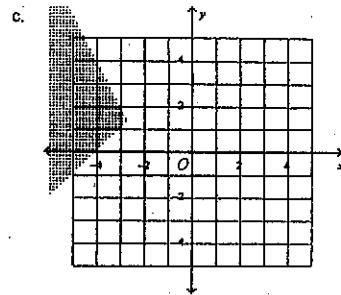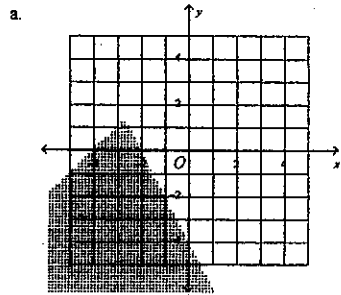
Write a system of inequalities for the graph.

___ 16.
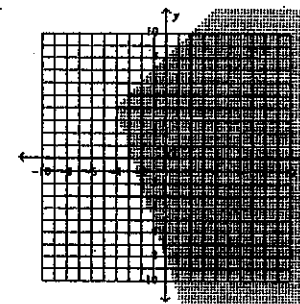
a. $y \geq x + 8$
$8x + y \geq -8$

b. $y \leq x + 3$
$8x + y \leq -8$

c. $y \geq x + 8$
$3x + y \leq -8$

d. $y \leq x + 8$
$3x + y \geq -8$

Simplify the expression.

___ 17. $-(7)^{-1}$

a. $-\dfrac{1}{-1^7}$

b. $\dfrac{1}{7}$

c. $-\dfrac{1}{7}$

d. 7

___ 18. $(-5)^{-3}$

a. 15

b. -125

c. $\dfrac{1}{125}$

d. $-\dfrac{1}{125}$

___ 19. $12^{-1} \cdot 16^{0}$

a. 12   b. −12   c. $\dfrac{1}{12}$ d. 0

____ 20. $y^3 \cdot 4y^2$

   a. $5y^6$ b. $4y^5$ c. $5y^5$ d. $4y^6$

____ 21. $(x^3)^{-6}$

   a. $\dfrac{1}{x^{18}}$ b. $\dfrac{1}{x^{729}}$ c. x^{18} d. $\dfrac{x}{18}$

____ 22. $(x^9)^0(x^7)^2$

   a. x^{18} b. 1   c. x^{14} d. x^{126}

____ 23. $(-3c^5d^6)^2(c^2d^5)^4$

   a. $9c^{18}d^{32}$ b. $-9c^{18}d^{32}$ c. $\dfrac{c^{18}d^{32}}{9}$ d. $9c^{13}d^{17}$

____ 24. $\dfrac{y^{10}}{y^8}$

   a. y^{80} b. $\dfrac{1}{y^2}$ c. y^2 d. y^{18}

____ 25. $\left(\dfrac{m^{-1}m^5}{m^{-2}}\right)^{-3}$

   a. $-\dfrac{3m^4}{m^{-2}}$ b. $\dfrac{1}{m^{18}}$ c. m^{18} d. $-m^{216}$

____ 26. $\left(\dfrac{(-1)^4}{(-4)^{-1}}\right)^2$

   a. 16   b. 4^8 c. $\dfrac{1}{16}$ d. 4^{-8}

____ 27. $2\sqrt{3} + \sqrt{3}$

   a. $3\sqrt{3}$ b. $\sqrt{3}$ c. $\sqrt{6}$ d. $3\sqrt{6}$

____ 28. $(6 + \sqrt{5})(6 - \sqrt{5})$

   a. $36 + \sqrt{5}$ c. 11

   b. $41 + 12\sqrt{5}$ d. 31

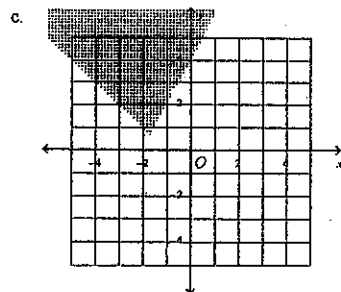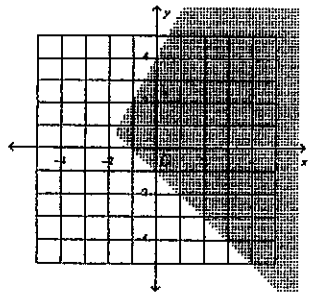____ 29. $\sqrt{26}\left(\sqrt{6} + 5\right)$

   a. $\sqrt{156} + 5$ c. $\sqrt{32} + 5\sqrt{26}$

   b. $2\sqrt{39} + 5\sqrt{26}$ d. $\sqrt{156} + 5\sqrt{26}$

____ 30. Write $8 \cdot 10^{-2}$ as a decimal.

   a. 800   b. 0.08   c. −160   d. 0.8

____ 31. Chase scored 7 points on Monday, and he doubled his score each day thereafter. How many points did he score on Thursday?

   a. 112 points   b. 21 points   c. 28 points   d. 56 points

____ 32. Which number is NOT written in scientific notation?

   a. 3×10^{-8} b. 6.7×10^3 c. 8.7×10^{-5} d. 25.67×10^{-2}

____ 33. Which number is written in scientific notation?

   a. 7.8×10^{-5} b. 3.4×100^2 c. 0.84×10^6 d. -5×10^{-12}

Write the number in scientific notation.

____ 34. 0.00235

   a. 23.5×100^{-4} b. 0.235×10^{-2} c. 2.35×10^{-3} d. 2.35×10

Write the number in standard notation.

____ 35. 2.94×10^{-4}

   a. −117.6   b. 0.0000294   c. 0.000294   d. 0.00294

____ 36. Which list shows the numbers in order from least to greatest?

   a. $5.4 \times 10^4, 5.4 \times 10^3, 4.5 \times 10^4$ c. $5.4 \times 10^3, 5.4 \times 10^4, 4.5 \times 10^4$

   b. $5.4 \times 10^3, 4.5 \times 10^4, 5.4 \times 10^4$ d. $4.5 \times 10^4, 5.4 \times 10^3, 5.4 \times 10^4$

Simplify the expression. Write the answer using scientific notation.

____ 37. $6\left(7.2 \times 10^2\right)$

   a. 4.32×10^3 b. 43.2×10^2 c. 1.32×10^3 d. 43.2×10^4

Complete the equation, by supplying the missing exponent.

____ 38. $m^{\blacksquare} \cdot n^2 \cdot m^3 = m^{11}n^2$

   a. 4   b. −3   c. −8   d. 8

____ 39. Last year a large trucking company delivered 4.5×10^5 tons of goods with an average value of $26,000 per ton. What was the total value of the goods delivered? Write the answer in scientific notation.

   a. 1.17×10^9 dollars   c. 1.17×10^{12} dollars

   b. 1.17×10^{11} dollars   d. 1.17×10^{10} dollars

Find the common ratio of the sequence.

____ 40. −3, −21, −147, −1029, . . .

   a. 18   b. $-\dfrac{1}{7}$ c. 7   d. −18

Evaluate the function rule for the given value.

____ 41. $y = 10 \cdot 5^x$ for $x = -2$

    a. $\dfrac{2}{5}$ b. -100 c. 2   d. $\dfrac{2}{25}$

____ 42. Suppose an investment of \$8,700 doubles in value every 8 years. How much is the investment worth after 16 years?

    a. \$139,200   c. \$34,800

    b. \$278,400   d. \$34,800
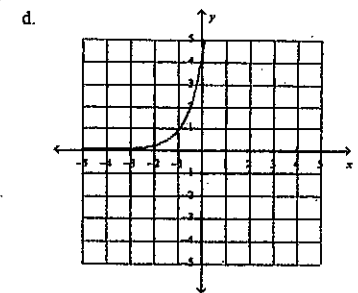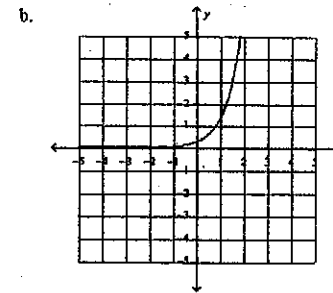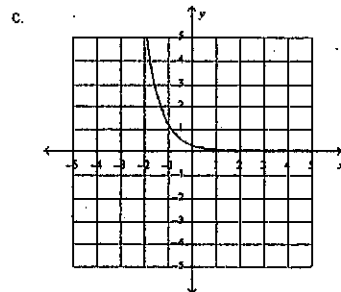
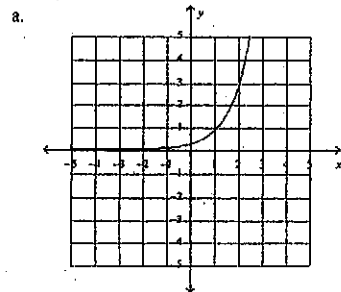**Match the table with the function that models the data.**

____ 43.

x	y
1	4
2	16
3	64
4	256

    a. $y = x^4$ b. $y = 4x$ c. $y = 4^x$

Match the function rule with the graph of the function.

____ 44. $y = \dfrac{1}{4} \cdot 5^x$

a.

c.

b.

d.

____ 45. Identify the initial amount a and the growth factor b in the exponential function.

    $f(x) = 20 \cdot 1.5^x$

    a. 1.5, 20   b. 20, 1.5

____ 46. Suppose the population of a town is 2,800 and is growing 2% each year.

    a. Write an equation to model the population growth.

    b. Predict the population after 10 years.

    a. $y = 2 \cdot 2,800^x$; about 56,000 people

    b. $y = 2,800 \cdot 2^x$; about 2,867,200 people

    c. $y = 2,800 \cdot 1.02^x$; about 3,413 people

    d. $y = 2,800 \cdot 2^x$; about 3,413 people

____ 47. Write the polynomial in standard form. Then name the polynomial based on its degree and number of terms.

    $2 - 11x^2 - 8x + 6x^2$

    a. $-5x^2 - 8x + 2$; quadratic trinomial   c. $-6x^2 - 8x - 2$; cubic polynomial

    b. $5x^2 - 8x - 2$; quadratic trinomial   d. $6x^2 - 8x + 2$; cubic trinomial

____ 48. Write the polynomial in standard form.

    $4g - g^3 + 9g^2 - 10$

    a. $9g^3 - g^2 + 4g - 10$ c. $g^3 - 9g^2 + 4g - 10$

    b. $-10 + 4g + 9g^2 - g^3$ d. $-g^3 + 9g^2 + 4g - 10$

____ 49. Match the expression with its name.

    $6x^3 - 7x + 6$

    a. cubic trinomial   c. fourth-degree monomial

    b. not a polynomial   d. quadratic binomial

Simplify the difference.

____ 50. $(8w^2 - 4w - 5) - (6w^2 + 3w - 4)$

    a. $14w^2 - 1w - 9$ c. $2w^2 - 1w - 9$

b. $2w^2 - 7w - 1$ d. $14w^2 + 7w + 1$

Simplify the product.

____ 51. $3p^4(4p^4 + 7p^3 + 4p + 1)$
  a. $12p^8 + 3p^7 + 4p^5 + p^4$
  b. $12p^8 + 21p^7 + 12p^5 + 3p^4$
  c. $7p^8 + 10p^7 + 7p^5 + 4p^4$
  d. $12p^{16} + 21p^{12} + 15p^4$

____ 52. $5a^2(3a^4 + 3b)$
  a. $8a^4 + 8ab$
  b. $15a^8 + 3b$
  c. $15a^6 + 15a^2b$
  d. $8a^6 + 15a^2b$

Factor the polynomial.

____ 53. $54c^3d^4 + 9c^4d^2$
  a. $9c^3d^2(d^2 + 6c)$
  b. $9c^3d^2(6d^2 + c)$
  c. $9c^4d^2(d^2 + 6)$
  d. $9c^4d^2(6d^2 + 1)$

____ 54. Simplify the product using the distributive property.

  $(4h + 6)(2h + 4)$

  a. $8h^2 + 4h - 24$
  b. $8h^2 - 28h + 24$
  c. $8h^2 + 28h + 24$
  d. $8h^2 - 4h - 24$

____ 55. Find the missing coefficient.

  $(4d - 4)(3d + 7) = 12d^2 + \blacksquare d - 28$

  a. -40 b. 40 c. 16 d. -16

____ 56. Simplify using the horizontal method.

  $(2n^2 + 5n + 4)(3n - 5)$

  a. $6n^3 - 5n^2 + 37n - 20$
  b. $6n^3 + 5n^2 - 13n - 20$
  c. $6n^3 + 25n^2 - 37n - 20$
  d. $6n^3 + 13n^2 - 5n - 20$

Find the product.

____ 57. $(4p - 3)(4p + 3)$
  a. $16p^2 + 9$
  b. $16p^2 + 24p + 9$
  c. $16p^2 - 24p - 9$
  d. $16p^2 - 9$

Complete.

____ 58. $z^2 + 1z - 132 = (z - 11)(z + \blacksquare\ )$

  a. -12 c. -1
  b. 12 d. 132

Factor the expression.

____ 59. $x^2 - x - 42$
  a. $(x - 7)(x + 6)$
  b. $(x + 7)(x + 6)$
  c. $(x + 7)(x - 6)$
  d. $(x - 7)(x - 6)$

____ 60. $6x^2 + 5x + 1$
  a. $(3x - 1)(2x - 1)$
  b. $(3x + 1)(2x - 1)$
  c. $(3x - 1)(2x + 1)$
  d. $(3x + 1)(2x + 1)$

____ 61. $3g^2 + 10g - 8$
  a. $(3g - 2)(g + 4)$
  b. $(3g - 2)(g - 4)$
  c. $(3g + 2)(g - 4)$
  d. $(3g + 2)(g + 4)$

____ 62. $d^2 - 14d + 49$
  a. $(d - 7)(d + 7)$
  b. $(d - 49)(d - 1)$
  c. $(d - 7)^2$
  d. $(d + 7)^2$

____ 63. $r^2 - 49$
  a. $(r - 7)(r + 7)$
  b. $(r + 7)(r + 7)$
  c. $(r - 7)(r - 7)$
  d. $(r - 7)(r + 9)$

____ 64. $81b^2 - 64$
  a. $(9b + 8)(9b - 8)$
  b. $(8b + 9)(8b - 9)$
  c. $(9b - 8)(9b - 8)$
  d. $(9b + 8)(9b + 8)$

____ 65. $3x^3 + 3x^2 + x + 1$
  a. $x(3x^2 + x + 1)$
  b. $(x + 3)(3x^2 - 1)$
  c. $3x^2(x + 1)$
  d. $(x + 1)(3x^2 + 1)$

____ 66. Find the GCF of the first two terms and the GCF of the last two terms of the polynomial.
  $5h^3 + 20h^2 + 4h + 16$

  a. $5h^2, 16$ b. $5h^3, 4$ c. $5h^2, 4$ d. $h2, h$

Factor by grouping.

____ 67. $3x^2 + 7x - 6$
  a. $(3x - 2)(x - 3)$
  b. $(3x - 2)(x + 3)$
  c. $(x + 3)(3x + 2)$
  d. $(3x + 2)(x - 3)$

____ 68. Which of the quadratic functions has the narrowest graph?
  a. $y = x^2$ b. $y = \frac{1}{3}x^2$ c. $y = \frac{1}{7}x^2$ d. $y = 4x^2$

____ 69. Which of the quadratic functions has the widest graph?
  a. $y = \frac{1}{3}x^2$ b. $y = -4x^2$ c. $y = 0.3x^2$ d. $y = -\frac{4}{5}x^2$

____ 70. Order the group of quadratic functions from widest to narrowest graph.
  $y = -7x^2,\ y = -\frac{1}{5}x^2,\ y = -\frac{1}{3}x^2$

  a. $y = -\frac{1}{3}x^2,\ y = -\frac{1}{5}x^2,\ y = -7x^2$
  c. $y = -7x^2,\ y = -\frac{1}{3}x^2,\ y = -\frac{1}{5}x^2$

b. $y = -\frac{1}{5}x^2$, $y = -\frac{1}{3}x^2$, $y = -7x^2$ d. $y = -\frac{1}{5}x^2$, $y = -7x^2$, $y = -\frac{1}{3}x^2$

_____ 71. If $|m| > |n|$, then the graph of $y = mx^2$ is _____ narrower than $y = nx^2$.
a. always   b. sometimes   c. never

_____ 72. A parabola _____ has an axis of symmetry.
a. always   b. sometimes   c. never

_____ 73. Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of the function $y = 4x^2 + 5x - 1$.
a. $x = \frac{5}{8}$; vertex: $\left(\frac{5}{8}, 4\frac{5}{8}\right)$ c. $x = -\frac{5}{8}$; vertex: $\left(-\frac{5}{8}, -5\frac{11}{16}\right)$
b. $x = \frac{5}{8}$; vertex: $\left(\frac{5}{8}, 3\frac{11}{16}\right)$ d. $x = -\frac{5}{8}$; vertex: $\left(-\frac{5}{8}, -2\frac{9}{16}\right)$

_____ 74. The quadratic equation $x^2 + a = 0$, where $a > 0$, _____ has at least one real number solution.
a. always   b. sometimes   c. never

Solve the equation by factoring.

_____ 75. The expression $ax^2 - bx = 0$ _____ has the solution $x = 0$.
a. always   b. sometimes   c. never

_____ 76. Tasha is planning an expansion of a square flower garden in a city park. If each side of the original garden is increased by 6 m, the new total area of the garden will be 196 m². Find the length of each side of the original garden.
a. 20 m   b. 8 m   c. $\sqrt{8}$ m   d. 14 m

Solve the equation by the quadratic formula. Round to the nearest hundredth if necessary.

_____ 77. $x^2 + 5x = 14$
a. 2.78, 4.5   b. 2, -7   c. 4.06, -4.06   d. 17.75, -22.75

_____ 78. $x^2 + 2x - 10 = 0$
a. 2.32, -4.32   b. 3, 3.32   c. -12, 10   d. 2.32, -4.32

**Use any method to solve the equation. If necessary, round to the nearest hundredth.**

_____ 79. $7x^2 + 25x = -17$
a. 2.66, 0.91   b. -0.91, -2.66   c. 8.86, -12.43   d. -1.83, -18.6

_____ 80. $4x^2 = 42$
a. 3.24, -3.24   b. 2, -2   c. 0.31, -0.31   d. 6.48, -6.48

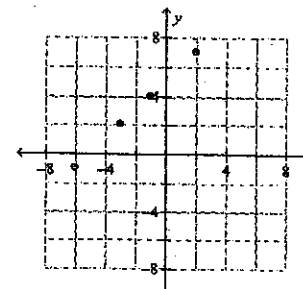_____ 81. For which discriminant is the graph possible?
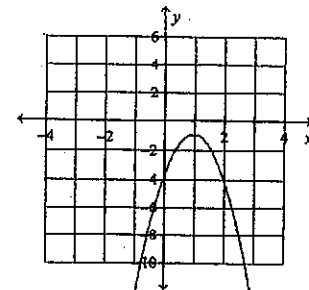
a. $b^2 - 4ac = -16$ b. $b^2 - 4ac = 0$ c. $b^2 - 4ac = 5$

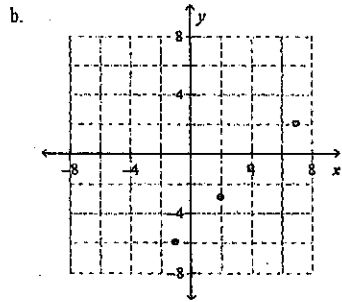**Find the number of real number solutions for the equation.**

_____ 82. $x^2 - 3x + 3 = 0$
a. 0   b. 2   c. 1

_____ 83. Graph the set of points. Which model is most appropriate for the set?
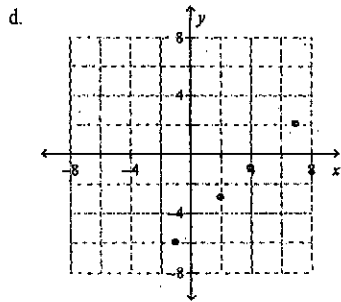$(-6, -1), (-3, 2), (-1, 4), (2, 7)$
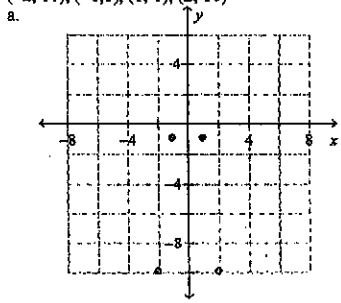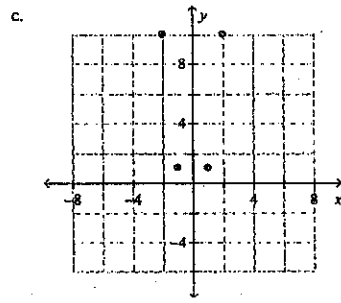
a.

linear

c.
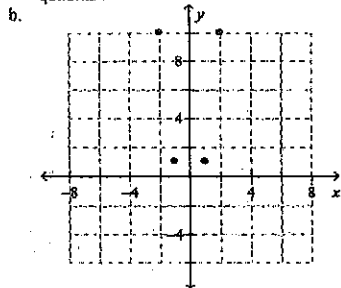
exponential

b.

quadratic

d.
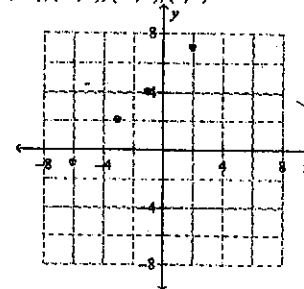
linear

___ 84. Graph the set of points. Which model is most appropriate for the set?
$(-2, 10), (-1,1), (1, 1), (2, 10)$
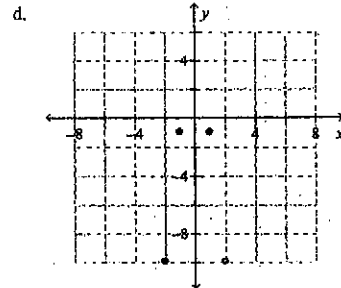
a.

quadratic

c.

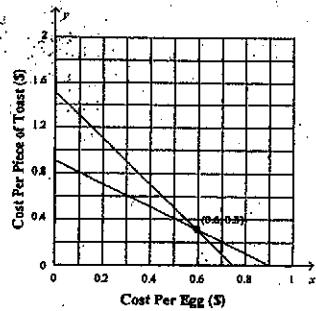linear

b.

quadratic

d.

exponential

Simplify the radical expression.

___ 85. $-3\sqrt{44}$
  a. $-\sqrt{11}$ b. $-6\sqrt{11}$ c. $-3\sqrt{22}$ d. $-3\sqrt{4}$

___ 86. $\sqrt{180}$
  a. $5\sqrt{6}$ b. $6\sqrt{5}$ c. $6\sqrt{10}$ d. 6

___ 87. $-2\sqrt{4} \cdot 2\sqrt{8h}$
  a. $-16\sqrt{2h^2}$ b. $\sqrt{32h}$ c. $-16\sqrt{2h}$ d. $-4\sqrt{32h}$

___ 88. $\sqrt{\dfrac{33}{64}}$
  a. $\dfrac{\sqrt{33}}{8}$ b. $\dfrac{\sqrt{33}}{32}$ c. $8\sqrt{33}$ d. $\dfrac{33}{8}$

___ 89. $\sqrt{\dfrac{60}{3}}$
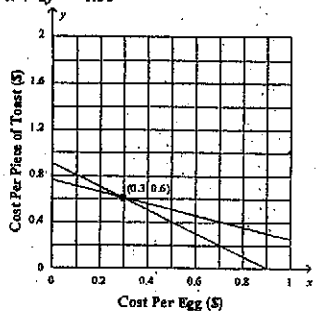 a. $\dfrac{4\sqrt{3}}{3}$ b. $2\sqrt{5}$ c. 40 d. $\dfrac{4\sqrt{3}}{\sqrt{3}}$

Solve the equation. Check your solution.

___ 90. $-6 = \sqrt{y} - 9$
  a. 9 b. $\sqrt{3}$ c. 1.5 d. 3

___ 91. $\sqrt{p+4} = 5$
  a. 29 b. 6 c. 1 d. 21

___ 92. Kendra owns a restaurant. She charges $1.50 for 2 eggs and one piece of toast, and $.90 for one egg and one piece of toast. Write and graph a system of equations to determine how much she charges for each egg and each piece of toast. Let x represent the number of eggs and y the number of pieces of toast.
  a. $y = -x + 0.90$ c. $2x + y = 1.50$
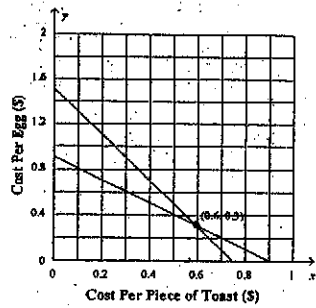 $y = -2x + 1.50$ $x + y = 0.90$

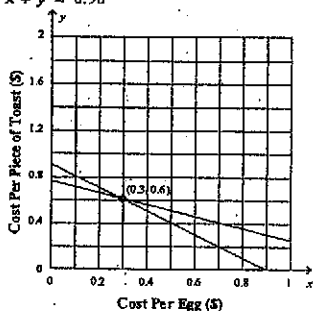$.60 per egg, $.30 for toast

b. $x + y = 0.90$
   $x + 2y = 1.50$

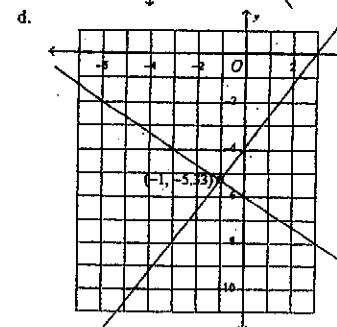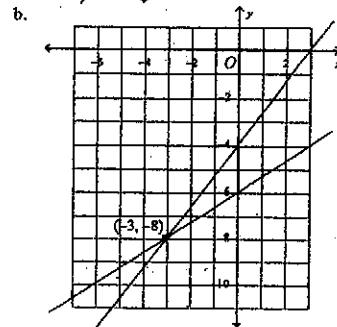$.30 per egg, $.60 for toast

d. $2x + y = 1.50$
   $x + y = 0.90$

$.30 per egg, $.60 for toast

$.60 per egg, $.30 for toast

a.

$(2.67, -2)$

c.

$(1, -5.33)$

b.

$(-3, -8)$

d.

$(-1, -5.33)$
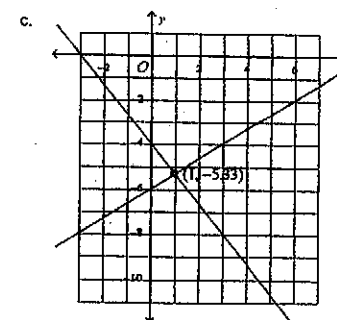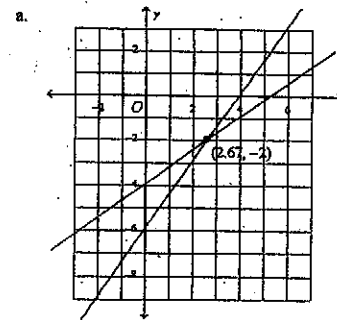
___ 93. Solve the following system of equations by graphing.

$-4x + 3y = -12$

$-2x + 3y = -18$