Algebra 1 Semester 2
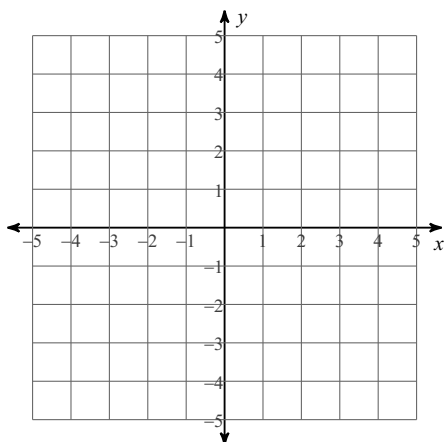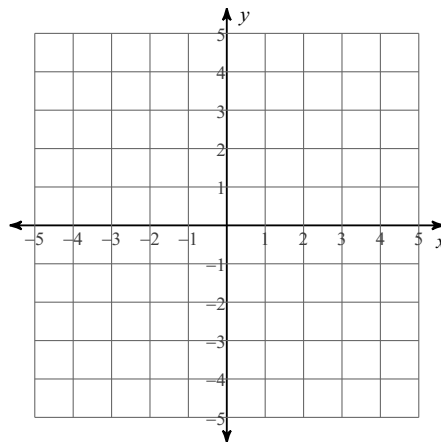
Name_____

Final Exam Study Guide

Date_____ Hour____

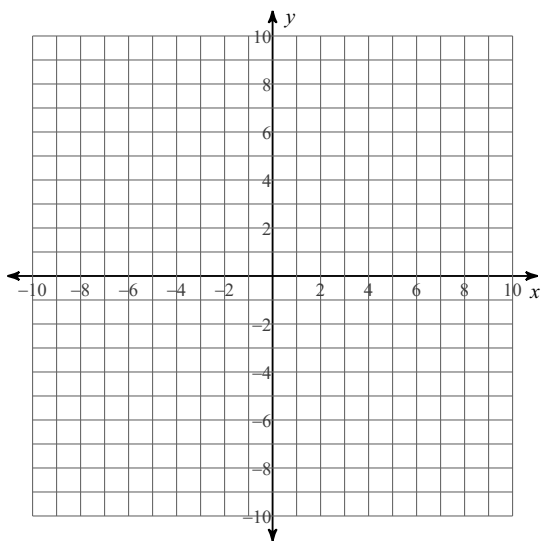## Solve each system by graphing.

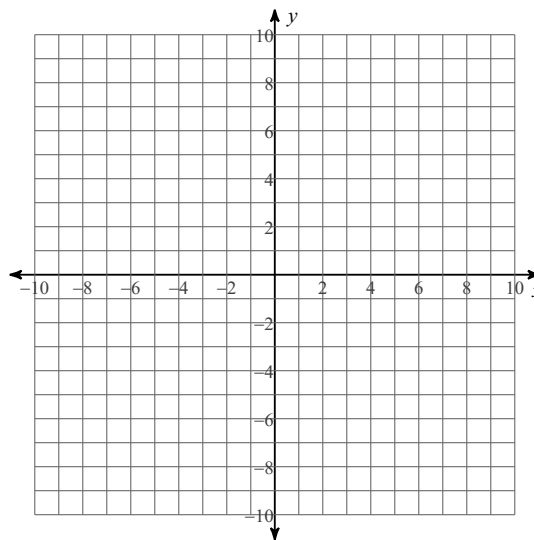1) $y = x - 4$

$y = -\dfrac{1}{2}x - 1$

2) $y = -x - 3$

$y = 4x + 2$

3) $y = -\dfrac{3}{2}x - 6$

$y = -3$

4) $2 = -6x + y$

$-9 + x = -y$

Solve each system by elimination.

5) $-5x - 3y = 10$

$x + 3y = -2$

6) $6x + y = -17$

$-6x - 2y = 16$

7) $18x + 6y = -6$

$9x - y = 13$

8) $2x + 5y = -15$

$-10x + 7y = -21$

9) $\dfrac{3}{32} = -y - \dfrac{1}{4}x$

  $0 = -12y - 3x$

Solve each system by substitution.

10) $y = 4x - 3$
  $y = -3x - 3$

11) $y = 3x - 10$
  $y = 4x - 12$

12) $-7x + y = -22$
  $7x + 4y = 17$

13) $8x + y = -16$
  $8x + 3y = 0$

14) $-5x + 4y = -10$
  $5x + 4y = 10$

Sketch the solution to each system of inequalities.

15) $y \le -\dfrac{1}{3}x - 2$

  $y < \dfrac{4}{3}x + 3$

16) $y < x - 2$
  $y \le -3x + 2$

17) $y \ge -\dfrac{1}{2}x + 3$

  $y > \dfrac{5}{2}x - 3$

18) $x + y > 4$
  $6x + y < -1$
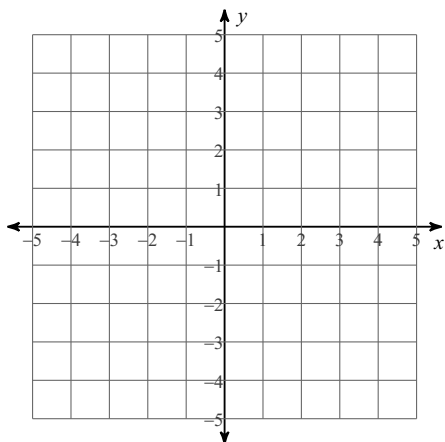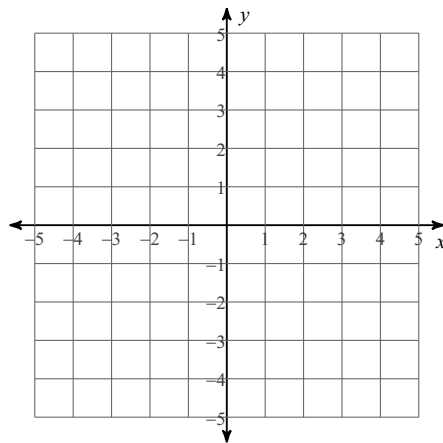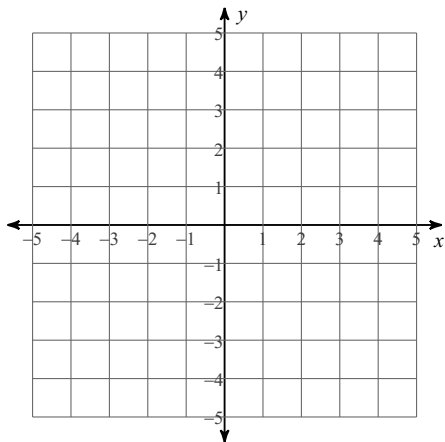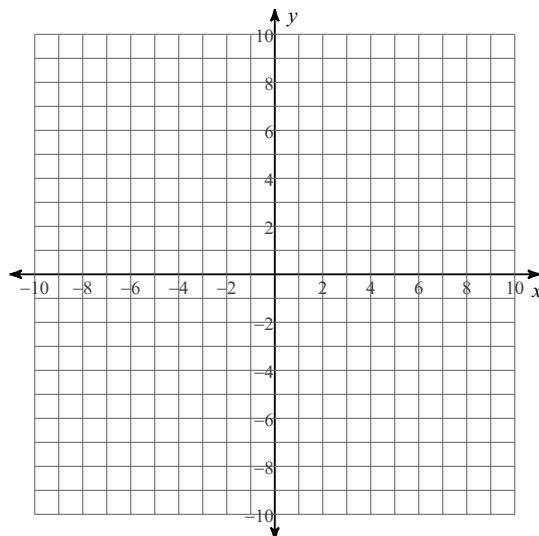
19) Wilbur and Ted each improved their yards by planting daylilies and ornamental grass. They bought their supplies from the same store. Wilbur spent $66 on 4 daylilies and 6 bunches of ornamental grass. Ted spent $63 on 3 daylilies and 6 bunches of ornamental grass. What is the cost of one daylily and the cost of one bunch of ornamental grass?

20) Lea and Norachai are selling flower bulbs for a school fundraiser. Customers can buy packages of tulip bulbs and bags of daffodil bulbs. Lea sold 1 package of tulips bulbs and 5 bags of daffodil bulbs for a total of $39. Norachai sold 4 packages of tulip bulbs and 5 bags of daffodil bulbs for a total of $51. What is the cost each of one package of tulips bulbs and one bag of daffodil bulbs?

21) Eduardo and Trevon each improved their yards by planting grass sod and shrubs. They bought their supplies from the same store. Eduardo spent $98 on 10 ft² of grass sod and 9 shrubs. Trevon spent $20 on 2 ft² of grass sod and 2 shrubs. What is the cost of one ft² of grass sod and the cost of one shrub?

22) Emily and Ndiba each improved their yards by planting rose bushes and geraniums. They bought their supplies from the same store. Emily spent $144 on 8 rose bushes and 8 geraniums. Ndiba spent $72 on 2 rose bushes and 5 geraniums. What is the cost of one rose bush and the cost of one geranium?

23) The school that Alberto goes to is selling tickets to a play. On the first day of ticket sales the school sold 13 senior citizen tickets and 8 student tickets for a total of $63. The school took in $45 on the second day by selling 2 senior citizen tickets and 13 student tickets. What is the price each of one senior citizen ticket and one student ticket?

Factor the common factor out of each expression.

24) $-15b + 6$

25) $10x^4 + 2x$

26) $-40x^2y^2 - 30x^3 + 30x$

27) $-56y^4x^3 + 32yx^4 - 32y^3$

28) $-35y^2x^2z^3 + 45y^2x^2z^2 + 25y^3z - 15y^2x^2$

Factor each completely.

29) $v^2 + 16v + 60$

30) $x^2 + 4x - 60$

31) $5k^2 - 7k$

32) $10n^2 + 66n - 112$

33) $-9x^2 + x + 10$

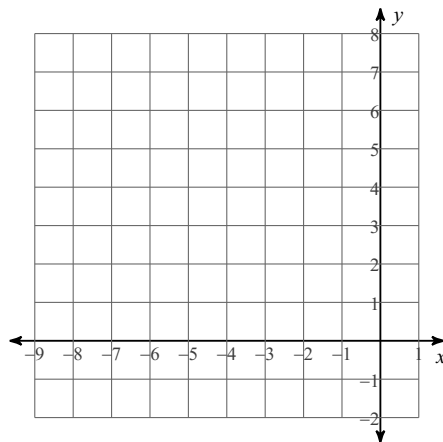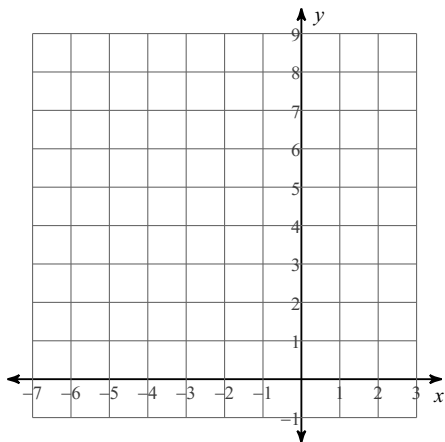34) $n^2 - 9$

35) $4r^2 - 25$

36) $75x^2 - 243$
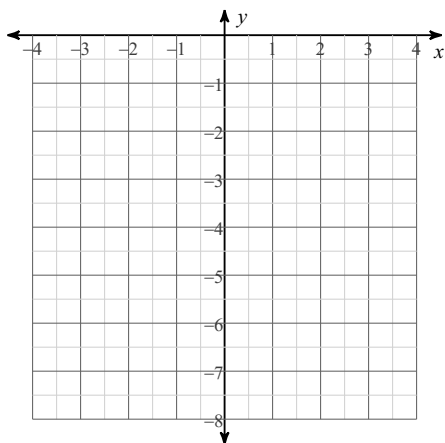
37) $36 - 441x^2$

38) $2n^2 - 40n + 200$

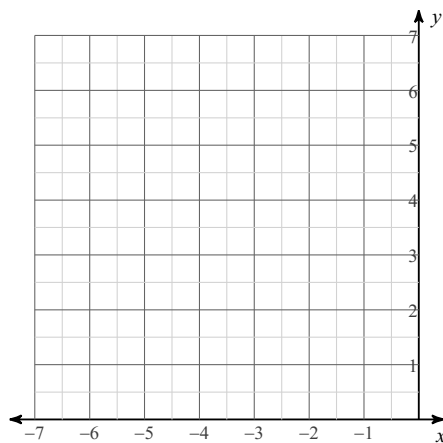**Sketch the graph of each function.**

39) $y = 2x^2$

40) $f(x) = 2x^2 + 4x + 1$

41) $y = -x^2 - 2x - 4$

42) $f(x) = x^2 + 9x + 23$

Solve each equation by taking square roots. When required, express solutions in BOTH approximate decimal form and exact radical form.

43) $x^2 = 49$

44) $b^2 - 3 = 46$

45) $3n^2 + 10 = 154$

46) $5v^2 + 7 = 42$

47) $16x^2 - 14 = 658$

Solve each equation by factoring and using Zero Product Property.

48) $(b - 3)(4b + 5) = 0$

49) $(n - 1)(n + 3) = 0$

50) $8n^2 - 80 = -24n$

51) $x^2 = 8 - 2x$

52) $2m^2 + 4m - 3 = -2m^2$

Solve each equation with the quadratic formula. When required, express your solutions in BOTH exact radical form and approximate decimal form.

53) $2n^2 + n - 6 = 0$

54) $2x^2 - 4x - 6 = 0$

55) $7v^2 + 5v = 9$

56) $4m^2 = 12$

57) $-7m^2 + 9m + 34 = -3m^2$

Without solving, tell how many solutions each equation has.

58) $-2x^2 - 7x + 13 = 9$

59) $9m^2 + 8m + 7 = 4$

60) $6x^2 - 12x + 3 = -6x^2$

Find the value of c that completes the square.

61) $x^2 - 16x + c$

62) $z^2 + 30z + c$

63) $m^2 - 34m + c$

64) $x^2 + 3x + c$

65) $x^2 + 17x + c$

Solve each equation by completing the square When required, express your solution in BOTH exact radical and approximate decimal form.
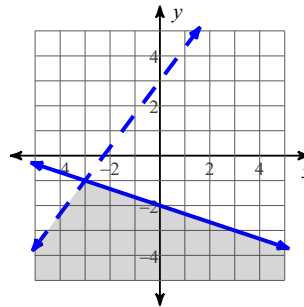
66) $a^2 + 14a + 13 = 0$

67) $r^2 + 12r - 63 = 0$
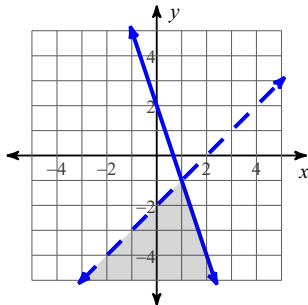
68) $n^2 + 12n - 64 = 10$

69) $p^2 - 2p - 62 = 2$

70) $7b^2 - 18b + 75 = -12$
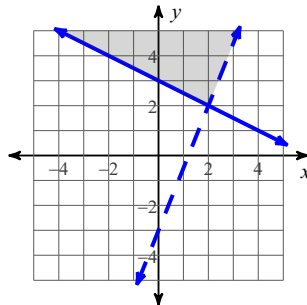
Answers to Final Exam Study Guide

1) $(2, -2)$ 2) $(-1, -2)$ 3) $(-2, -3)$ 4) $(1, 8)$

5) $(-2, 0)$ 6) $(-3, 1)$ 7) $(1, -4)$ 8) $(0, -3)$

9) No solution   10) $(0, -3)$ 11) $(2, -4)$ 12) $(3, -1)$

13) $(-3, 8)$ 14) $(2, 0)$ 15)
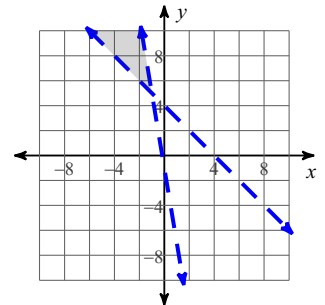

16)

17)

18)

19) daylily: $3, bunch of ornamental grass: $9

20) package of tulips bulbs: $4, bag of daffodil bulbs: $7

21) ft² of grass sod: $8, shrub: $2   22) rose bush: $6, geranium: $12

23) senior citizen ticket: $3, student ticket: $3   24) $3(-5b + 2)$ 25) $2x(5x^3 + 1)$

26) $10x(-4xy^2 - 3x^2 + 3)$ 27) $8y(-7x^3y^3 + 4x^4 - 4y^2)$

28) $5y^2(-7x^2z^3 + 9x^2z^2 + 5yz - 3x^2)$ 29) $(v + 10)(v + 6)$ 30) $(x - 6)(x + 10)$

31) $k(5k - 7)$ 32) $2(5n - 7)(n + 8)$ 33) $-(x + 1)(9x - 10)$ 34) $(n + 3)(n - 3)$
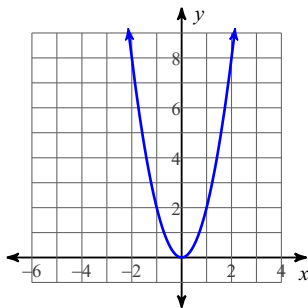
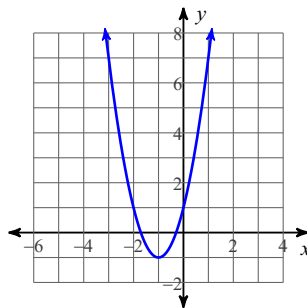35) $(2r + 5)(2r - 5)$ 36) $3(5x + 9)(5x - 9)$ 37) $9(2 + 7x)(2 - 7x)$ 38) $2(n - 10)^2$
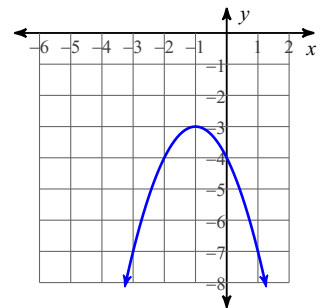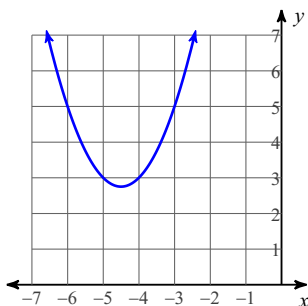
39)

40)

41)

42)

43) $\{7, -7\}$ 44) $\{7, -7\}$

45) $\{4\sqrt{3}, -4\sqrt{3}\}$ 46) $\{\sqrt{7}, -\sqrt{7}\}$ 47) $\{\sqrt{42}, -\sqrt{42}\}$ 48) $\left\{3, -\dfrac{5}{4}\right\}$

49) $\{1, -3\}$ 50) $\{2, -5\}$ 51) $\{-4, 2\}$

52) $\left\{\dfrac{1}{2}, -\dfrac{3}{2}\right\}$ 53) $\left\{1\dfrac{1}{2}, -2\right\}$ 54) $\{3, -1\}$

55) $\left\{\dfrac{-5 + \sqrt{277}}{14}, \dfrac{-5 - \sqrt{277}}{14}\right\}$ 56) $\{\sqrt{3}, -\sqrt{3}\}$ 57) $\left\{-2, 4\dfrac{1}{4}\right\}$

58) 81; two real solutions   59) −44; two imaginary solutions

60) 0; one rational solution   61) 64   62) 225

63) 289

64) $\dfrac{9}{4}$ 65) $\dfrac{289}{4}$ 66) $\{-1, -13\}$

67) $\{3.95, -15.95\}$ 68) $\{-6 + \sqrt{110}, -6 - \sqrt{110}\}$ 69) $\{1 + \sqrt{65}, 1 - \sqrt{65}\}$

70) No solution.