Algebra 2 Name_____

Semester One Exam - Review Problems

1) The school that Sumalee goes to is selling tickets to the annual dance competition. On the first day of ticket sales the school sold 9 adult tickets and 7 child tickets for a total of $71. The school took in $40 on the second day by selling 5 adult tickets and 4 child tickets. Find the price of an adult ticket and the price of a child ticket.

adult ticket: $4, child ticket: $5

2) The senior classes at High School A and High School B planned separate trips to the water park. The senior class at High School A rented and filled 1 van and 12 buses with 507 students. High School B rented and filled 6 vans and 12 buses with 582 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

Van: 15, Bus: 41

3) Mark and Brenda each improved their yards by planting grass sod and ivy. They bought their supplies from the same store. Mark spent $199 on 14 ft² of grass sod and 13 pots of ivy. Brenda spent $182 on 7 ft² of grass sod and 14 pots of ivy. What is the cost of one ft² of grass sod and the cost of one pot of ivy?

ft² of grass sod: $4, pot of ivy: $11

4) The senior classes at High School A and High School B planned separate trips to the water park. The senior class at High School A rented and filled 7 vans and 3 buses with 155 students. High School B rented and filled 14 vans and 2 buses with 206 students. Each van and each bus carried the same number of students. How many students can a van carry? How many students can a bus carry?

Van: 11, Bus: 26

Solve each equation.

5) $|x+9|=9$

$\{0, -18\}$

6) $\left|\frac{b}{8}\right|=3$

$\{24, -24\}$

7) $\left|\frac{b}{3}\right|=2$

$\{6, -6\}$

8) $|-6x|=30$

$\{-5, 5\}$

9) $-7|8+n|=-56$

$\{0, -16\}$

10) $\frac{|10x|}{8}=4$

$\left\{\frac{16}{5}, -\frac{16}{5}\right\}$

11) $\frac{|n+3|}{10}=1$

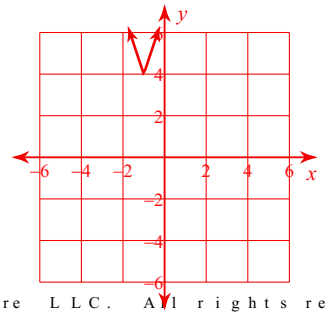
$\{7, -13\}$

12) $2+|9r|=47$

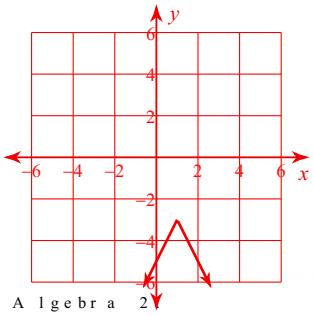
$\{5, -5\}$

State how the graph compares to the parent graph. (y = | x |)

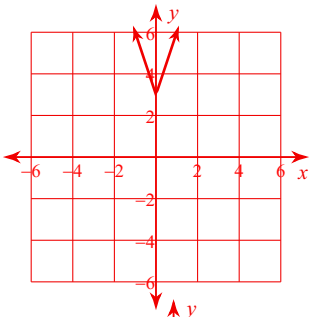
13) $y=3|x+1|+4$



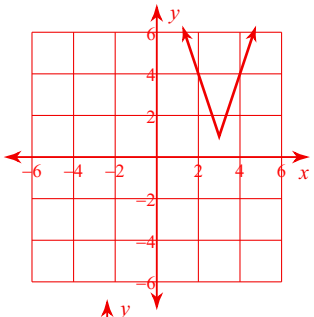
14) $y=-2|x-1|-3$



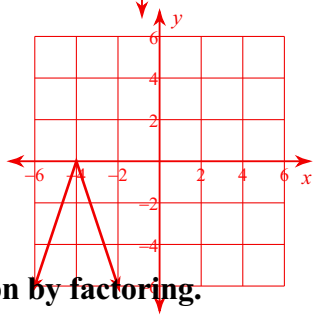
15) $y = 3\left|x\right| + 3$



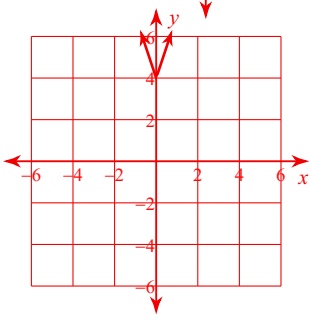
16) $y = 3\left|x - 3\right| + 1$



17) $y = -3\left|x + 4\right|$



18) $y = 3\left|x\right| + 4$



Solve each equation by factoring.

19) $v^2 + 42 = 13v$

$\{6, 7\}$

20) $x^2 - 3 = -2x$

$\{-3, 1\}$

21) $a^2 - 7 = 6a$

$\{7, -1\}$

22) $x^2 - 12x = -35$

$\{5, 7\}$

23) $n^2 + 25 = 10n$

$\{5\}$

24) $k^2 - 15k = -56$

$\{8, 7\}$

Solve each system using matrices.

25) $-2x + 3y - 2z = -21$
$x - y - 2z = 3$
$5x + 2y - 6z = 2$

$(4, -3, 2)$

26) $x - 5y - 6z = -17$
$4x + y - 2z = -5$
$4x + 6y + 4z = 10$

$(-2, 3, 0)$

27) $-4x - 2y = -18$
$x + 2y + 2z = -1$
$4x + 2y - z = 20$

$(5, -1, -2)$

28) $4x + 6y - 2z = -10$
$-6x + 5y - 3z = 5$
$5x - 2y - 4z = 11$

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

Solve each equation with the quadratic formula.

29) $5x^2 + 12x - 24 = 0$

$\left\{\frac{-6 + 2\sqrt{39}}{5}, \frac{-6 - 2\sqrt{39}}{5}\right\}$

30) $8p^2 - 9p + 5 = 0$

$\left\{\frac{9 + i\sqrt{79}}{16}, \frac{9 - i\sqrt{79}}{16}\right\}$

31) $4n^2 - 7n - 92 = 0$

$\left\{\frac{23}{4}, -4\right\}$

32) $5x^2 - 2x - 7 = 0$

$\left\{\frac{7}{5}, -1\right\}$

Solve each equation by taking square roots.

33) $n^2 + 7 = 9$

$\{\sqrt{2}, -\sqrt{2}\}$

34) $n^2 - 2 = 79$

$\{9, -9\}$

35) $2b^2 = -20$

$\{i\sqrt{10}, -i\sqrt{10}\}$

36) $a^2 - 7 = -11$

$\{2i, -2i\}$

Factor each and find all roots. One root has been given.

37) $x^4 - 6x^3 - x^2 + 30x = 0$; 5

Factors to: $x(x + 2)(x - 3)(x - 5) = 0$
Roots: $\{0, -2, 3, 5\}$

38) $x^4 - 4x^3 - 3x^2 + 18x = 0$; 3

Factors to: $x(x + 2)(x - 3)^2 = 0$
Roots: $\{0, -2, 3 \text{ mult. } 2\}$

39) $x^4 - 2x^3 - x^2 + 2x = 0;\ 2$

Factors to: $x(x-1)(x+1)(x-2) = 0$
Roots: $\{0, 1, -1, 2\}$

40) $x^4 + x^3 - 4x^2 - 4x = 0;\ -2$

Factors to: $x(x+1)(x-2)(x+2) = 0$
Roots: $\{0, -1, 2, -2\}$

Simplify each expression.

41) $(5n^2 - 6n^3 - 7n) + (3n^3 + 7n - 4n^2)$

$-3n^3 + n^2$

42) $(7 + 6b^2 - 5b^3) - (4b^3 - 7b^2 - 7)$

$-9b^3 + 13b^2 + 14$

43) $(2k^4 - 4k^2 - 2k) - (4k^4 + 8k^2 + 5k)$

$-2k^4 - 12k^2 - 7k$

44) $(2x^3 - 6x - 6) + (8x - 3 + 6x^3)$

$8x^3 + 2x - 9$

Find each product.

45) $(4p - 4)(4p + 8)$

$16p^2 + 16p - 32$

46) $(5n - 3)(2n + 8)$

$10n^2 + 34n - 24$

47) $(7n - 3)(n - 6)$

$7n^2 - 45n + 18$

48) $(4k + 1)(7k^2 + 4k + 2)$

$28k^3 + 23k^2 + 12k + 2$

49) $(3p + 7)(8p^2 + 6p - 3)$

$24p^3 + 74p^2 + 33p - 21$

50) $(3x + 5)(5x^2 + 6x - 6)$

$15x^3 + 43x^2 + 12x - 30$

Solve each equation by completing the square.

51) $x^2 + 8x - 32 = 0$

$\{-4 + 4\sqrt{3}, -4 - 4\sqrt{3}\}$

52) $x^2 - 2x - 67 = 0$

$\{1 + 2\sqrt{17}, 1 - 2\sqrt{17}\}$

53) $v^2 - 18v + 77 = 0$

$\{11, 7\}$

54) $x^2 + 14x - 51 = 0$

$\{3, -17\}$

55) $n^2 + 12n - 8 = 0$

$\{-6 + 2\sqrt{11}, -6 - 2\sqrt{11}\}$

56) $x^2 - 2x - 48 = 0$

$\{8, -6\}$

57) The height h (in feet) of a baseball t seconds after it is hit is given by this function: $h = -16t^2 + 96t + 3$.

Find the following:

a.) The height from which the ball is hit.

b.) The maximum height that the ball reaches.

c.) The time at which the ball reaches its maximum height.

d.) The time when the ball hits the ground.