Algebra 2
Re-Review 5.2

Hints for Factoring

- *Check to see if there is a common monomial factor that can be factored out.*
- $x^2 + bx + c = (x + m)(x + n)$
- $x^2 - bx + c = (x - m)(x - n)$
- $x^2 + bx - c = (x + m)(x - n)$
- $x^2 - bx - c = (x + m)(x - n)$
- $a^2 - b^2 = (a + b)(a - b)$; *if you have the difference of perfect squares*
- *To solve by factoring:*
  - *Set the equation equal to 0*
  - *Factor the equation*
  - *Set each factor equal to 0 and solve*

Example 1
Factor $x^2 + 8x + 15$

Example 2
Factor $3x^2 + 11x - 4$

Example 3
Factor $2x^2 - 98$

Example 4
Factor $3x^2 + 15x - 42$

Example 5
Solve $x^2 + 10x + 21 = 0$

Example 6
Solve $10x^2 - 6x = -2x^2 + 36$

Practice

1. What must be true about a quadratic equation before you can solve it using the zero product property?

2. A student solved $x^2 + 4x + 3 = 8$ as shown. Explain the student's mistake. Then solve the equation correctly.

$$x^2 + 4x + 3 = 8$$
$$(x + 3)(x + 1) = 8$$
$$x + 3 = 8 \text{ or } x + 1 = 8$$
$$x = 5 \text{ or } x = 7$$

Factor the trinomial.

3. $x^2 - 9x + 20$

4. $6x^2 + 5x - 6$

5. $x^2 - 10x + 25$

6. $4x^2 - 2x - 20$

7. $9x^2 - 16$

8. $9x^2 + 56x + 12$

Solve the equation by factoring.

9. $2x^2 - 13x - 7 = 0$

10. $x^2 - 8x = -15$

11. $3x^2 - 24x - 27 = 0$

12. $8x^2 + 5x = 2x^2 + 4$

Helpful Hints for Factoring

- First see if there is a common factor that can be taken out.
  - For example: $20x^2 + 10x + 25$ have a common factor of 5
  - $20x^2 + 10x + 25 = 5(4x^2 + 2x + 5)$
- Secondly, see if the first and last terms are perfect squares.
  - For example $9x^2 + 6x + 1$; $9x^2$ and 1 are perfect squares
  - If so, then you can possibly use one of the special patterns
    - $a^2 - b^2 = (a + b)(a - b)$ Ex: $4x^2 - 9 = (2x + 3)(2x - 3)$
    - $a^2 + 2ab + b^2 = (a + b)^2$ Ex: $9x^2 + 6x + 1 = (3x + 1)^2$
    - $a^2 - 2ab + b^2 = (a - b)^2$ Ex: $16x^2 - 40x + 25 = (4x - 5)^2$
    - *Check 2ab is the middle term: 2(3x)(1) = 6x; 2(4x)(-5) = -40x*
  - If not, factor like normal
- Some more hints when factoring
  - Check the second sign, if it is +, both sides will be the same; Then check the first sign, which tells you what sign both should be
    - If $x^2 + bx + c$ then you have $(x + \ )(x + \ )$
    - If $x^2 - bx + c$ then you have $(x - \ )(x - \ )$
  - Check the second sign, if it is –, the signs will be different; Then check the first sign, which tells you what sign the bigger factor is
    - If $x^2 + bx - c$ then you have $(x + \ )(x - \ )$ and the bigger factor is positive
    - If $x^2 - bx - c$ then you have $(x + \ )(x - \ )$ and the bigger factor is negative
  - Find factors of c that add to give you b
  - Slip, Factor, Divide, Slide if there is an a in front of x^2
- To solve by factoring:
  - Set the equation equal to 0
  - Factor the expression
  - Set each factor equal to 0 and solve

Algebra 2
Practice 5.1-5.2

Write the quadratic function in standard form.

1. $y = (x + 1)(x + 2)$

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

3. $y = 4(x - 1)^2 + 5$

4. $y = -(x + 2)^2 - 7$

5. $y = -\frac{1}{2}(x - 6)(x - 8)$

6. $y = 2(x - 9)^2 - 4$

Factor the expression.

7. $x^2 - x - 2$

8. $2x^2 + x - 3$

9. $x^2 - 16$

10. $x^2 + 2x + 1$

11. $x^2 - 4x + 4$

12. $x^2 + x$

13. $x^2 + 5x + 4$

14. $x^2 + 3x - 10$

15. $2x^2 + 7x + 3$

16. $3x^2 + 32x - 11$

17. $x^2 - 25$

18. $9x^2 + 12x + 4$

19. $5x^2 + 5x - 10$

20. $8x^2 - 28x - 60$

Solve the equation by factoring.

21. $x^2 - 3x - 4 = 0$

22. $x^2 + 19x + 88 = 0$

23. $8x^2 - 6x - 5 = 0$

24. $x^2 + 9x = -20$

25. $2x^2 + 4x - 1 = 7x^2 - 7x + 1$

1. $(x+7)(x+1)$
2. $(x-10)(x-1)$
3. $(x-9)(x+10)$
4. $(x-2)(x+6)$
5. $(x-1)(x-9)$
6. $(x+8)^2$
7. $(x+6)(x-4)$
8. DNF
9. $(x-5)(x-8)$
10. $(x+2)(x+9)$
11. $(x+7)(x-8)$
12. $(x-2)(x-3)$
13. $(x-3)^2$
14. $(x-8)^2$
15. $(x-5)^2$
16. $(x+6)^2$
17. $(x+2)^2$
18. $(x-11)^2$
19. $(x+5)^2$
20. $(x-1)^2$
21. $(x+2)^2$
22. $(x+4)(x-4)$
23. $(x-2)(x+2)$
24. $(x+3)(x-3)$
25. $(x+5)(x-5)$
26. $(x+1)(x-1)$
27. $(x+6)(x-6)$
28. $(x+7)(x-7)$
29. $(x+8)(x-8)$
30. $(x-9)(x+9)$
31. $2(x+9)(x-6)$
32. $2(x+5)(x+6)$
33. $5(x-2)(x-4)$
34. $2(x-1)(x+2)$
35. $4(x+1)(x-2)$
36. $6(x+10)(x+1)$
37. $7(x-5)(x+5)$
38. $4(x-6)(x+2)$
39. $5(x+1)(x+2)$
40. $3(x-6)(x-3)$
41. $(7x+4)(x-5)$
42. $(2x+3)(x+7)$
43. $(5x+9)(x-2)$
44. $(x+9)(10x-1)$
45. $(3x+3)(x-2)$
46. $(3x-1)(x+4)$
47. $(2x+5)(5x+1)$
48. $(4x+1)(4x+5)$
49. $(2x-5)(x-5)$
50. $(4x+1)(3x+4)$
51. $(4x+5y)(4x-5y)$
52. $(2x+y)(2x-y)$
53. $(3x-6y)(3x+6y)$
54. $(6x-5y)(6x+5y)$
55. $(x-3y)(x+3y)$

Name:

Factor and find the zeros

1. $x^2 + 9x + 18$

2. $3x^2 + 13x + 14$

3. $2x^2 - 16x + 32$

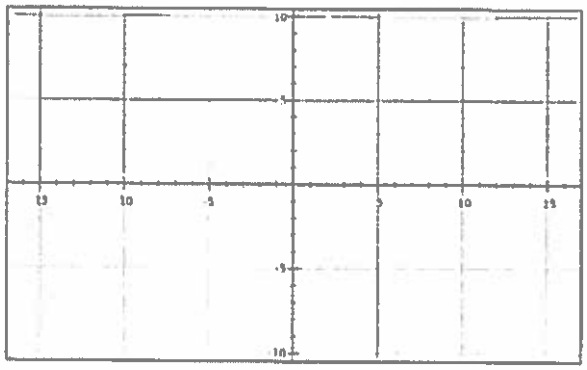
4. $4x^2 + 4x + 1$

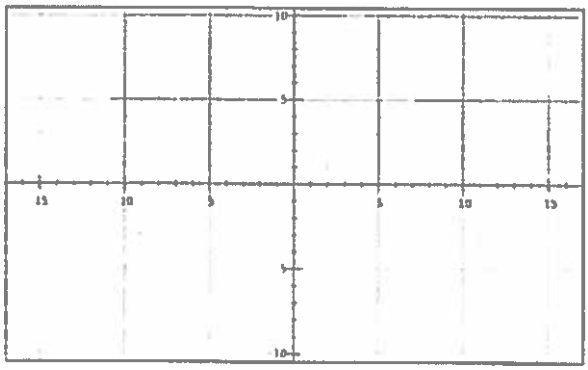
5. $7x^2 - 28x + 28$

6. $x^2 - 64$

7. What does a zero mean in terms of graphing?

Pick any 2 problems and draw a rough sketch (TELL ME WHAT PROBLE THE GRAPH IS)





BONUS

$$15x^2 + 27x - 6$$

Factoring Worksheet

1. $10c^2 + 23c - 42$

2. $4j^2 - 19j + 21$

3. $25e^2 + 15e - 70$

4. $96d^3 + 88d^2 + 12d$

5. $4i^3 + 14i^2 - 8i$

6. $60r^4 - 145r^3 + 70r^2$

7. $24u^3 - 148u^2 + 140u$

8. $8p^2 + 38p + 35$

9. $12i^2 + 52i + 35$

10. $6b^2 + 41b - 56$

11. $15n^2 - 7n - 4$

12. $6i^2 + 41i + 30$

13. $12a^2 + 5a - 2$

14. $60a^2 + 9a - 27$

15. $3p^2 - 8p - 16$

16. $24d^2 - 80d - 14$

17. $40z^2 - 4z - 96$

18. $6d^2 + 11d - 7$

19. $24g^2 + 10g + 1$

20. $15c^2 + 61c + 56$

21. $36e^4 + 90e^3 + 56e^2$

22. $6i^2 + 31i + 35$

23. $6v^4 + 63v^3 + 120v^2$

24. $16p^2 + 84p - 72$

Algebra 2

Practice Factoring $x^2 + bx + c$

Factor the expression. If the expression cannot be factored, say so.

1. $x^2 - x - 6$

2. $x^2 - 6x + 5$

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

4. $x^2 + 5x + 6$

5. $x^2 + 9x + 18$

6. $x^2 - 4x + 3$

7. $x^2 - 6x + 8$

8. $x^2 - 3x - 4$

9. $x^2 + 3x - 4$

10. $x^2 + 4x + 4$

11. $x^2 + 6x + 9$

12. $x^2 - 2x + 1$

13. $x^2 - 6x + 9$

14. $x^2 + 8x + 16$

Algebra 2

Practice Factoring $ax^2 + bx + c$

Factor the quadratic expression. If the expression cannot be factored, say so.

1. $2x^2 - 5x - 3$

2. $3x^2 - x - 2$

3. $3x^2 + 7x + 2$

4. $2x^2 + 5x + 3$

5. $10x^2 - 3x - 1$

6. $6x^2 - 13x + 2$

7. $15x^2 - 14x + 3$

8. $2x^2 + 7x + 1$

9. $4x^2 + 4x + 1$

10. $9x^2 - 12x + 4$

Algebra 2
Factoring Pass Back Game
Factor the trinomial. If the trinomial cannot be factored, say so.

1. $x^2 + 5x + 4$

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

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

4. $x^2 - 5x - 6$

5. $x^2 - 7x - 10$

Algebra 2
Factoring Pass Back Game
Factor the trinomial. If the trinomial cannot be factored, say so.

1. $x^2 - 8x + 12$

2. $x^2 + 9x + 14$

3. $x^2 + 6x - 27$

4. $x^2 - 16x + 51$

5. $x^2 + 13x + 40$

Algebra 2
Factoring Pass Back Game
Factor the trinomial. If the trinomial cannot be factored, say so.

1. $x^2 + 2x - 80$

2. $x^2 - 14x - 72$

3. $2x^2 + 7x + 3$

4. $3x^2 + 17x + 10$

5. $8x^2 + 18x + 9$

Algebra 2
Factoring Pass Back Game

Factor the trinomial. If the trinomial cannot be factored, say so.

1. $5x^2 - 7x + 2$

2. $6x^2 - 9x + 5$

3. $10x^2 - 19x + 6$

4. $3x^2 + 32x - 11$

5. $12x^2 - 25x - 7$