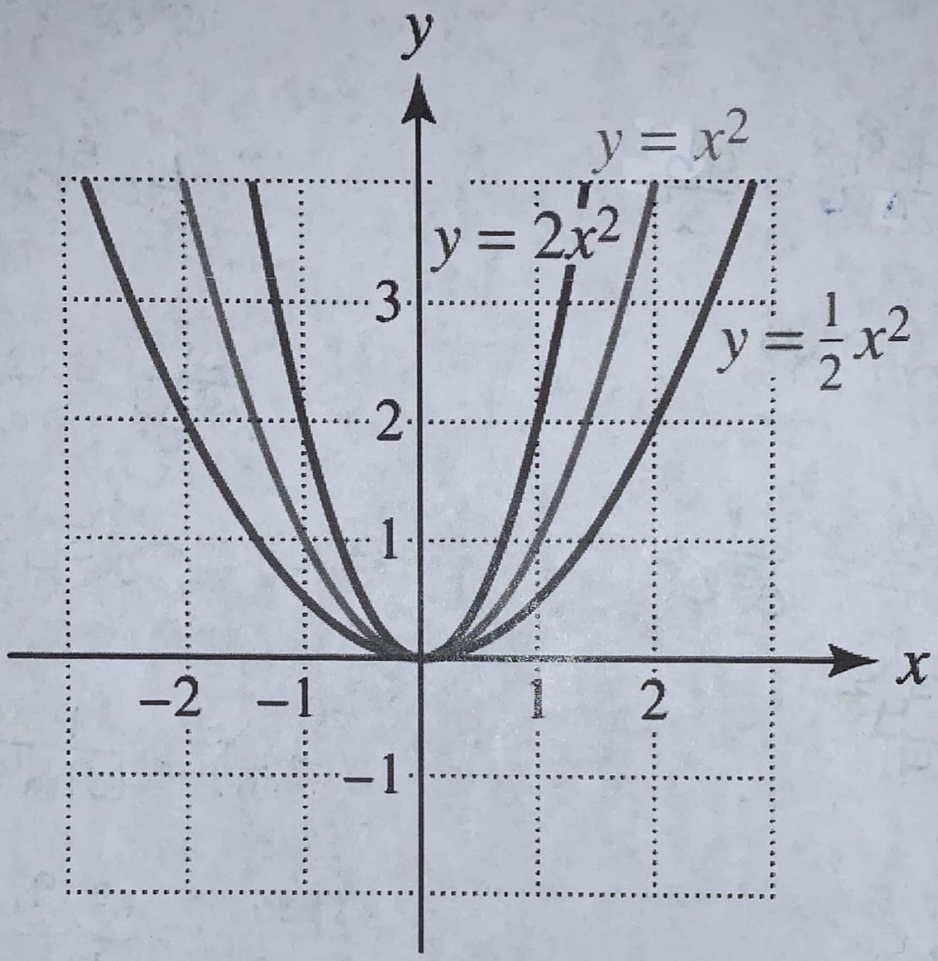
Unit 1 Homework
Quadratics Revisited



Quiz is _____

Test is _____

Name: Bonanni

Honors Algebra 2: Unit 1 Review of Exponents – Worksheet #1

Simplify. Your answer should contain only positive exponents.

1) $3n \cdot 2n^2$ $6n^3$

2) $\frac{3x}{x^3}$ $\frac{3}{x^2}$

3) $\frac{v^3}{(v^3)^2} = \frac{v^3}{v^6} = \frac{1}{v^3}$

4) $\frac{(2a)^3}{a^3b^2 \cdot b} = \frac{8a^3}{a^3b^3} = \frac{8}{b^3}$

5) $\left(\frac{2a^3b^3}{a^3 \cdot a^2b^3}\right)^2 = \frac{4a^6b^6}{a^{10}b^6} = \frac{4}{a^4}$

6) $4a^2b^3 \cdot a^3b^4$ $4a^5b^7$

7) $(2m^3n^2)^3$ $8m^9n^6$

8) $\frac{(y^3)^2}{x^4y^4}$ $\frac{y^6}{x^4y^4} = \frac{y^2}{x^4}$

9) $\frac{a^3b^4}{(a^2b^4)^3}$ $\frac{a^3b^4}{a^6b^{12}} = \frac{1}{a^3b^8}$

10) $\frac{2x^4y^3}{x^{-1}y^0} = 2x^5y^3$

11) $\frac{x^{-1}y^2}{4x^{-4}} = \frac{x^3y^2}{4}$

12) $(4m^0n^2)^{-3}$ $\left(\frac{1}{4m^0n^2}\right)^3 = \frac{1}{64n^6}$

13) $2x^3y^{-4} \cdot 2x^3$ $\frac{4x^6}{y^4}$

14) $\frac{(yx^3)^3}{2y^{-4} \cdot 2x^{-1}} = \frac{y^3x^9y^4x}{4} = \frac{x^{10}y^7}{4}$

15) $\left(\frac{(2x^4y^{-3}z^{-2})^2}{zx^3y^4}\right)^{-4} = \left(\frac{4x^8y^{-6}z^{-4}}{x^3y^4z}\right)^{-4} = \left(\frac{4x^5}{y^{10}z^5}\right)^{-4}$ $\left(\frac{y^{10}z^5}{4x^5}\right)^4 = \frac{y^{40}z^{20}}{256x^{20}}$

16) $4n^2 \cdot 4n^{-3}$ $\frac{16}{n}$

17) $(2r^3)^{-2}$ $\left(\frac{1}{2r^3}\right)^2 = \frac{1}{4r^6}$

18) $2p^{-2}q^{-3}r^2$ $\frac{2r^2}{p^2q^3}$

19) $x^{-3}y^{-2}z^3$ $\frac{z^3}{x^3y^2}$

Honors Algebra 2
Unit 1 - Worksheet #2

Name _____

Radical Review. Simplify Completely.

1. $4\sqrt{5}+3\sqrt{5}$

$7\sqrt{5}$

2. $-7\sqrt{3}+12\sqrt{3}$

$5\sqrt{3}$

3. $\sqrt{5}\cdot\sqrt{10}$ $=\sqrt{50}$

$5\sqrt{2}$

4. $3\sqrt{2}\cdot5\sqrt{6}$

$15\sqrt{12}$

$30\sqrt{3}$

5. $5\sqrt{3}\cdot2\sqrt{3}$

$10\cdot3$

30

6. $\frac{\sqrt{10}}{\sqrt{2}}$

$\sqrt{5}$

7. $\frac{\sqrt{3}}{\sqrt{5}}\frac{\sqrt{5}}{\sqrt{5}}$

$\frac{\sqrt{15}}{5}$

8. $\frac{\sqrt{3}}{\sqrt{6}}=\frac{\sqrt{1}}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}$

$\frac{\sqrt{2}}{2}$

9. $\sqrt{24x^5}$

$2x^2\sqrt{6x}$

10. $\sqrt[3]{-27a^5b^4}$

$-3ab\sqrt[3]{a^2b}$

11. $\sqrt{6x}\cdot\sqrt{3x^5}$ $=\sqrt{18x^6}$

$3x^3\sqrt{2}$

12. $\sqrt[4]{32x^7y^3z^5}$

$2xz\sqrt[4]{2x^3y^3z}$

13. $\frac{1}{\sqrt[3]{8}}$

$\frac{1}{2}$

14. $\frac{\sqrt[4]{5}}{\sqrt[4]{16}}$

$\frac{\sqrt[4]{5}}{2}$

15. $\sqrt[3]{\frac{16}{x^3}}=\frac{\sqrt[3]{16}}{\sqrt[3]{x^3}}$

$\frac{2\sqrt[3]{2}}{x}$

16. $\frac{4}{(3-\sqrt{6})}\frac{(3+\sqrt{6})}{(3+\sqrt{6})}$

$\frac{12+4\sqrt{6}}{9-6}$

$\frac{12+4\sqrt{6}}{3}$

17. $\sqrt{27a^4b^5}$

$3a^2b^2\sqrt{3b}$

18. $\sqrt{27}+\sqrt{20}-\sqrt{12}+\sqrt{45}$

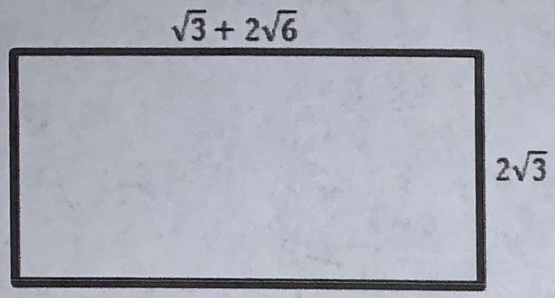
$3\sqrt{3}+2\sqrt{5}-2\sqrt{3}+3\sqrt{5}$

$\sqrt{3}+5\sqrt{5}$

19. Simplify

$4\sqrt{3}\left(2\sqrt{5}+6\sqrt{2}\right) = 8\sqrt{15}+24\sqrt{6}$

20. Which value below would represent the **area** of the rectangle?



$2\sqrt{3}\left(\sqrt{3}+2\sqrt{6}\right)$

$2\cdot 3+4\sqrt{18}$

$6+12\sqrt{2}$

a. $2\sqrt{6}+6$

b. $6+12\sqrt{2}$

c. $3\sqrt{3}+4\sqrt{6}$

d. $6\sqrt{3}+4\sqrt{6}$

21. Rationalize the Denominator and Simplify if possible:

$\frac{12}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = 4\sqrt{3}$

22. $\sqrt{\frac{14x}{18x^7}} = \sqrt{\frac{7}{9x^6}} = \frac{\sqrt{7}}{\sqrt{9x^6}} = \frac{\sqrt{7}}{3x^3}$

Honors Algebra 2
Unit 1 – Rational Exponents Worksheet #3

Evaluate without using a calculator.

1. $\sqrt[4]{1}$ → 1

2. $\sqrt[3]{125}$ → 5

3. $\sqrt[3]{-1000}$ → -10

4. $-\sqrt[6]{64}$ → -2

5. $(\sqrt[3]{-27})^2$ → $(-3)^2 = 9$

6. $(-8)^{\frac{5}{3}}$ → $(\sqrt[3]{-8})^5 = (-2)^5$ → -32

7. $81^{\frac{3}{2}}$ → $(\sqrt{81})^3 = (9)^3$ → 729

8. $64^{\frac{2}{3}}$ → $(\sqrt[3]{64})^2 = (4)^2$ → 16

9. $32^{\frac{2}{5}}$ → $(\sqrt[5]{32})^2 = (2)^2$ → 4

10. $(25)^{\frac{-3}{2}}$ → $(\sqrt{25})^{-3} = (5)^{-3}$ → $\frac{1}{125}$

11. $(100)^{\frac{-5}{2}}$ → $\sqrt{100}^{-5} = (10)^{-5}$ → $\frac{1}{100000}$

12. $27^{\frac{-4}{3}}$ → $(\sqrt[3]{27})^{-4} = (3)^{-4}$ → $\frac{1}{81}$

13. $\sqrt[4]{81}$ → 3

14. $\sqrt[5]{32}$ → 2

15. $(1)^{\frac{1}{6}}$ → 1

16. $(81)^{\frac{3}{4}}$ → $(\sqrt[4]{81})^3 = (3)^3$ → 27

*17. $(-4)^{\frac{3}{2}}$ → $\sqrt{-4}^3$ → no real solution

18. $\left(\frac{1}{16}\right)^{-\frac{1}{4}}$ → $(16)^{1/4} = \sqrt[4]{16}$ → 2

19. $(-64)^{\frac{2}{3}}$ → $\sqrt[3]{-64}^2 = (-4)^2$ → 16

20. $\left(\frac{2}{50}\right)^{\frac{3}{2}} = \left(\frac{1}{25}\right)^{3/2}$ → $\sqrt{\frac{1}{25}}^3$ → $\left(\frac{1}{5}\right)^3$ → $\frac{1}{125}$

Simplify the expression. Give the answer in the form the problem is given.

21. $4^{\frac{1}{3}} \cdot 4^{\frac{1}{3}}$ → $4^{2/3}$

22. $5^{\frac{2}{3}} \cdot 5^{\frac{4}{3}}$ → $5^{4/3} = 5^2$ → 25

23. $\sqrt[3]{4} \cdot \sqrt[3]{16}$ → $\sqrt[3]{64}$ → 4

24. $x^{\frac{1}{3}} \cdot x^{\frac{5}{3}}$

$x^{6/3} = x^2$

25. $(7^{\frac{2}{3}})^{\frac{5}{2}}$

$7^{5/3}$

26. $\left(64^{\frac{1}{3}} \cdot 8^{\frac{1}{3}}\right)^2$

$(\sqrt[3]{64} \cdot \sqrt[3]{8})^2 = (4 \cdot 2)^2$

64

27. $\sqrt[4]{8} \cdot \sqrt[4]{2}$

$\sqrt[4]{16}$

2

28. $x^{\frac{1}{3}} \cdot x^{\frac{1}{5}}$

$x^{5/15} \cdot x^{3/15}$

$x^{8/15}$

29. $(10^{\frac{1}{2}})^{\frac{2}{3}}$

$10^{1/3}$

30. $(27x)^{\frac{1}{3}}$ $27^{1/3} x^{1/3}$

$3x^{1/3}$

31. $\sqrt[5]{27x} \cdot \sqrt[5]{9x^4}$

$\sqrt[5]{243x^5}$

$3x$

32. $\sqrt[4]{27} \cdot \sqrt[4]{3}$

$\sqrt[4]{81}$

3

33. $\left(\frac{x}{4}\right)^{\frac{1}{2}} = \frac{x^{1/2}}{4^{1/2} \to \sqrt{4}}$

$\frac{x^{1/2}}{2}$

34. $(16x)^{\frac{1}{4}}$

$16^{1/4} x^{1/4}$

$2x^{1/4}$

35. $6^{\frac{1}{2}} \cdot 6^{\frac{1}{3}}$

$6^{3/6} \cdot 6^{2/6}$

$6^{5/6}$

36. $(m^4n^2)^{\frac{1}{2}} \cdot \sqrt{m^2n^2}$

$m^2n \cdot mn$

m^3n^2

37. $\left(\frac{81x^2}{y^4}\right)^{\frac{3}{4}} = \frac{81^{3/4} x^{3/2}}{y^3}$

$\frac{27x^{3/2}}{y^3}$

38. $\sqrt[6]{6x^6y^7z^{10}}$

$xyz\sqrt[6]{6yz^4}$

39. $\frac{x^{\frac{5}{4}}}{x^{\frac{3}{4}}}$

$x^{2/4} = x^{1/2}$

40. $\frac{10^{\frac{5}{6}}}{10^{\frac{4}{6}}}$

$10^{1/6}$

41. $\frac{x^{\frac{5}{3}}y}{xy^{-\frac{1}{2}}}$

$x^{2/3} y^{3/2}$

42. $(3^{\frac{1}{2}} \cdot 3^{\frac{2}{3}})^{\frac{3}{2}}$

$(3^{7/6})^{3/2}$

$3^{7/4}$

43. $\frac{x^{1}}{x^{\frac{1}{4}}}$

$x^{3/4}$

44. $\frac{1}{y^{\frac{1}{3}}}$ $\frac{y^{2/3}}{y^{2/3}}$

$\frac{y^{2/3}}{y}$

45. $\left(\frac{27}{x}\right)^{\frac{1}{3}}$ $= \frac{27^{1/3}}{x^{1/3}}$

$\frac{3}{x^{1/3}} \cdot \frac{x^{2/3}}{x^{2/3}} = \frac{3x^{2/3}}{x}$

46. $\frac{2\sqrt{x} \cdot \sqrt{x^3}}{\sqrt{9x^{10}}}$

$\frac{2x^2}{3x^5} = \frac{2}{3x^3}$

47. $a^{\frac{1}{3}} \cdot a^{\frac{1}{6}} \cdot a^{\frac{3}{2}}$

$a^{2/6} \cdot a^{1/6} \cdot a^{9/6}$

$a^{12/6} = a^2$

Rewrite the expression using rational exponent notation.

48. $\sqrt[3]{7}$

$7^{1/3}$

49. $(\sqrt[3]{6})^2$

$6^{2/3}$

50. $(\sqrt[7]{-21})^3$

$(-21)^{3/7}$

51. $\sqrt{-xy^3}$

$(-xy^3)^{1/2}$ or

$(-x)^{1/2} y^{3/2}$

Rewrite the expression using radical notation.

52. $33^{\frac{2}{3}}$

$(\sqrt[3]{33})^2$

53. $(-28)^{\frac{7}{5}}$

$(\sqrt[5]{-28})^7$

54. $(9x^4y^5)^{\frac{1}{2}}$

$\sqrt{9x^4y^5}$

55. $-3x^{\frac{2}{3}}$

$-3\sqrt[3]{x^2}$

Honors Algebra 2
WS#4 Intro to Complex Numbers

No calculator allowed unless noted.

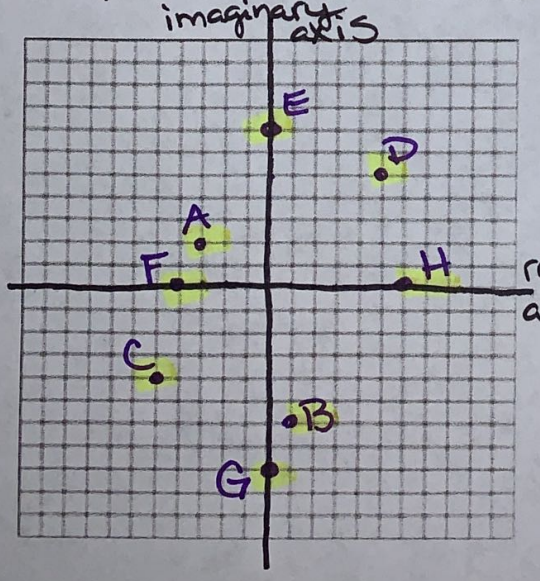
Part 1: Simplify.

1. $\sqrt{-9}$ — $3i$
2. $-\sqrt{-100}$ — $-10i$
3. $\pm 2\sqrt{-4}$ — $\pm 4i$
4. $3\sqrt{-1}$ — $3i$
5. $-\sqrt{-48}$ — $-4i\sqrt{3}$
6. $3+\sqrt{-60}$ — $3+2i\sqrt{15}$
7. $\left(\sqrt{-18}\right)^2$ — -18
8. $\left(3\sqrt{-9}\right)^3$ — $(9i)^3 = 729i^3 = -729i$

Evaluate.

9. i^3 — $-i$
10. i^{14} — -1
11. $-i^8$ — -1
12. $2i^{14} \bullet i^{15}$ — $-2 \cdot -i = 2i$
13. $3(i^3)^3 \bullet i^{12}$ — $3i^{21} = 3i$
14. $-4i^2 \bullet i^{23}$ — $-4i^{25} = -4i$
15. $\dfrac{i^4 \bullet (2i^2)^3}{i^{-2}}$ — $8i^{12} = 8$
16. i^{681} — i
17. $i^{134} \bullet i^{51}$ — $i^{185} = i$

Part II: Plot the following points on the complex plane (label each using the corresponding letter). Be sure to draw and label the axes.



A: $-3+2i$
B: $1-6i$
C: $-5-4i$
D: $5+5i$
E: $7i$ $0+7i$
F: -4 $-4+0i$
G: $-8i$ $0-8i$
H: 6 $6+0i$

Part III: Find the absolute value of each of the complex numbers above.

$|A| =$ $\sqrt{13}$ $|B| =$ $\sqrt{37}$ $|C| =$ $\sqrt{41}$ $|D| =$ $\sqrt{50} = 5\sqrt{2}$

$|E| =$ 7 $|F| =$ 4 $|G| =$ 8 $|H| =$ 6

Part IV: Find the distance between the following points from above.

(1) Points A and B: $4\sqrt{5}$ $\sqrt{(1+3)^2+(-6-2)^2}$

(2) Points C and D: $\sqrt{181}$ $\sqrt{10^2+9^2}$

(3) Points A and E: $\sqrt{34}$ $\sqrt{(3)^2+(5)^2}$

(4) Points B and F: $\sqrt{61}$ $\sqrt{5^2+6^2}$

(5) Points E and G: 15

(6) Points F and H: 10

(7) Points E and F: $\sqrt{65}$ $\sqrt{(4)^2+(7)^2}$

(8) Points G and H: 10

Part V: Simplify the following expressions. (Remember, no calculator!)

(1) i^{35} $-i$

(2) i^{44} 1

(3) i^{327} $-i$

(4) $i^{2^3} = i^8$ 1

(5) $i^{5^2} = i^{25}$ i

(6) $(i^2)^3 = i^6$ -1

(7) $i^3 \cdot i^5 = i^8$ 1

(8) $\frac{i^9}{i^4} = i^5$ i

(9) $i^{119}+i^{67}$ $-i+-i$ $-2i$

(10) $i^{47}-i^{33}$ $-i-i$ $-2i$

(11) $i^{16}(i^{11}+i^3)$ $1(-i-i)$ $i^{27}+i^{19}$ $-i+-i=-2i$

(12) $(i^3+i^7)(i^{13}-i^5)$ $(-i-i)(i-i)=0$

Part VI: Add or subtract the following complex numbers.

(1) $(3-2i)+(-5+5i)$ $-2+3i$

(2) $(-6+7i)+(5-9i)$ $-1-2i$

(3) $(4+2i)-(6+i)$ $-2+i$

(4) $(3-8i)-(-2i-3)$ $6-6i$

(5) $(-8-i)-(4+i)$

-12-2i

(6) $-5i+(4-3i)$

4-8i

(7) $5+(-7+9i)-11i$

-2-2i

(8) $17-(9+4i)+2i$

8-2i

(9) $-i+(+10+2i)+(4-5i)-9$

5-4i

(10) $1+(2+i)+(3-5i)+(9+2i)+4i$

-13+2i

WS#5 Complex or Real solutions? Name_____

Solve each equation. Solve by Square root method. Factoring may be necessary. After solving define your solutions as real or imaginary.

1. $x^2 + 80 = 0$ — I
$\sqrt{x^2} = \pm\sqrt{-80}$
$x = \pm 4i\sqrt{5}$

2. $5x^2 - 500 = 0$ — R
$5x^2 = 500$
$\sqrt{x^2} = \pm\sqrt{100}$
$x = \pm 10$

3. $2x^2 + 40 = 0$ — I
$2x^2 = -40$
$\sqrt{x^2} = \pm\sqrt{-20}$
$x = \pm 2i\sqrt{5}$

4. $3x^2 + 36 = 0$ — I
$3x^2 = -36$
$\sqrt{x^2} = \pm\sqrt{-12}$
$x = \pm 2i\sqrt{3}$

5. $3x^2 + 75 = 0$ — I
$3x^2 = -75$
$\sqrt{x^2} = \pm\sqrt{-25}$
$x = \pm 5i$

6. $2x^2 + 144 = 0$ — I
$2x^2 = -144$
$\sqrt{x^2} = \pm\sqrt{-72}$
$x = \pm 6i\sqrt{2}$

7. $4x^2 + 1600 = 0$ — I
$4x^2 = -1600$
$\sqrt{x^2} = \pm\sqrt{-400}$
$x = \pm 20i$

8. $4x^2 - 1 = 0$ — R
$4x^2 = 1$
$\sqrt{x^2} = \pm\sqrt{\frac{1}{4}}$
$x = \pm \frac{1}{2}$

9. $2x^2 + 10 = 0$ — I
$2x^2 = -10$
$\sqrt{x^2} = \pm\sqrt{-5}$
$x = \pm i\sqrt{5}$

10. $4x^2 + 100 = 0$ — I
$4x^2 = -100$
$\sqrt{x^2} = \pm\sqrt{-25}$
$x = \pm 5i$

11. $x^2 + 9 = 0$ — I
$\sqrt{x^2} = \pm\sqrt{-9}$
$x = \pm 3i$

12. $9x^2 - 90 = 0$ — R
$9x^2 = 90$
$\sqrt{x^2} = \sqrt{10}$
$x = \pm\sqrt{10}$

13. $\sqrt{(x-4)^2} = \pm\sqrt{-81}$ — I
$x - 4 = \pm 9i$
$x = 4 \pm 9i$

14. $-3(x+5)^2 = 9$ — I
$\sqrt{(x+5)^2} = \pm\sqrt{-3}$
$x + 5 = \pm i\sqrt{3}$
$x = -5 \pm i\sqrt{3}$

15. $-2(x-1)^2 = -8$ — R
$\sqrt{(x-1)^2} = \pm\sqrt{4}$
$x - 1 = \pm 2$
$x = 1 \pm 2$
$x = 3, -1$

16. $\frac{1}{2}(x+7)^2 = -16$ — I
$\sqrt{(x+7)^2} = \pm\sqrt{-32}$
$x + 7 = \pm 4i\sqrt{2}$
$x = -7 \pm 4i\sqrt{2}$

17. $\frac{2}{5}(x+8)^2 = 18$ — R
$\sqrt{(x+8)^2} = \pm\sqrt{45}$
$x + 8 = \pm 3\sqrt{5}$
$x = -8 \pm 3\sqrt{5}$

18. $(3x-4)^2 + 8 = 0$ — I
$\sqrt{(3x-4)^2} = \pm\sqrt{-8}$
$3x - 4 = \pm 2i\sqrt{2}$
$3x = 4 \pm 2i\sqrt{2}$
$x = \frac{4 \pm 2i\sqrt{2}}{3}$

19. $x^2 - 8x + 16 = -10$ — I
$\sqrt{(x-4)^2} = \pm\sqrt{-10}$
$x - 4 = \pm i\sqrt{10}$
$x = 4 \pm i\sqrt{10}$

20. $4x^2 + 24x + 36 = -1$ — I
$4(x^2 + 6x + 9) = -1$
$4(x+3)^2 = -1$
$\sqrt{(x+3)^2} = \pm\sqrt{-\frac{1}{4}}$
$x + 3 = \pm\frac{1}{2}i$
$x = -3 \pm \frac{1}{2}i$

21. $5x^2 + 7 = -8$ — I
$5x^2 = -15$
$\sqrt{x^2} = \pm\sqrt{-3}$
$x = \pm i\sqrt{3}$

Part 2: More practice with operations and complex conjugates.

1. $\frac{-2}{3i}\frac{i}{i} = \frac{-2i}{3i^2}$

$\frac{2i}{3}$

2. $\frac{(9-7i)}{i}\frac{i}{i} = \frac{9i-7i^2}{i^2}$

$\frac{7+9i}{-1} = -7-9i$

3. $\frac{9i^7}{3i^3} = 3i^4$

3

4. $(4-4i)(3-5i)$

$12-32i+20i^2$

$-8-32i$

5. $(6+2i)(3+i)$

$18+12i+2i^2$

$16+12i$

6. $(2-i\sqrt{3})(3+i\sqrt{5})$

$6+2i\sqrt{5}-3i\sqrt{3}-i^2\sqrt{15}$

$6+\sqrt{15}+2i\sqrt{5}-3i\sqrt{3}$

7. $\frac{(-3-i)(4-3i)}{(4+3i)(4-3i)}$

$\frac{-12+5i+3i^2}{16-9i^2} = \frac{-15+5i}{25}$

$\frac{-3+i}{5}$

8. $\frac{-5i}{(-6+i)}\frac{(-6-i)}{(-6-i)}$

$\frac{30i+5i^2}{36-i^2} = \frac{-5+30i}{37}$

9. $\frac{(3+i\sqrt{2})(2+i\sqrt{3})}{(2-i\sqrt{3})(2+i\sqrt{3})}$

$\frac{6+3i\sqrt{3}+2i\sqrt{2}+i^2\sqrt{6}}{4-3i^2}$

$\frac{6-\sqrt{6}+3i\sqrt{3}+2i\sqrt{2}}{7}$

10. $\frac{(1-9i)}{(2+i)}\frac{(2-i)}{(2-i)}$

$\frac{2-19i+9i^2}{2-i^2} = \frac{-7-19i}{3}$

11. $\frac{6+5i}{\sqrt{-1}} = \frac{6+5i}{i}\cdot\frac{i}{i}$

$\frac{6i+5i^2}{i^2} = \frac{-5+6i}{-1}$

$5-6i$

12. $\frac{5i}{(3-2i)}\frac{(3+2i)}{(3+2i)}$

$\frac{15i+10i^2}{9-4i^2} = \frac{-10+15i}{13}$

13. $\left(\frac{3-3i}{1-i}\right)\left(\frac{5}{4+i}\right)$

$\left(\frac{3(1-i)}{1-i}\right)\left(\frac{5}{4+i}\right)$

$15\frac{(4-i)}{(4+i)}\frac{(4-i)}{(4-i)} = \frac{60-15i}{16-i^2}$

$\frac{60-15i}{17}$

14. $\left(\frac{2-i}{4+i}\right)\left(\frac{-1+2i}{-i}\right)$

$\frac{-2+5i-2i^2}{-4i-i^2}$

$\frac{5i}{(1-4i)}\frac{(1+4i)}{(1+4i)}$

$\frac{5i+20i^2}{1-16i^2} = \frac{-20+5i}{17}$

15. $\left(\frac{-2+i}{i}\right)(1+2i)-(5+4i)+7$

$\frac{-2-3i+2i^2}{i}$ $-5-4i+7$

$\left(\frac{-4-3i}{i}\right)\frac{i}{i}$

$\frac{-4i-3i^2}{i^2}$

$-3+4i-5-4i+7$

-1

16. State the complex conjugate of $-7-6i$ $-7+6i$

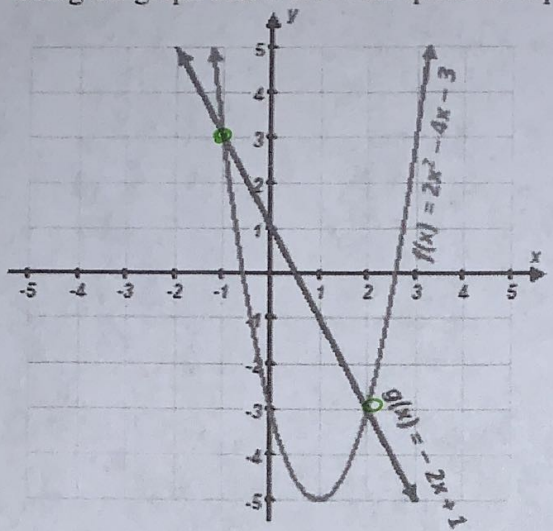
17. What is the product of $3-\sqrt{-25}$ and its complex conjugate? 34

$(3-5i)(3+5i)$

$9-25i^2$

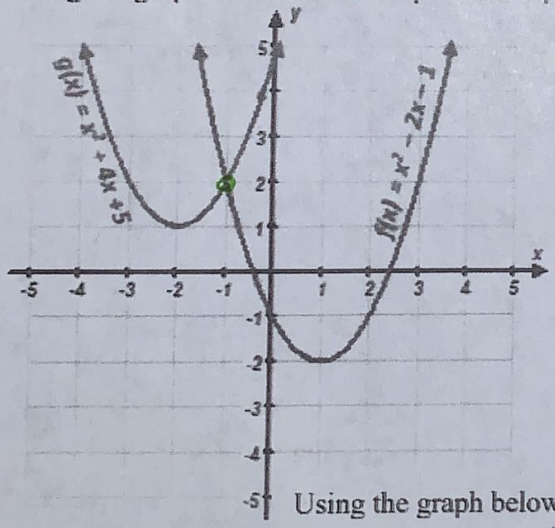
Honors Alg 2 1.6 Name_____
Unit 1 – Solving Quadratics by Graphing
Worksheet #6 part 1
Solve algebraically and compare your answer to the graph.

1. Using the graph below solve the quadratic equation: $2x^2 - 4x - 3 = -2x + 1$



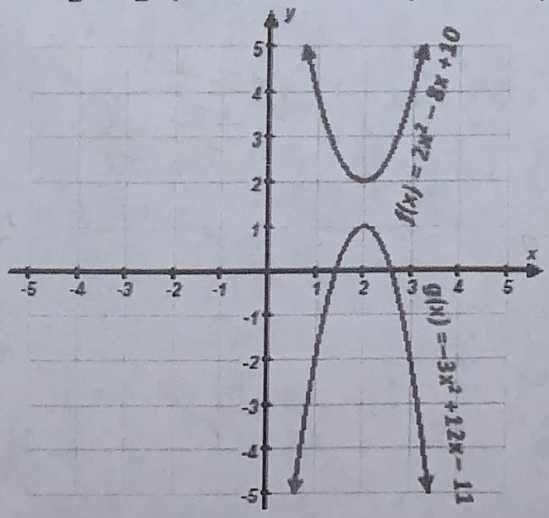
$2x^2 - 2x - 4 = 0$
$2(x^2 - x - 2) = 0$
$2(x-2)(x+1) = 0$
$x - 2 = 0 \quad x + 1 = 0$
$x = 2 \quad x = -1$

2. Using the graph below solve the quadratic equation: $x^2 + 4x + 5 = x^2 - 2x - 1$



$4x + 5 = -2x - 1$
$6x = -6$
$x = -1$

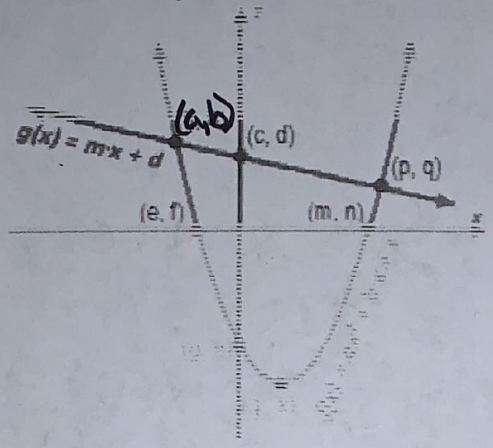
3. Using the graph below solve the quadratic equation: $2x^2 - 8x + 10 = -3x^2 + 12x - 11$



$5x^2 - 20x + 21 = 0$

No Solution
Real

4. Consder the equation $ax^2 + b \cdot x + c = m \cdot x + d$ where a, b, c, m, and d are all constants.



Given the graph above what values of x, make the statement $ax^2 + b \cdot x + c = m \cdot x + d$ true?

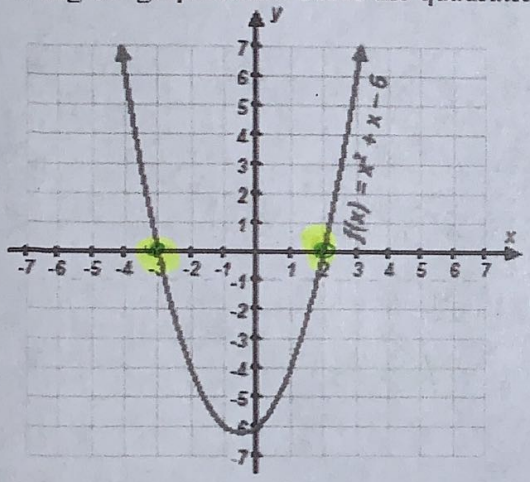
a. $x = e, m$

b. $x = a, p$

c. $x = c, g$

d. $x = b, q$

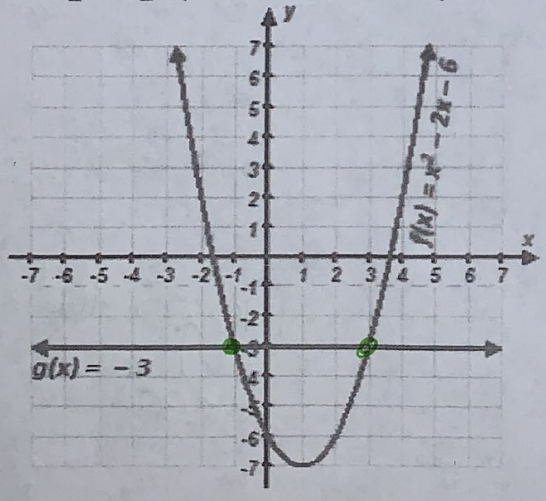
5. Using the graph below solve the quadratic equation: $x^2 + x - 6 = 0$



$x = -3$

$x = 2$

6. Using the graph below solve the quadratic equation: $x^2 - 2x - 6 = -3$



$x = -1$

$x = 3$

Honors Alg 2
Unit 1 – Solving Quadratics by Factoring
Worksheet #7

Name_____

Date_____ Pd_____

Factor completely. Solve.

1. $x^2-16=0$

$(x+4)(x-4)=0$

$x=-4 \quad x=4$

2. $4x^2+22x-12=0$

$2(2x^2+11x-6)=0$

$2(2x-1)(x+6)=0$

$x=\frac{1}{2} \quad x=-6$

3. $x^2+14x+49=0$

$(x+7)(x+7)=0$

$x=-7$ twice

4. $3x^3-12x^2+x-4=0$

$3x^2(x-4)+1(x-4)=0$

$(3x^2+1)(x-4)=0$

$3x^2+1=0$

$\sqrt{x^2}=\pm\sqrt{\frac{-1}{3}}$

$x=\pm\frac{i\sqrt{3}}{3}, \quad x=4$

5. $x^2+5x+6=0$

$(x+3)(x+2)=0$

$x=-3 \quad x=-2$

6. $3x^3+18x^2+27x=0$

$3x(x^2+6x+9)=0$

$3x(x+3)(x+3)=0$

$x=0 \quad x=-3$ twice

7. $x^3+4x^2-9x-36=0$

$x^2(x+4)-9(x+4)=0$

$(x^2-9)(x+4)=0$

$(x+3)(x-3)(x+4)=0$

$x=-3, \quad x=3, \quad x=-4$

8. $5x^5-125x^3=0$

$5x^3(x^2-25)=0$

$5x^3(x+5)(x-5)=0$

$x=0, \quad x=-5, \quad x=5$

9. $6x^2+7x-10=0$

$(6x-5)(x+2)=0$

$x=\frac{5}{6} \quad x=-2$

10. $x^3-6x^2-x+6=0$

$x^2(x-6)-1(x-6)=0$

$(x^2-1)(x-6)=0$

$(x+1)(x-1)(x-6)=0$

$x=-1, \quad x=1, \quad x=6$

11. $4x^3+10x^2-28x-70=0$

$2x^2(2x+5)-14(2x+5)=0$

$(2x^2-14)(2x+5)=0$

$2(x^2-7)(2x+5)=0$

$x^2=7$

$x=\pm\sqrt{7} \quad x=-\frac{5}{2}$

12. $x^2-169=0$

$(x+13)(x-13)=0$

$x=-13 \quad x=13$

13. $2x^2+21x+10=0$

$(2x+1)(x+10)=0$

$x=-\frac{1}{2} \quad x=-10$

14. $x^4-3x^2+2=0$

$(x^2-2)(x^2-1)=0$

$(x^2-2)(x+1)(x-1)=0$

$x^2-2=0$

$x^2=2$

$x=\pm\sqrt{2}, -1, 1$

15. $9x^4+35x^2-4=0$

$(9x^2-1)(x^2+4)=0$

$(3x+1)(3x-1)(x^2+4)$

$x=-\frac{1}{3}, \frac{1}{3}$

$x^2+4=0$

$x^2=-4$

$x=\pm 2i$

16. $12x^3-81x^2-21x=0$

$3x(4x^2-27x-7)=0$

$3x(4x+1)(x-7)=0$

$x=0, \quad x=-\frac{1}{4}, \quad x=7$

17. $-x^2+8x-12=0$

$-1(x^2-8x+12)=0$

$-1(x-6)(x-2)=0$

$x=6 \quad x=2$

Name: _____ Date: _____

Solving Quadratics by Using Square Roots and Completing the Square

Solve each quadratic equation.

1. $x^2 + 4 = 29$

$x^2 = 25$

$x = \pm 5$

2. $3x^2 - 7 = 47$

$3x^2 = 54$

$x^2 = 18$

$x = \pm 3\sqrt{2}$

3. $x^2 + 11 = 16$

$x^2 = 5$

$x = \pm\sqrt{5}$

4. $\sqrt{(x+4)^2} = \pm 121$

$x + 4 = \pm 11i$

$x = -4 \pm 11i$

5. $(2x-3)^2 = 9$

$2x - 3 = \pm 3$

$2x - 3 = 3 \quad 2x - 3 = -3$

$x = 3 \quad x = 0$

6. $(x-7)^2 = 99$

$x - 7 = \pm 3\sqrt{11}$

$x = 7 \pm 3\sqrt{11}$

7. $(x+3)^2 + 6 = 18$

$(x+3)^2 = 12$

$x + 3 = \pm 2\sqrt{3}$

$x = -3 \pm 2\sqrt{3}$

8. $(2x+6)^2 - 8 = 24$

$(2x+6)^2 = 32$

$2x + 6 = \pm 4\sqrt{2}$

$x = \frac{-6 \pm 4\sqrt{2}}{2}$

$x = -3 \pm 2\sqrt{2}$

9. $\frac{2}{5}x^2 - 3 = 7$

$\frac{2}{5}x^2 = 10$

$x^2 = 25$

$x = \pm 5$

10. $x^2 + 4 = -8$

$x^2 = -12$

$x = \pm 2i\sqrt{3}$

11. $(x-2)^2 - 3 = -10$

$(x-2)^2 = -7$

$x - 2 = \pm i\sqrt{7}$

$x = 2 \pm i\sqrt{7}$

12. $3(x+4)^2 + 72 = 0$

$3(x+4)^2 = -72$

$(x+4)^2 = -24$

$x + 4 = \pm 2i\sqrt{6}$

$x = -4 \pm 2i\sqrt{6}$

Error Analysis:
Describe and correct the error Sarah made when attempting to solve by square roots.

Problem: $(x + 2)^2 = 36$

Sarah's Process:

$(x + 2)^2 = 36$

$\sqrt{(x+2)^2} = \sqrt{36}$

$x + 2 = 6$

$x = 6 + 2$ and $x = 6 - 2$

$x = 8$ and 4

Correct Process:

$\sqrt{(x+2)^2} = \pm\sqrt{36}$

$x+2 = \pm 6$

$x+2=6$ & $x+2=-6$

$x=4$ & $x=-8$

She should have ± in front of the square root sign so it is ±6 rather than 6±

Solving Quadratics by Completing the Square

Steps for Solving Quadratics by Completing the Square (works only when a = 1):
1. Move constant to the other side by adding or subtracting
2. Add $\left(\frac{b}{2}\right)^2$ to both sides
3. Use number diamonds or perfect square trinomials to factor left side.
4. Take the square roots of both sides.
5. Solve for x.

1. $x^2 - 16x - 8 = 0$

$x^2 - 16x + 64 = 8 + 64$

$\left(\frac{-16}{2}\right)^2$

$(x-8)^2 = 72$

$x - 8 = \pm 6\sqrt{2}$

$x = 8 \pm 6\sqrt{2}$

2. $x^2 + 4x + 5 = 0$

$x^2 + 4x + 4 = -5 + 4$

$(x+2)^2 = -1$

$x + 2 = \pm i$

$x = -2 \pm i$

3. $x^2 - 12x + 10 = 0$

$x^2 - 12x + 36 = -10 + 36$

$(x-6)^2 = 26$

$x - 6 = \pm\sqrt{26}$

$x = 6 \pm \sqrt{26}$

4. $x^2 - 8x + 18 = 0$

$x^2 - 8x + 16 = -18 + 16$

$(x-4)^2 = -2$

$x - 4 = \pm i\sqrt{2}$

$x = 4 \pm i\sqrt{2}$

5. $x^2 + 14x + 5 = -5$

$x^2+14x+49 = -10+49$

$(x+7)^2 = 39$

$x = -7 \pm \sqrt{39}$

6. $2x^2 - 8x + 20 = -6$

$x^2-4x+10 = -3$

$x^2-4x+4 = -13+4$

$(x-2)^2 = -9$

$x = 2 \pm 3i$

Defend:

Matt is trying to solve the following problem by completing the square:

$$x^2 - 18x + 6 = 0$$

He believes he has got the answer and wants to compare it with his classmate, Marcus. He says,"Hey Marcus, I got $x = 9 + 5\sqrt{3}$ and $9 - 5\sqrt{3}$, what did you get?"

$x^2-18x+81 = -6+81$

$(x-9)^2 = 75$

Marcus replied, "hmm that's weird I got $x = 9 + \sqrt{75}$ and $9 - \sqrt{75}$."

Matt then says "well we both got the 9 part so we have similar thinking, lets ask Tiffany!"

Tiffany looks at their work and says " I got the same thing as Matt I just combined like terms and got $x = 14\sqrt{3}$ and $4\sqrt{3}$."

More confused than ever they call over Mrs. Dombrowski. She assures them that one of them has the correct answer...

Who is correct? Explain.

Matt is correct. Marcus did not simplify the radical. Tiffany combined unlike terms.

Error Analysis:

Describe and correct the error Emma made when attempting to solve by completing the square.

Problem: $x^2 + 20x - 8 = 0$

Emma's Process:

$x^2 + 20x - 8 = 0$

$x^2 + 20x + \_\_\_\_ = 8 + \_\_\_\_$

$x^2 + 20x + 10 = 8 + 10$

$x^2 + 20x + 10 = 18$

20

10

??? - "Not Factorable"

This is only $\frac{b}{2}$ instead of $(\frac{b}{2})^2$

Correct Process:

$x^2+20x-8 = 0$

$x^2+20x+100 = 8+100$

$\sqrt{(x+10)^2} = \sqrt{108}$

$x+10 = \pm 6\sqrt{3}$

$x = -10 \pm 6\sqrt{3}$

Name: _____ Date: _____

Solving Quadratics Using the Quadratic Formula

Directions: Find the discriminant and tell the number and type of solutions. Then solve each of the following equations using the Quadratic Formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1. $x^2 + 4x - 2 = 0$

$\frac{-4 \pm \sqrt{(4)^2-4(1)(-2)}}{2(1)}$

$\frac{-4 \pm \sqrt{24}}{2}$

$\frac{-4 \pm 2\sqrt{6}}{2}$

Discriminant: 24
# of Solutions: 2 real
X = $-2 \pm \sqrt{6}$

2. $4x^2 - 8x + 3 = 0$

$\frac{8 \pm \sqrt{(-8)^2-4(4)(3)}}{2(4)}$

$\frac{8 \pm \sqrt{16}}{8}$

$\frac{8 \pm 4}{8} = \frac{8+4}{8} = \frac{12}{8}$; $\frac{8-4}{8} = \frac{4}{8}$

Discriminant: 16
# of Solutions: 2 real
X = $\frac{3}{2}, \frac{1}{2}$

3. $5x^2 - 10x + 18 = 13$

$5x^2 - 10x + 5 = 0$

$5(x^2 - 2x + 1) = 0$

$\frac{2 \pm \sqrt{(-2)^2-4(1)(1)}}{2(1)}$

$\frac{2 \pm \sqrt{0}}{2}$

Discriminant: 0
# of Solutions: 1 real
X = 1

4. $6x^2 = -4x - 10$

$6x^2 + 4x + 10 = 0$

$2(3x^2 + 2x + 5) = 0$

$\frac{-2 \pm \sqrt{(2)^2-4(3)(5)}}{2(3)}$

$\frac{-2 \pm \sqrt{-56}}{6} = \frac{-2 \pm 2i\sqrt{14}}{6}$

Discriminant: -56
# of Solutions: 2 imag.
X = $\frac{-1 \pm i\sqrt{14}}{3}$

5. $x^2 - 4x = -13$

$x^2 - 4x + 13 = 0$

$\frac{4 \pm \sqrt{(-4)^2-4(1)(13)}}{2(1)}$

$\frac{4 \pm \sqrt{-36}}{2} = \frac{4 \pm 6i}{2}$

Discriminant: -36
# of Solutions: 2 imag.
X = $2 \pm 3i$

6. $3x^2 - 2x = -2$

$3x^2 - 2x + 2 = 0$

$\frac{-2 \pm \sqrt{(-2)^2-4(3)(2)}}{2(3)}$

$\frac{-2 \pm \sqrt{-20}}{6}$

$\frac{-2 \pm 2i\sqrt{5}}{6}$

Discriminant: -20
# of Solutions: 2 imag.
X = $\frac{-1 \pm i\sqrt{5}}{3}$

7. $2x^2 - 7x - 13 = -10$

$2x^2 - 7x - 3 = 0$

$\frac{7 \pm \sqrt{(-7)^2 - 4(2)(-3)}}{2(2)}$

$\frac{7 \pm \sqrt{73}}{4}$

Discriminant: 73
# of Solutions: 2 real
$X = \frac{7 \pm \sqrt{73}}{4}$

8. $8x^2 + 4x + 16 = -x^2$

$9x^2 + 4x + 16 = 0$

$\frac{-4 \pm \sqrt{(4)^2 - 4(9)(16)}}{2(9)}$

$\frac{-4 \pm 4i\sqrt{35}}{18}$

Discriminant: -560
# of Solutions: 2 imag
$X = \frac{-2 \pm 2i\sqrt{35}}{9}$

Error Analysis:
Describe and correct the error Jaya made when attempting to solve using the quadratic formula.

Problem: $7x + 2x^2 - 4 = 3$

Jaya's Process:

$7x + 2x^2 - 4 = 3$

$7x + 2x^2 - 7 = 0$

$\frac{-2 \pm \sqrt{2^2 - 4(7)(-7)}}{2(7)}$

$\frac{-2 \pm \sqrt{200}}{14}$

$x = \frac{-2 \pm 10\sqrt{2}}{14}$

$x = \frac{-1 + 5\sqrt{2}}{7}$ and $\frac{-1 - 5\sqrt{2}}{7}$

Correct Process:

$7x + 2x^2 - 4 = 3$

$2x^2 + 7x - 7 = 0$

$\frac{-7 \pm \sqrt{(7)^2 - 4(2)(-7)}}{2(2)}$

$X = \frac{-7 \pm \sqrt{105}}{4}$

Jaya didn't write the equation in standard form before using the quadratic formula

Decision Making:

I have a non factorable trinomial where a is 1 and b is odd, which method am I going to use? Quadratic formula

I have a ~~factorable~~ trinomial where a is NOT 1 and b is odd, which method am I going to use? Quadratic formula or Factoring

I have a non factorable trinomial where a is 1 and b is even, which method am I going to use? Completing the Square or Quadratic formula

I have a binomial squared and its equal to some number, which method am I going to use? Square Root method

Honors Algebra 2
Unit 1 Solving Quads all Methods WS#10

Name _____

Solve the quadratic equation. Find ALL solutions.

1. $x^2+3x-\frac{3}{4}=0$

$4x^2+12x-3=0$

$\frac{-12\pm\sqrt{(12)^2-4(4)(-3)}}{2(4)} = \frac{-12\pm\sqrt{192}}{8}$

$\frac{-12\pm 8\sqrt{3}}{8}$

$x=\frac{-3\pm 2\sqrt{3}}{2}$

2. $x^2+x+2=0$

$\frac{-1\pm\sqrt{(1)^2-4(1)(2)}}{2(1)}$

$\frac{-1\pm\sqrt{-7}}{2} = \frac{-1\pm i\sqrt{7}}{2}$

3. $x^2=\frac{14}{3}x+\frac{5}{3}$

$3x^2-14x-5=0$

$(3x+1)(x-5)=0$

$x=-\frac{1}{3}$ & $x=5$

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

$(x-2)(x-1)=0$

$x=2$ & $x=1$

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

$3x^2-2x+5=0$

$\frac{2\pm\sqrt{(-2)^2-4(3)(5)}}{2(3)} = \frac{2\pm\sqrt{-56}}{6} = \frac{2\pm 2i\sqrt{14}}{6}$

$x=\frac{1\pm i\sqrt{14}}{6}$

6. $4(x+13)^2=25$

$\sqrt{(x+13)^2}=\pm\sqrt{\frac{25}{4}}$

$x+13=\pm\frac{5}{2}$

$x=-13\pm\frac{5}{2}$

$x=-\frac{21}{2}$ & $\frac{-31}{2}$

7. $x^2+x+1=0$

$\frac{-1\pm\sqrt{(1)^2-4(1)(1)}}{2(1)}$

$\frac{-1\pm\sqrt{-3}}{2} = \frac{-1\pm i\sqrt{3}}{2}$

8. $12x^2-5x-2=0$

$\frac{5\pm\sqrt{(-5)^2-4(12)(-2)}}{2(12)}$

$\frac{5\pm\sqrt{121}}{24} = \frac{5\pm 11}{24}$

$x=\frac{2}{3}$ & $\frac{-1}{4}$

9. $x^2-\frac{7}{4}x=\frac{1}{2}$

$4x^2-7x-2=0$

$(4x+1)(x-2)=0$

$x=-\frac{1}{4}$ & $x=2$

10. $\frac{1}{8}x^2-x-16=0$

$x^2-8x-128=0$

$x^2-8x+16=128+16$

$(x-4)^2=144$

$x-4=\pm 12$

$x=16$ & -8

11. $25x^2+3=20x$

$25x^2-20x+3=0$

$(5x-1)(5x-3)=0$

$x=\frac{1}{5}$ $x=\frac{3}{5}$

12. $-2(x+3)^2=32$

$(x+3)^2=-16$

$x+3=\pm 4i$

$x=-3\pm 4i$

$x=4\pm 12$

13. $5(x+2)^2-6=-16$

$5(x+2)^2=-10$

$(x+2)^2=-2$

$x+2=\pm i\sqrt{2}$

$x=-2\pm i\sqrt{2}$