

Algebra: Unit 8 Review

AXIS OF SYMMETRY:

$$\frac{-b}{2a}$$

QUADRATIC FORMULA:

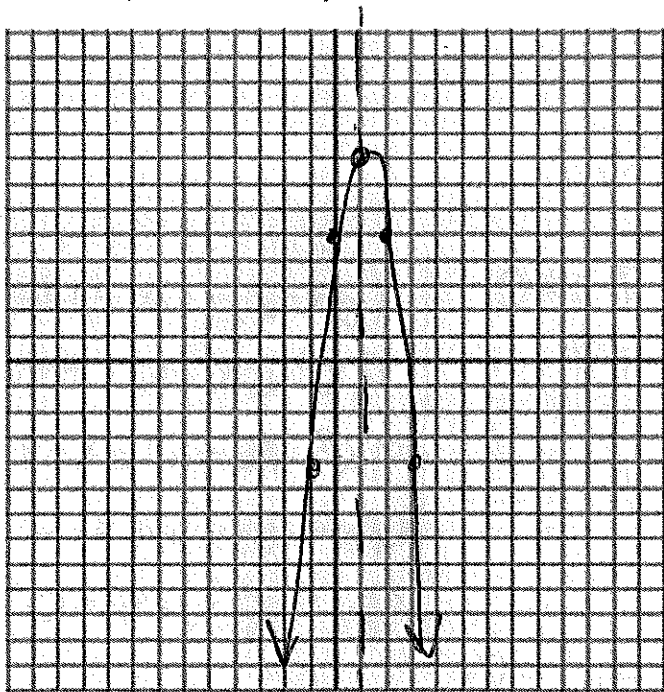
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

COMPLETING THE SQUARE:

$$\left(\frac{b}{2}\right)^2$$

GRAPHING

1. Graph the function: $y = -3x^2 + 6x + 5$

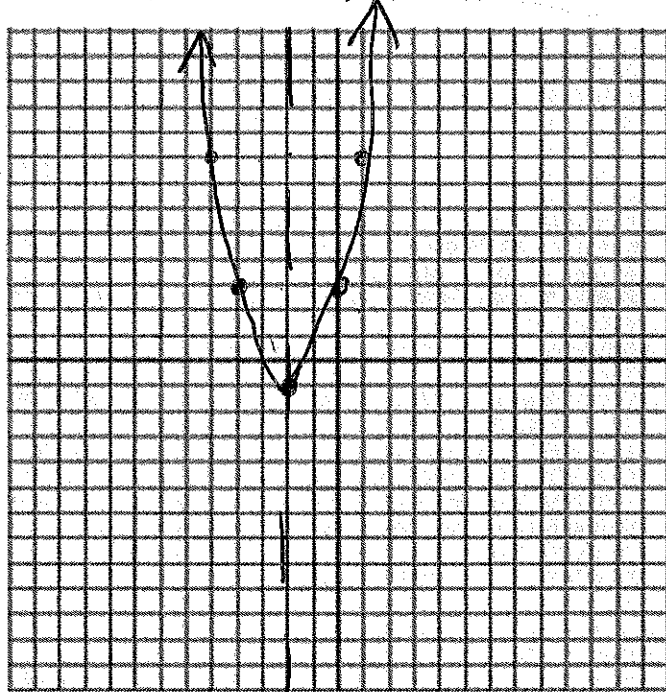


$$\frac{-b}{2a} = \frac{-6}{2(-3)} = \frac{-6}{-6} = 1$$

$$(1, 8)$$

x	-1
y	-4

2. Graph the function: $f(x) = x^2 + 4x + 3$



$$\frac{-b}{2a} = \frac{-4}{2(1)} = \frac{-4}{2} = -2$$

$$(-2, -1)$$

x	1
y	8

SQUARE ROOTS

3. $3x^2 + 12 = 12$
 $-12 \quad -12$

$$\underline{3x^2 = 0}$$

3

$$\sqrt{x^2} = \sqrt{0}$$

$$\boxed{x = 0}$$

4. $2x^2 + 32 = 0$
 $-32 \quad -32$

$$\frac{2x^2 = -32}{2}$$

$$\sqrt{x^2} = \sqrt{-16}$$

$$\boxed{x = \pm 4i}$$

5. $x^2 - 49 = 0$

$$\sqrt{x^2} = \sqrt{49}$$

$$\boxed{x = \pm 7}$$

FACTORING

6. $2x^2 - 5x = 88$
 $2x^2 - 5x - 88 = 0$

	2x	11
x	2x ²	11x
-8	-16x	-88

$-176 = 8 \cdot 22$
 $-16 \quad 11$

$$(2x+11)(x-8) = 0$$

$$2x+11=0$$

$$\underline{2x = -11}$$

2

$$x-8=0$$

$$\boxed{x=8}$$

$$\boxed{x = -5.5}$$

7. $x^2 + x - 42 = 0$

$$(x-6)(x+7) = 0$$

$$x-6=0$$

$$\boxed{x=6}$$

$$x+7=0$$

$$\boxed{x=-7}$$

8. $(3x-2)^2 = 6x-4$

$$(3x-2)(3x-2) = 6x-4$$

$$9x^2 - 6x - 6x + 4 = 6x - 4$$

$$9x^2 - 12x + 4 = 6x - 4$$

$$9x^2 - 12x + 4 = -4$$

$$9x^2 - 12x + 8 = 0$$

$$(3x-2)(3x-4) = 0$$

$$3x-2=0$$

$$\underline{3x=2}$$

$$\frac{3}{3}$$

$$\boxed{x = \frac{2}{3}}$$

$$3x-4=0$$

$$\underline{3x=4}$$

$$\frac{3}{3}$$

$$\boxed{x = \frac{4}{3}}$$

	3x	-2
3x	9x ²	-6x
-4	-12x	8

$72 = 8 \cdot 9$
 $3 \cdot 24$
 $18 \cdot 4$
 $36 \cdot 2$
 $12 \cdot 6$

COMPLETING THE SQUARE

$$\left(\frac{b}{2}\right)^2 = \left(\frac{2}{2}\right)^2 = 1$$

9. $a^2 + 9a - 682 = 0$

$$\left(\frac{b}{2}\right)^2 = \left(\frac{9}{2}\right)^2 = 20.25$$

$$a^2 + 9a = 682$$

$$a^2 + 9a + 20.25 = 702.25$$

$$\sqrt{(a + 4.5)^2} = \sqrt{702.25}$$

$$a + 4.5 = \pm 26.5$$

$$a + 4.5 = 26.5 \quad a + 4.5 = -26.5$$

$$\boxed{a = 22}$$

$$\boxed{a = -31}$$

10. $4y^2 + 8y - 36 = 0$

$$\frac{4y^2 + 8y = 36}{4}$$

$$y^2 + 2y = 9$$

$$y^2 + 2y + 1 = 10$$

$$\sqrt{(y + 1)^2} = \sqrt{10}$$

$$y + 1 = \pm 3.2$$

$$y + 1 = 3.2$$

$$\boxed{y = 2.2}$$

$$y + 1 = -3.2$$

$$\boxed{y = -4.2}$$

QUADRATIC FORMULA

11. $2x^2 + 4x - 7 = 0$

$$x = \frac{-4 \pm \sqrt{4^2 - 4(2)(-7)}}{2(2)} = \frac{-4 \pm \sqrt{16 + 56}}{4}$$

$$\frac{-4 \pm \sqrt{72}}{4} = \frac{-4 \pm 8.5}{4}$$

$$\frac{-4 + 8.5}{4} = \boxed{1.125}$$

$$\frac{-4 - 8.5}{4} = \boxed{-3.125}$$

12. $7x^2 - 2x - 8 = 0$

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(7)(-8)}}{14} = \frac{2 \pm \sqrt{4 + 224}}{14}$$

$$\frac{2 \pm \sqrt{228}}{14} = \frac{2 \pm 15.1}{14}$$

$$\frac{2 + 15.1}{14} = \boxed{1.22}$$

$$\frac{2 - 15.1}{14} = \boxed{-0.9}$$

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

WHEN IS IT BEST??

When should you use each of the different methods for solving?

Graphing	easily graphed.
Square Roots	no "b" term
Factoring	easily factorable
Completing the Square	$ax^2 - a = 1$
Quadratic Formula	all the time.

Which method would you choose to solve each equation? Justify your reasoning. Then solve using the method you chose.

13. $13x^2 - 5x + 21 = 0$

Quadratic

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(13)(21)}}{2(13)} = \frac{5 \pm \sqrt{25 - 1092}}{26}$$

$$\frac{5 \pm \sqrt{-1067}}{26} = \boxed{\frac{5 \pm i\sqrt{1067}}{26}}$$

15. $144x^2 = 25$

S.R

$$144x^2 = 25$$

$$\frac{144x^2}{144} = \frac{25}{144}$$

$$\sqrt{x^2} = \frac{25}{144}$$

$$\boxed{x = \pm \frac{5}{12}}$$

14. $x^2 - x - 30 = 0$ $\left(\frac{b}{2}\right)^2 - \left(\frac{c}{a}\right)^2 = \frac{1}{4}$

C. the \square

$$x^2 - x = 30$$

$$x^2 - x + \frac{1}{4} = 30.25$$

$$\sqrt{\left(x - \frac{1}{2}\right)^2} = \sqrt{30.25}$$

$$x - \frac{1}{2} = \pm 5.5$$

$$x - \frac{1}{2} = 5.5 \quad x - \frac{1}{2} = -5.5$$

$$\boxed{x = 6} \quad \boxed{x = -5}$$

16. $x^2 - 7x + 4 = 0$

$\left(\frac{b}{2}\right)^2 - \left(\frac{c}{a}\right)^2 =$

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

$$x^2 - 7x + 12.25 = 8.25$$

$$\sqrt{\left(x - 3.5\right)^2} = \sqrt{8.25}$$

$$x - 3.5 = \pm 2.87$$

$$x - 3.5 = 2.87 \quad x + 3.5 = -2.87$$

$$+3.5 \quad +3.5$$

$$x = 6.37 \quad x = 0.63$$

$x - 12$
 \boxed{x}

or C. the \square

9

RADICALS

WHAT IS "I":

$$\sqrt{-1}$$

i^2

$$-1$$

COMPLEX NUMBER FORM.

$$a + bi$$

Simplify the radical

17. $\sqrt{175} = \sqrt{25 \cdot 7} =$

$$5\sqrt{7}$$

18. $\sqrt{99} =$

$$3\sqrt{11}$$

19. $\sqrt{448} =$

$$8\sqrt{7}$$

Simplify the radical. Write the answer in complex number form.

20. $\sqrt{-80} =$

$$4i\sqrt{5}$$

21. $\sqrt{-252} =$

$$6i\sqrt{7}$$

22. $\sqrt{-147} =$

$$7i\sqrt{3}$$

Solve using any method. Write the answer in complex number form.

23. $x^2 - 2x + 10 = 0$

$$x^2 - 2x = -10$$

$$x^2 - 2x + 1 = -9$$

$$\sqrt{(x-1)^2} = \sqrt{-9}$$

$$x-1 = \pm 3i$$

$$x-1 = 3i$$

$$x = 1 + 3i$$

$$x-1 = -3i$$

$$x = 1 - 3i$$

24. $2x^2 + x + 1 = 0$

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

$$x = \frac{-1 \pm \sqrt{1^2 - 4(2)(1)}}{4} = \frac{-1 \pm \sqrt{1-8}}{4}$$

$$\frac{-1 \pm \sqrt{-7}}{4} = \frac{-1 \pm i\sqrt{7}}{4}$$

$$\left[\frac{-1}{4} + \frac{i\sqrt{7}}{4} \right]$$

$$\left[\frac{-1}{4} - \frac{i\sqrt{7}}{4} \right]$$