Accelerated Geom/Alg
Quadratics Review

Name_____'s favorite childhood toy was:

Solve the following equations by factoring, completing the square or taking square roots.

1. $-2(x-10)^2+4=-16$

$-4 \quad -4$

$\frac{-2(x-10)^2}{-2} = \frac{-20}{-2}$

$(x-10)^2 = 10$

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

$+10 \quad +10$

1. $x = 10 \pm \sqrt{10}$

2. $4(x-3)^2-15=-3$

$+15 \quad +15$

$\frac{4(x-3)^2}{4} = \frac{12}{4}$

$(x-3)^2 = 3$

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

$+3 \quad +3$

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

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

$a:1$

$b:-12$

$c:3$

$\frac{12 \pm \sqrt{12^2-4(1)(3}}{2} = \frac{12 \pm \sqrt{144-12}}{2} = \frac{12 \pm \sqrt{132}}{2}$

$\frac{12 \pm 2\sqrt{33}}{2}$

$\sqrt{132} \to 66 \to 11, 6 \to 3, 2$

3. $x = 6 \pm \sqrt{33}$

4. $2x^2-8x-24=0$

$\frac{2(x^2-4x-12)}{2} = \frac{0}{2}$

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

$+12 \quad +12$

$x^2-4x \overset{+4}{=} 12 \overset{+4}{}$

$\div 2$ ↓ square

$(x-2)^2 = 16$

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

$x-2 = \pm 4$

$+2 \quad +2$

$x = 2 \pm 4$

4. $x = -2, 6$

5. $4(x-6)^2-10=70$

$+10 \quad +10$

$\frac{4(x-6)^2}{4} = \frac{80}{4}$

$(x-6)^2 = 20$

$x-6 = \pm\sqrt{20} \to \sqrt{20}$

$10 \to 5, 2$

$= \pm 2\sqrt{5}$

$x-6 = \pm 2\sqrt{5}$

$+6 \quad +6$

5. $x = 6 \pm 2\sqrt{5}$

6. $x^2-14x+13=0$

$a:1$

$b:-14$

$c:13$

$\frac{14 \pm \sqrt{(14)^2-4(1)(13)}}{2}$

$\frac{14 \pm \sqrt{196-52}}{2} = \frac{14 \pm \sqrt{144}}{2} = \frac{14 \pm 12}{2} = \frac{2}{2}, \frac{26}{2}$

6. $x = 1, 13$

7. $3x^2-30x=-36$

$\frac{3(x^2-10x)}{3} = \frac{-36}{3}$

$x^2-10x \overset{+25}{=} -12 \overset{+25}{}$

$\div 2$ ↓ square

$(x-5)^2 = 13$

$x-5 = \pm\sqrt{13}$

$+5 \quad +5$

7. $x = 5 \pm \sqrt{13}$

$b^2-4ac=0$

8. The quadratic equation $3kx^2 - 6kx + 2 = 0, k \neq 0$, has one real root. Solve for k.

a: $3k$

b: $-6k$

c: 2

$(-6k)^2 - 4(3k)(2) = 0$

$36k^2 - 24k = 0$

$\frac{12(3k^2-2k)}{12} = \frac{0}{12}$

$\frac{k(3k-2)}{k} = \frac{0}{k}$

$3k - 2 = 0$

$+2 \quad +2$

$\frac{3k}{3} = \frac{2}{3}$

$k = \frac{2}{3}$

9. The quadratic equation $f(x) = 2x^2 + 3kx - 1 = 0$ has two real roots with a discriminant of 44. Solve for k.

a: 2

b: $3k$

c: -1

$b^2-4ac = 44$

$(3k)^2 - 4(2)(-1) = 44$

$9k^2 + 8 = 44$

$9k^2 = 36$

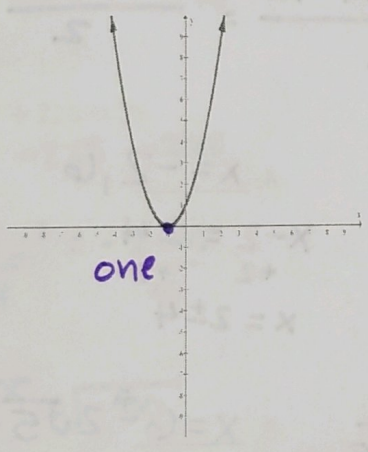
$\frac{9k^2}{9} = \frac{36}{9}$

$\sqrt{k^2} = \sqrt{4}$

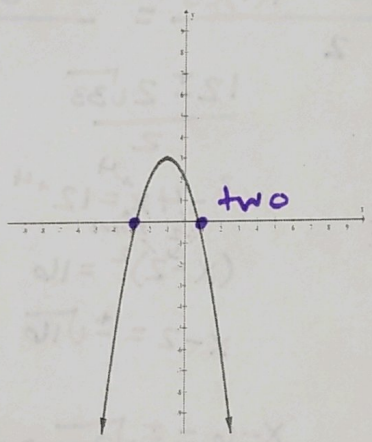
$k = \pm 2$

10. Decide if the discriminant is positive, negative or 0.

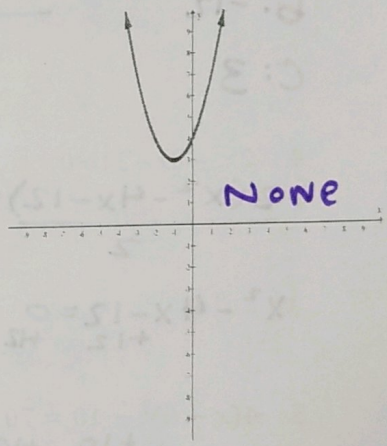
a. Discriminant: $\varnothing$



b. Discriminant: positive



c. Discriminant: negative



11. The quadratic equation $g(x) = \left(\frac{1}{2}k + 6\right)x^2 + 2kx + 1$ has one real solution. Solve for k.

a: $\frac{1}{2}k + 6$

b: $2k$

c: 1

$b^2-4ac=0$

$(2k)^2 - 4(\frac{1}{2}k+6)(1) = 0$

$4k^2 - 2k - 24 = 0$

$\frac{2(2k^2-k-12)}{2} = \frac{0}{2}$

$2k^2 - k - 12 = 0$

a: 2

b: -1

c: -12

$\frac{1 \pm \sqrt{1-4(2)(-12)}}{4}$

$\frac{1 \pm \sqrt{97}}{4}$

Solve the following quadratic equations using the Quadratic Formula.

12. $3x^2 + 10x = -5$

12. _____

$3x^2 + 10x + 5 = 0$

a: 3

b: 10

c: 5

$\frac{-10 \pm \sqrt{100-4(3)(5)}}{6} = \frac{-10 \pm \sqrt{100-60}}{6} = \frac{-10 \pm \sqrt{40}}{6}$

$\frac{-10 \pm 2\sqrt{10}}{6} = \frac{-5 \pm \sqrt{10}}{3}$

$\sqrt{40}$

$4 \quad 10$

$2 \; 2 \quad 5 \; 2$

Key Take
Whoa!

13. $4x^2 - 5x - 6 = 0$

a: 4
b: -5
c: -6

$\frac{5 \pm \sqrt{5^2 - 4(4)(-6)}}{8}$ $\frac{5 \pm \sqrt{25+96}}{8}$ $\frac{5 \pm \sqrt{121}}{8}$ $\frac{5 \pm 11}{8} = \frac{-6}{8}, \frac{16}{8}$

13. $x = \frac{-3}{4}, 2$

14. $x^2 + 8x = 9$

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

a: 1
b: 8
c: -9

$\frac{-8 \pm \sqrt{8^2 - 4(1)(-9)}}{2}$ $\frac{-8 \pm \sqrt{64+36}}{2} \rightarrow \frac{-8 \pm \sqrt{100}}{2} \rightarrow \frac{-8 \pm 10}{2} \rightarrow \frac{2}{2}, \frac{-18}{2}$

14. $x = 1, -9$

15. $3x^2 + 4x - 6 = 0$

a: 3
b: 4
c: -6

$\frac{-4 \pm \sqrt{4^2 - 4(3)(-6)}}{6}$ $\frac{-4 \pm \sqrt{16+72}}{6}$ $\frac{-4 \pm \sqrt{88}}{6}$

$\sqrt{88} = 2\sqrt{22}$

11 ^ 8
4 ^ 2
2 2

$\frac{-4 \pm 2\sqrt{22}}{6}$

15. $x = \frac{-2 \pm \sqrt{22}}{3}$

Use the discriminant to determine the number and type of solutions for each quadratic equation. $b^2 - 4ac$

16. $4x^2 + 3x - 7 = 0$

a: 4
b: 3
c: -7

$3^2 - 4(4)(-7)$
$9 + 112$
121

Discriminant: 121
# of Solutions: 2 real

17. $-2x^2 + 5x + 4 = 0$

a: -2
b: 5
c: 4

$5^2 - 4(-2)(4)$
$25 + 32$

Discriminant: 57
# of Solutions: 2 real

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

a: 3
b: 6
c: 3

$6^2 - 4(3)(3)$
$36 - 36$
0

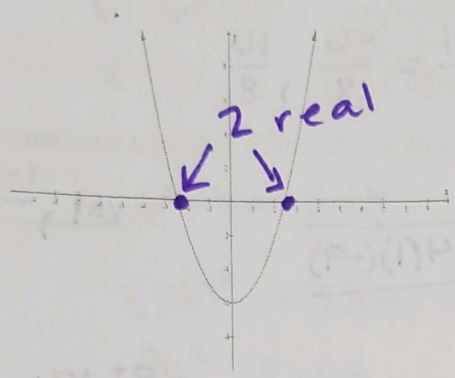
Discriminant: 0
# of Solutions: 1 solution (real)

IAW

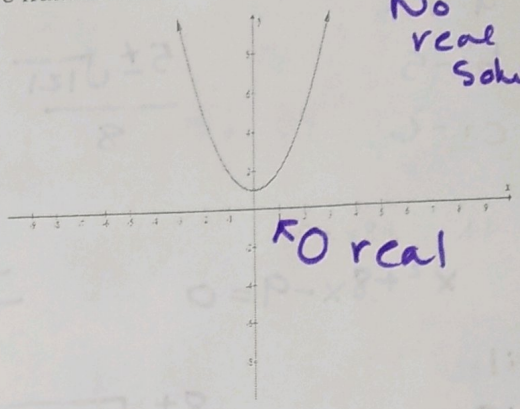
19. Which of the following would have a discriminant = 0? C because 1 real solution

20. Which of the following would have a discriminant = a negative number? b because No real solution

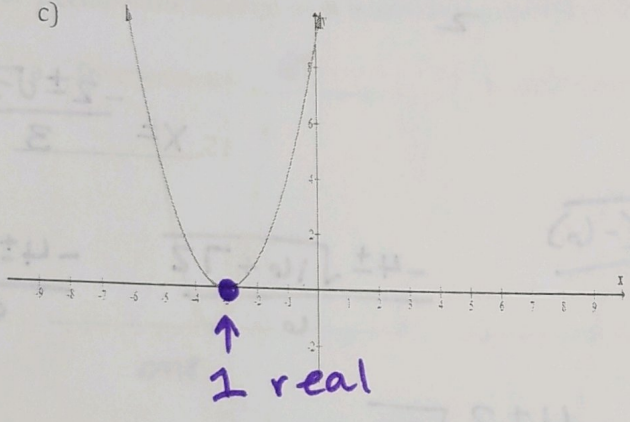
a)



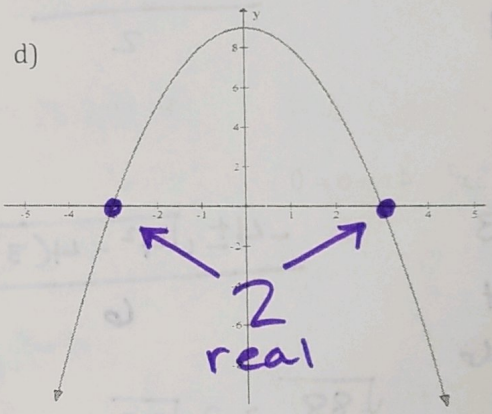
b)



c)

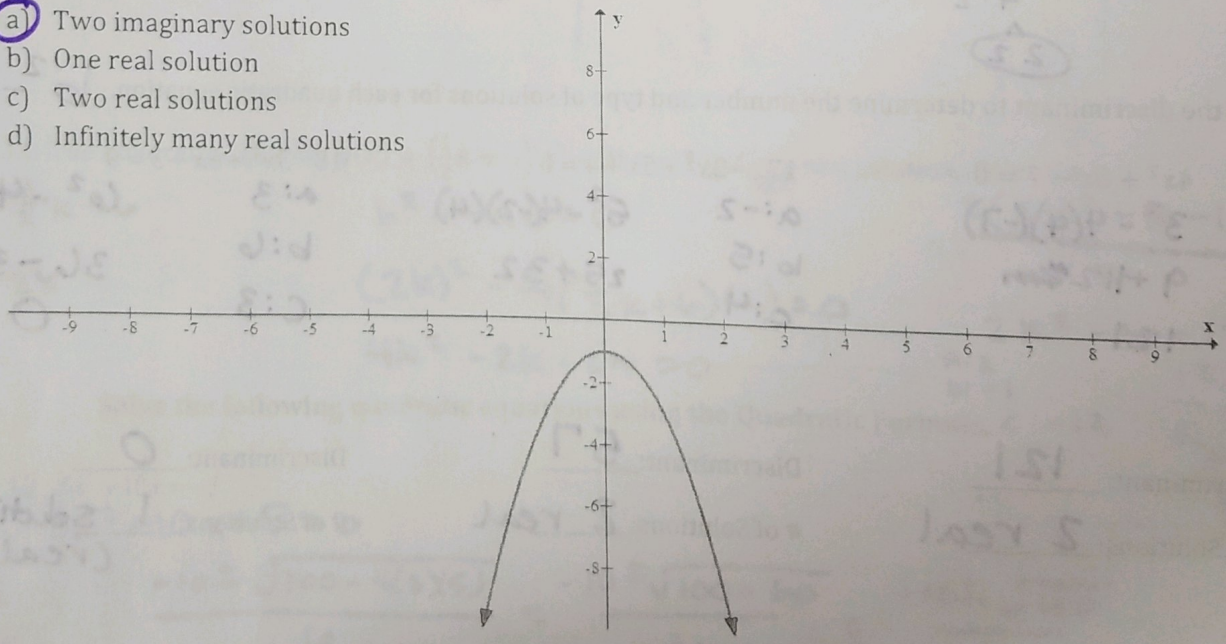


d)



21. How many solutions does the quadratic equation have?

a) Two imaginary solutions
b) One real solution
c) Two real solutions
d) Infinitely many real solutions



Simplify the following:

21. $\sqrt{-250}$

$25 \wedge 10$ (5 5) $5 \wedge 2$

$\pm 5i\sqrt{10}$

22. $\sqrt{-81}$

(9 9)

$\pm 9i$

23. i^{65}

$\frac{65}{4} = 16.25$

$.25 = \frac{1}{4} \leftarrow i^1 = i$

24. $\sqrt{-147}$

$3 \wedge 49$ (7 7)

$\pm 7i\sqrt{3}$

25. i^{180}

$\frac{180}{4} = 45 \text{ r } 0 \rightarrow i^0 = 1$

26. i^6

$\frac{6}{4} = 1 \text{ r. } 2$ so $i^2 = -1$

27. $(7 + 6i) - (3i - 18)$

$7 - (-18) + 6i - 3i = 25 + 3i$

28. $(i + 8) + (-4i - 6)$

$i - 4i + 8 - (-6) = -3i + 14 = 14 - 3i$

29. $(5 + 6i)(-8i - 6)$

	5	$6i$
$-8i$	$-40i$	$-48i^2$ / 48
-6	-30	$-36i$

$-48i^2 \rightarrow i^2 = -1$

$(-48)(-1)$

$18 - 76i$

30. $(2 + 5i)(7 - 9i)$

	2	$5i$
7	14	$35i$
$-9i$	$-18i$	$-45i^2$ / 45

$59 + 17i$

31. Write the complex conjugate of the following:

$10 + 8i$ $\quad 10 - 8i$

$7 - 5i$ $\quad 7 + 5i$

$-8i + 4$ $\quad 4 + 8i$

$9 - 9i$ $\quad 9 + 9i$

32. Use a complex conjugate to simplify the following and write it in the form $a \pm bi$:

$\frac{6+8i}{9+i}\left(\frac{9-i}{9-i}\right)$

Numer:

	6	$8i$
9	54	$72i$
$-i$	$-6i$	$-8i^2$ / 8

$62 + 66i$

Denomin= 82

	9	i
9	81	$9i$
$-i$	$-9i$	$-i^2$ / 1

$\frac{31+33i}{41}$

divide by common 2

Numerator:

	3	$-9i$
7	21	$-63i$
$3i$	$9i$	$-27i^2$ / 27

$48 - 54i$

$\frac{3-9i}{7-3i}\left(\frac{7+3i}{7+3i}\right)$

Denom:

	7	$-3i$
7	49	$-21i$
$3i$	$21i$	$-9i^2$ / 9

58

$\frac{24-27i}{29}$

divide by common 2

Solve the following quadratic equations by any method:

33. $2x^2 + 6x + 7 = 0$

a: 2
b: 6
c: 7

$$\frac{-6 \pm \sqrt{6^2 - 4(2)(7)}}{4}$$

$$\frac{-6 \pm \sqrt{36 - 56}}{4}$$

$$\frac{-6 \pm \sqrt{-20}}{4}$$

$\sqrt{20} = 2i\sqrt{5}$

$20 = 2 \cdot 10 = 2 \cdot 2 \cdot 5$

$$\frac{-6 \pm 2i\sqrt{5}}{4} = \boxed{\frac{-3 \pm \sqrt{5}}{2}}$$

34. $x^2 - 8x + 3 = -22$

$-3 \quad -3$

$x^2 - 8x = -25$ $+16$ $+16$

$\frac{1}{2}$ square

$(x - 4)^2 = -25 + 16$

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

$x - 4 = \pm\sqrt{-9}$

$+4 \quad +4$

$x = 4 \pm \sqrt{-9}$

$\boxed{x = 4 \pm 3i}$

$\sqrt{-9} = \pm 3i$

$9 = 3 \cdot 3$

35. $4x^2 + 225 = 25$

$-225 \quad -225$

$\frac{4x^2}{4} = \frac{-200}{4}$

$\sqrt{x^2} = \sqrt{-50}$

$x = \pm\sqrt{-50}$

$50 = 25 \cdot 2$

$5 \cdot 5$

$\boxed{x = \pm 5\sqrt{2}}$

36. $\frac{-3(x-1)^2}{-3} = \frac{9}{-3}$

$(x-1)^2 = -3$

$x - 1 = \pm i\sqrt{3}$

$+1 \quad +1$

$\boxed{x = 1 \pm i\sqrt{3}}$