**Algebra I**
**Unit 7 Review**

**Name:** KEY

**U7L1-3**

1. What are the three methods we've learned for solving equations?

   a. Square Roots (L1)

   b. Factoring (L2)

   c. Quadratic Formula (L3)

**U7L1: Solve using square roots**

2. $x^2 - 36 = 0$

$x^2 = 36$

$\boxed{x = \pm 6}$

3. $-20x^2 = -245$

$x^2 = \frac{49}{4}$

$\boxed{x = \pm \frac{7}{2}}$

**U7L2: Solve by factoring**

4. What is the zero product property? If $ab = 0$, $a = 0$ or $b = 0$

5. $8t^2 - 32t = 0$

$8t(t - 4) = 0$

$\boxed{t = 0, 4}$

6. $4s^2 = 221 - 8s$

$4s^2 + 8s - 221 = 0$

$4s^2 + 34s + -26s - 221 = 0$

$2s(2s + 17) - 13(2s + 17) = 0$

$(2s + 17)(2s - 13) = 0$

$\boxed{s = -\frac{17}{2}, \frac{13}{2}}$

**U7L3: Solve using the Quadratic Formula**

7. What is the Quadratic Formula?

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

8. What is the discriminant? What does this tell us about our quadratic equation? WHY does it tell us this information?

$b^2-4ac$ # solutions under $\sqrt{\ }$

9. What is the U.S. equation for falling objects or projectiles? Describe what each variable represents in these equations.

$$h(t) = -16t^2 + v_0 t + h_0$$

$h(t)$ → height; $t$ → time; $v_0$ → initial velocity; $h_0$ → initial height

10. $2y^2 = 39y - 17$ (answers can be decimals)

$2y^2 - 39y + 17 = 0$

$$x = \frac{-(-39) \pm \sqrt{(-39)^2 - 4(2)(17)}}{2(2)}$$

$$= \frac{39 \pm \sqrt{1385}}{4} \approx \frac{39 \pm 37.22}{4}$$

$\boxed{x \approx 19.06,\ 0.45}$

11. $8x^2 + 8x + 1 = 0$ (write EXACT answers; use radicals)

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

$$= \frac{-8 \pm \sqrt{32}}{16}$$

$$= \frac{-8 \pm 4\sqrt{2}}{16} = \boxed{\frac{-2 \pm \sqrt{2}}{4}}$$

12. A ball is thrown upwards from a height of 15 feet with an initial velocity of 5 ft/s. Write an equation using height of a projectile formula. How long it will take for the ball to hit the ground?

$h(t) = -16t^2 + 5t + 15$

$0 = -16t^2 + 5t + 15$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(-16)(15)}}{2(-16)}$$

$$= \frac{-5 \pm \sqrt{985}}{-32} \approx \frac{-5 \pm 31.38}{-32}$$

$x \approx -0.82,\ 1.14$

$\boxed{1.14 \text{ secs}}$

13. Use the discriminant to determine if the ball from the previous problem will ever reach a height of 32 feet.

$32 = -16t^2 + 5t + 15$

$0 = -16t^2 + 5t - 17$

$5^2 - 4(-16)(-17)$

$-1063 < 0$ $\boxed{\text{no}}$

**U7L1-3:**

a) **Find the discriminant**
b) **Tell the number and type of solutions**
c) **Choose the correct method to solve the equation (if there are any solutions)**
d) **Find the solutions (if there are any) (write all solutions EXACT; use radicals if needed)**

14. $54x^2 - 96 = 0$

a. $0^2 - 4(54)(-96)$

$\boxed{20736}$

b. $\boxed{\text{2 rational sol}}$

c. $\boxed{\text{Square roots}}$

d. $54x^2 = 96$

$x^2 = \frac{16}{9}$

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

15. $6x^2 = 7x + 20$ $\quad 6x^2 - 7x - 20 = 0$

a. $(-7)^2 - 4(6)(-20)$

$\boxed{529}$

b. $\boxed{\text{2 rational sol}}$

c. $\boxed{\text{Factoring}}$

d. $6x^2 - 15x + 8x - 20 = 0$

$3x(2x-5) + 4(2x-5) = 0$

$(2x-5)(3x+4) = 0$

$\boxed{x = \frac{5}{2}, -\frac{4}{3}}$

16. $-x^2 = 18 - 12x$ $\quad 0 = x^2 - 12x + 18$

a. $(-12)^2 - 4(1)(18)$

$\boxed{72}$

b. $\boxed{\text{2 irrational sol}}$

c. $\boxed{\text{Quadratic Formula}}$

d. $x = \frac{-(-12) \pm \sqrt{72}}{2(1)}$

$= \frac{12 \pm 6\sqrt{2}}{2}$

$= \boxed{6 \pm 3\sqrt{2}}$

17. $4x^2 + 81 = 0$

1. $0^2 - 4(4)(81)$

$\boxed{-1296}$

2. $\boxed{\text{no sol}}$

3. X

4.

**U7L4-5: Simplify each radical as much as possible**

18. $\sqrt{448}$

$\boxed{8\sqrt{7}}$

19. $\sqrt{147}$

$\boxed{7\sqrt{3}}$

20. $\sqrt{80x^8}$

$\boxed{4x^4\sqrt{5}}$

21. $\sqrt{256v^{11}}$

$\boxed{16v^5\sqrt{v}}$

22. $3\sqrt{24x^2y^5}$

$3 \cdot 2xy^2\sqrt{6y}$

$\boxed{6xy^2\sqrt{6y}}$

23. $\sqrt{15} \bullet \sqrt{35}$

$\sqrt{525}$

$\boxed{5\sqrt{21}}$

24. $\left(10\sqrt{6}\right)^2$

$100(6)$

$\boxed{600}$

25. $\sqrt{\frac{17}{144}}$

$\boxed{\frac{\sqrt{17}}{12}}$

26. $\frac{\sqrt{256}}{\sqrt{32}}$

$\sqrt{8}$

$\boxed{2\sqrt{2}}$

27. $\frac{5}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$

$\boxed{\frac{5\sqrt{7}}{7}}$

28. $\frac{4}{\sqrt{2a}} \cdot \frac{\sqrt{2a}}{\sqrt{2a}}$

$\frac{4\sqrt{2a}}{2a} = \boxed{\frac{2\sqrt{2a}}{a}}$

29. $\sqrt{\frac{12}{225}} = \frac{\sqrt{12}}{15}$

$= \boxed{\frac{2\sqrt{3}}{15}}$

30. $10\sqrt{4}-\sqrt{4}$

$\boxed{9\sqrt{4}}$

31. $\sqrt{448}-3\sqrt{432}+\sqrt{175}$

$8\sqrt{7}-36\sqrt{3}+5\sqrt{7}$

$\boxed{13\sqrt{7}-36\sqrt{3}}$

32. $3\left(8\sqrt{3}-7\right)$

$\boxed{24\sqrt{3}-21}$

33. $\sqrt{10}\left(3-2\sqrt{6}\right)$

$3\sqrt{10}-2\sqrt{60}$

$\boxed{3\sqrt{10}-4\sqrt{15}}$

34. $3\sqrt{6}\left(2\sqrt{3}+\sqrt{6}\right)$

$6\sqrt{18}+3(6)$

$\boxed{18\sqrt{2}+18}$