Algebra 1 Name Key

Unit 9B PC Review WS

Solve each equation by factoring.

1) $8v^2 + 8v - 96 = 0$

$8(x^2 + x - 12) = 0$ (−12)

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

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

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

$-4\ -4$ $+3\ +3$

$x = -4, 3$

2) $x^2 - 4x - 5 = 0$ (−5)

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

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

$x-5=0$ $x+1=0$

$+5\ +5$ $-1\ -1$

$x = 5, -1$

3) $6n^2 = 42n$

$6n^2 - 42n = 0$

$6n(n-7) = 0$

$6n = 0$ $n-7=0$

$n = 0$ $n = 7$

4) $n^2 - 4 = 0$

$n^2 + 0n - 4 = 0$

$(n^2 + 2n)(-2n - 4) = 0$

$n(n+2) - 2(n+2) = 0$

$n-2=0$ $n+2=0$

$n = 2, -2$

5) $n^2 - 35 = -2n$

$n^2 + 2n - 35 = 0$

$(n^2 - 5n) + (7n - 35) = 0$

$n(n-5) + 7(n-5) = 0$

$n+7=0$ $n-5=0$

$n = -7, 5$

6) $x^2 + 7x = 8$

$x^2 + 7x - 8 = 0$

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

$x(x-1) + 8(x-1) = 0$

$(x+8)(x-1) = 0$

$x+8=0$

$-8\ -8$

$x-1=0$

$+1\ +1$

$x = -8, 1$

7) $3x^2 = -42 + 25x$

$3x^2 - 25x + 42 = 0$

$(3x^2 - 7x) + (-18x + 42) = 0$

$x(3x-7) - 6(3x-7) = 0$

$x-6=0$ $3x-7=0$

$x = 6, \frac{7}{3}$

8) $3x^2 - 5x = 8$

$3x^2 - 5x - 8 = 0$

$(3x^2 + 3x) + (-8x - 8) = 0$

$3x(x+1) - 8(x+1) = 0$

$3x-8=0$ $x+1=0$

$x = \frac{8}{3}, -1$

9) $7a^2 + 57a = -8$

$7x^2 + 57x + 8 = 0$

$(7x^2 + x) + (56x + 8) = 0$

$x(7x+1) + 8(7x+1) = 0$

$x+8=0$ $7x+1=0$

$x = -8, -\frac{1}{7}$

10) $2r^2 + 6 = 13r$

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

$(2x^2 - x) + (-12x + 6) = 0$

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

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

$x = 6, \frac{1}{2}$

Solve each equation with the quadratic formula.

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

11) $2k^2 - 10k - 72 = 0$

$\frac{-(-10) \pm \sqrt{(-10)^2 - 4(2)(-72)}}{2(2)}$

$\frac{10 \pm \sqrt{676}}{4} = \frac{10 \pm 26}{4}$

$\frac{10+26}{4} = 9$ $\frac{10-26}{4} = -4$

$k = 9, -4$

12) $k^2 - 4k - 20 = 0$

$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-20)}}{2(1)}$

$\frac{4 \pm \sqrt{96}}{2} = \frac{4 \pm 4\sqrt{6}}{4}$

$= \frac{4}{4} \pm \frac{4\sqrt{6}}{4} = 1 \pm \sqrt{6}$

$\sqrt{96}$: $8 \cdot 12$; $2 \cdot 4 \cdot 3$; $2 \cdot 2 \cdot 2 \cdot 2$

13) $b^2 = 7 - b$

$b^2 + b - 7 = 0$

$\frac{-1 \pm \sqrt{(1)^2 - 4(1)(-7)}}{2(1)}$

$\frac{-1 \pm \sqrt{29}}{2} = \boxed{\frac{-1}{2} \pm \frac{\sqrt{29}}{2}}$

14) $a^2 + 3 = -4a$

$a^2 + 4a + 3 = 0$

$\frac{-4 \pm \sqrt{(4)^2 - 4(1)(3)}}{2(1)}$

$\frac{-4 \pm \sqrt{4}}{2} = \frac{-4 \pm 2}{2}$ $\quad \frac{-4+2}{2} = -1$ $\quad \frac{-4-2}{2} = -3$

$\boxed{a = -1, -3}$

15) $x^2 = 78 + 7x$

$x^2 - 7x - 78 = 0$

$\frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(-78)}}{2(1)}$

$\frac{7 \pm \sqrt{361}}{2} = \frac{7 \pm 19}{2}$ $\quad \frac{7+19}{2} = 13$ $\quad \frac{7-19}{2} = -6$

$\boxed{x = 13, -6}$

16) $6x^2 - 40 = -8x$

$6x^2 + 8x - 40 = 0$

$\frac{-8 \pm \sqrt{(8)^2 - 4(6)(-40)}}{2(6)}$

$\frac{-8 \pm \sqrt{1024}}{12} = \frac{-8 \pm 32}{12}$ $\quad \frac{-8+32}{2} = 12$ $\quad \frac{-8-32}{2} = -20$

$\boxed{x = 12, -20}$

17) A fireworks rocket is launched from a hill above a lake. The rocket will fall into the lake after exploding at its maximum height. The rocket's height above the surface of the lake is given by $g(x) = -16x^2 + 64x + 80$. How long will it take the rocket to hit the lake?

$-16(x^2 - 4x - 5) = 0$

$-16(x + 1)(x - 5) = 0$

$x + 1 = 0 \quad x - 5 = 0$

$x = -1 \quad x = 5$

$\boxed{5 \text{ sec}}$

18) A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground x seconds after it is thrown is given by $f(x) = -16x^2 - 4x + 382$ How long after the rock is thrown does it hit the ground? $-16x^2 - 4x + 382 = 0$

$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(-16)(382)}}{2(-16)}$

$\frac{4 \pm \sqrt{24{,}464}}{-32} \approx \frac{4 \pm 156.41}{-32}$ $\quad \frac{4-156.41}{-32} = 4.76$ $\quad \frac{4+156.41}{-32} = -5.01$

$\boxed{4.76 \text{ sec}}$

19) In an effort to catch a criminal; a superhero is going to leap over a building and take a short cut down the ally. The function $f(x) = -16x^2 + 150x$ gives the superhero's height in feet as a function of time. The building is 425 feet high. Will the superhero make it over the building? Find max height

$\frac{-b}{2a}$ $\quad \frac{-150}{2(-16)} = 4.6875$ $\quad -16(4.6875)^2 + 150(4.6875) = 351.56$

$\boxed{\text{no}}$

20) You are interested in retrieving a souvenir from a shipwreck located below the water. You do not have diving equipment, so your dive is limited by the equation $y = 0.05x^2 - 4x - 38$ Assumming you are able to retrieve your souvenir, how long do you have to hold your breath until you resurface? $0 = 0.05x^2 - 4x - 38$

$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(0.05)(-38)}}{2(0.05)}$

$\frac{4 \pm \sqrt{23.6}}{0.1} = \frac{4 \pm 4.86}{0.1}$

$\frac{4+4.86}{0.1} = 88.6$ $\quad \frac{4-4.86}{0.1} = -8.6$

$\boxed{88.6 \text{ sec}}$