PreCalculus 11 Date _____

Unit 3: Quadratic Equations
3.2 Factoring Quadratic Equations

Zero Product Property: if the product of two or more factors is zero then one, some or all of the factors could equal zero

ie. if $a \cdot b = 0$

then $a = 0$ OR $b = 0$

ex. Determine the roots of $(3x - 5)(x + 1) = 0$

$3x - 5 = 0$ OR $x + 1 = 0$

$x = 5/3$ $x = -1$

ex. Determine the roots of each quadratic equation.

$x^2 + 6x = -9$ ① set = 0

$x^2 + 6x + 9 = 0$ ② factor

$(x+3)(x+3) = 0$ ③ use zero product property

$x+3 = 0$ OR $x+3 = 0$

$x = -3$ $x = -3$

$x = -3$

check

$(-3)^2 + 6(-3) \stackrel{?}{=} -9$

$9 - 18$

$-9 = -9$ ✓

$x^2 = 21 - 4x$

$x^2 + 4x - 21 = 0$

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

$x + 7 = 0$ OR $x - 3 = 0$

$x = -7$ $x = 3$

$2x^2 - 9x - 5 = 0$ ⊗ -10, ⊕ -9, -10, 1

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

$x(2x+1) - 5(2x+1)$

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

$2x + 1 = 0$ OR $x - 5 = 0$

$x = -1/2$ $x = 5$

$2n^2 = n$

$2n^2 - n = 0$

$n(2n-1) = 0$

$n = 0$ OR $2n - 1 = 0$

$n = 1/2$

$5b^2 - 45 = 0$ OR Square Root Property

$5(b^2 - 9) = 0$

$5(b+3)(b-3) = 0$

$5 \neq 0$ $b + 3 = 0$ OR $b - 3 = 0$

$b = -3$ $b = 3$

$5b^2 - 45 = 0$ ← no degree 1 term

$5b^2 = 45$ ← isolate the square

$b^2 = \pm\sqrt{9}$

$b = \pm 3$

ex. Dock jumping is an exciting dog event in which dogs compete for the longest jumping distance from a dock into a body of water. The path of a dog on a particular jump can be approximated by the quadratic function $h(d) = -\frac{3}{10}d^2 + \frac{11}{10}d + 2$, where *h* is the height above the surface of the water and *d* is the horizontal distance the dog travels from the base of the dock, both in feet. Determine the horizontal distance of the jump.

when the dog lands $h = 0$

$10\left(-\frac{3}{10}d^2 + \frac{11}{10}d + 2\right) = (0)10$

* eliminate denominators — multiply all terms on both sides by the LCD

$-3d^2 + 11d + 20 = 0$

$3d^2 - 11d - 20 = 0$

(×) -60

(+) -11

$-15, 4$

$3d^2 - 15d + 4d - 20$

$3d(d-5) + 4(d-5)$

$(d-5)(3d+4) = 0$

$d - 5 = 0$ or $3d + 4 = 0$

$d = 5$ $\quad d = -\frac{4}{3}$ reject

5 ft

ex. The length of an outdoor lacrosse field is 10 m less than twice the width. The area of the field is 6600 m^2. Determine the dimensions of an outdoor lacrosse field.

$6600\ m^2$ | w

$l = 2w - 10$

$l = 2(60) - 10$

$= 110$

$A = lw$

$6600 = (2w - 10)(w)$

$6600 = 2w^2 - 10w$

$0 = 2w^2 - 10w - 6600$

$0 = 2(w^2 - 5w - 3300)$

(×) -3300

(+) -5

$+55, -60$

$0 = 2(w + 55)(w - 60)$

$2 \neq 0$ $\quad w + 55 = 0$ or $w - 60 = 0$

$w = -55$ $\quad w = 60$

60m by 110m

Practice: pg. 230/ # 7adf, 8abe, 9acd, 10de, 11 – 17, 18ab, 19, 20, 24, 30