Name: Answer Key Date:

UNIT 1D LESSON 6

DO NOW

The area of a rectangle is represented by $x^2 - 5x - 24$. If the width of the rectangle is represented by $x - 8$, express the length of the rectangle as a binomial.

factor

$(x-8)(x+3)$

Aim: Area Problems

1. A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

X = width

$X + 40$ = length

$6000 = x(x+40)$

$x^2 + 40x = 6000$

$x^2 + 40x - 6000 = 0$

$(x+100)(x-60) = 0$

$X = -100$ | $X = 60$

X = 60 yards

$X+40$ = 100 yards

2. A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.

X = length

$.5X$ = width

$x(.5x) = 34$

$.5x^2 - 34 = 0$

$a = .5$

$b = 0$

$c = -34$

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

$X = \frac{-(0) \pm \sqrt{(0)^2 - 4(.5)(-34)}}{2(.5)}$

$X = \pm\sqrt{68}$

$X = 8.2$ → length

$.5X = 4.1$ → width

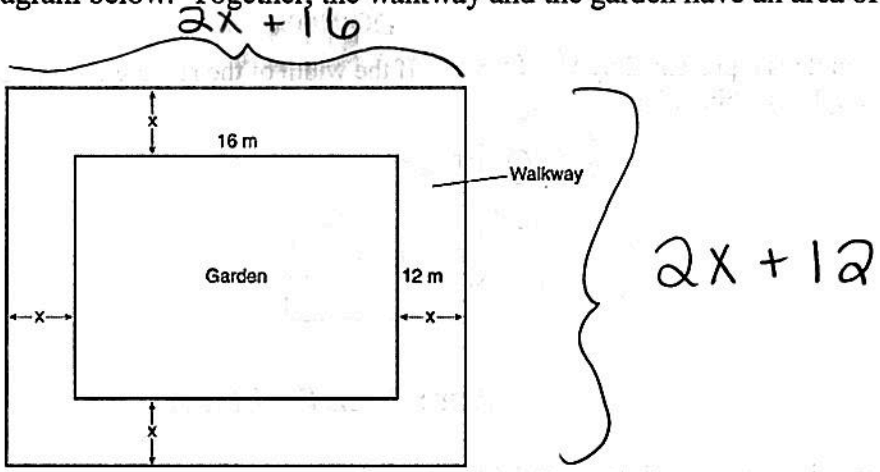
$\frac{.5x^2}{.5} = \frac{34}{.5}$

$\sqrt{x^2} = \sqrt{68}$

$X = 8.2$

$.5X = 4.1$

3. A rectangular garden measuring 12 meters by 16 meters is to have a walkway installed around it with a width of x meters, as shown in the diagram below. Together, the walkway and the garden have an area of 396 square meters.



Write an equation that can be used to find x, the width of the walkway. Describe how your equation models the situation. Determine and state the width of the walkway, in meters.

$(2x+16)(2x+12) = 396$

$4x^2 + 56x + 192 = 396$

$4x^2 + 56x - 204 = 0$

$4(x^2 + 14x - 51) = 0$

$4(x + 17)(x - 3) = 0$

$x = -17$ | $x = 3m$

$2x + 16$	
$4x^2$	$32x$
$24x$	192

$2x$

$+12$