Name: Date:

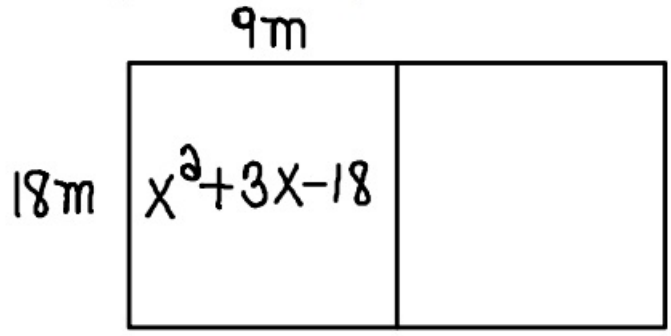
UNIT 5 • POLYNOMIAL OPERATIONS AND QUADRATIC FUNCTIONS A–SSE.3*

Lesson 5.4: Factoring Expressions with $a = 1$

Problem-Based Task 5.4: Don't Drop the Ball!

SMP	
1 ✓	2 ✓
3	4
5	6
7 ✓	8

A city is installing two identical rectangular volleyball courts at the local park. The expression $2x^2 + 6x - 36$ represents the combined area of both courts. If each court is 9 meters by 18 meters, what does x equal?



$$\frac{2x^2+6x-36}{2}$$

$x^2+3x-18 \longrightarrow$ area of each court

$a=1 \quad b=3 \quad c=-18$

-18

$6 \quad -3$

3

$(x+6)(x-3)$

↓ longer ↓ shorter

$x=12$

$x+6=18$

$-6 \quad -6$

$x=12$

$x-3=9$

$+3 \quad +3$

$x=12$

Name: Date:

UNIT 5 • POLYNOMIAL OPERATIONS AND QUADRATIC FUNCTIONS A–SSE.3*

Lesson 5.5: Factoring Expressions with $a > 1$

Problem-Based Task 5.5: Window Installation

A construction company is installing a rectangular pane of stained glass at a local museum. The expression $54x^2 + 69x + 20$ represents the area of the window in square inches, and the expression $6x + 5$ represents the width of the window in inches. If the window has a height of 94 inches, what are the actual width and area of the window? Recall that the area of a rectangle is equal to its width times its length (in this case, the height of the window).

SMP	
1 ✓	2 ✓
3	4 ✓
5	6
7 ✓	8

$54x^2+69x+20=$ area

$6x+5=$ width

height = length !

$a=54 \quad b=69 \quad c=20$

$ac=1080$

$y=\frac{1080}{x}$

2nd graph

1	1080
2	540
3	360
4	270
5	216
6	180
8	135
9	120
10	108
12	90
15	72

18	60
20	54
24	45

$\left(\frac{54x^2}{6x}+\frac{24x}{6x}\right)\left(\frac{45x}{5}+\frac{20}{5}\right)$

$6x(9x+4)+5(9x+4)$

$(6x+5)(9x+4)$

width height

$9x+4=94$

$-4 \quad -4$

$9x=90$

$x=10$

$6(10)+5$

65

width : 65 in.

height : 94 in.

area : 6110 $in.^2$

$\hookrightarrow a=lw$