PRACTICE WORK SAMPLE

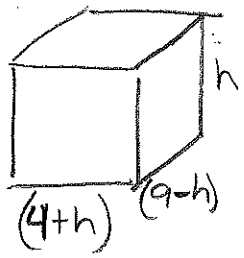
Name: _____

Period: _____

MS	RS	CR	A	RE

Box Dimensions

A packaging company is creating boxes that have a width that is 4 inches more than the height and a length that is height subtracted from 9 inches. The boxes can hold 180 in.^{3} of material. What are the dimensions of the box?



$V = \ell \cdot w \cdot h$

$V = h(4+h)(9-h)$

$180 = h(4+h)(9-h)$ multiply

$= (4h + h^2)(9-h)$ multiply 9-h

$= 36h - 4h^2 + 9h^2 - h^3$

$180 = -h^3 + 5h^2 + 36h$ To equal zero

$-180 \qquad -180$

$0 = -h^3 + 5h^2 + 36h - 180$ factor by grouping

$0 = -h^2(h-5) + 36(h-5)$

$0 = (h-5)(-h^2+36)$

$h - 5 = 0$

$h = 5$

$-h^2 + 36 = 0$

$\frac{-h^2}{-1} = \frac{-36}{-1}$

$\sqrt{h^2} = \sqrt{36}$

$h = 6$

Dimensions #1: $h=5$ $w=4+5$ $\ell = 9-5$

5 in by 9 in by 4 in

check $5 \cdot 9 \cdot 4 = 180$

#2: $h=6$ $w=4+6$ $\ell = 9-6$

6 in by 10 in by 3 in

check $6 \cdot 10 \cdot 3 = 180$