Int Alg B   Volume with Polynomials   Name_____
6.3 Level 3
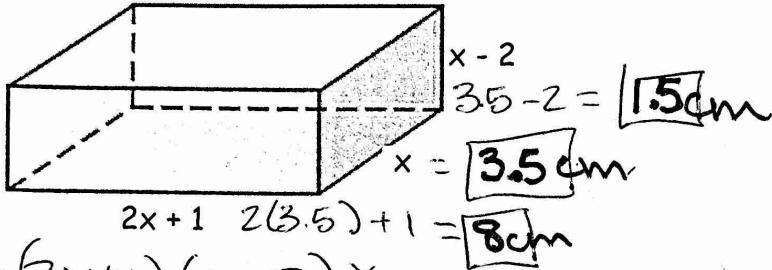
Show all work! Write and solve a polynomial equation to find the dimensions of the solid with the given volume.
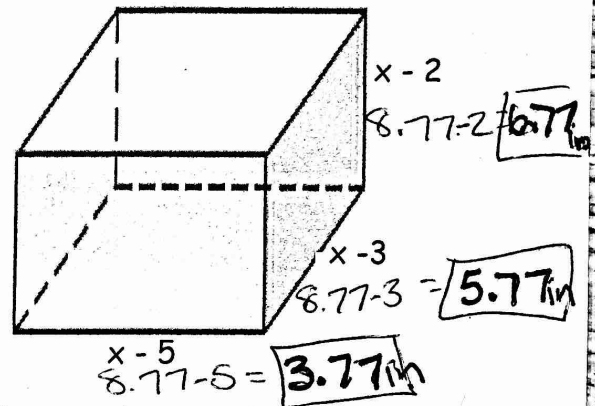
1.   V = 42 cm³

x - 2
$3.5 - 2 = \boxed{1.5 cm}$

$x = \boxed{3.5 cm}$

2x + 1 $2(3.5) + 1 = \boxed{8 cm}$

$42 = (2x+1)(x-2)x$
y_1
y_2

$X = 3.5 cm$

2.   V = 82 in³

x - 2
$8.77 - 2 = \boxed{6.77_{in}}$

x - 3
$8.77 - 3 = \boxed{5.77 in}$

x - 5
$8.77 - 5 = \boxed{3.77 in}$

$82 = (x-2)(x-5)(x-3)$

$X = 8.77 in$

3.   V = 96 ft³

$2(4) = \boxed{8 ft}$
2x

x - 1
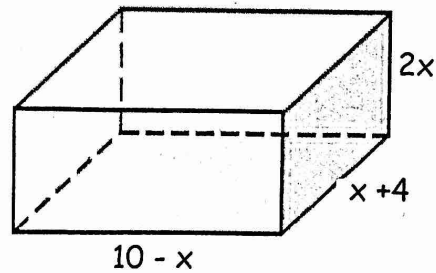$4 - 1 = \boxed{3 ft}$

x + 4
$4 + 4 = \boxed{8 ft}$
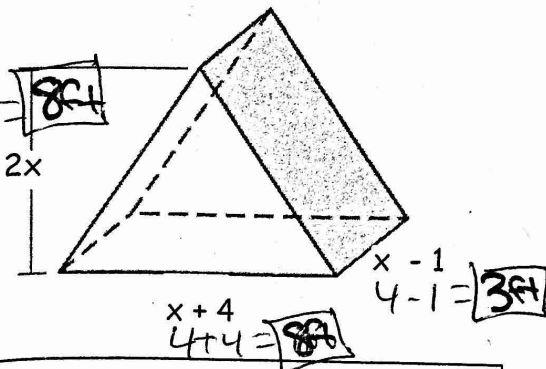
Volume of a triangular prism: $\frac{1}{2}lwh$

$96 = \frac{1}{2}(2x)(x+4)(x-1)$

$x = 4 ft$

4.   V = 22 m³

2x
x + 4
10 - x
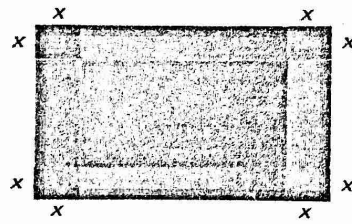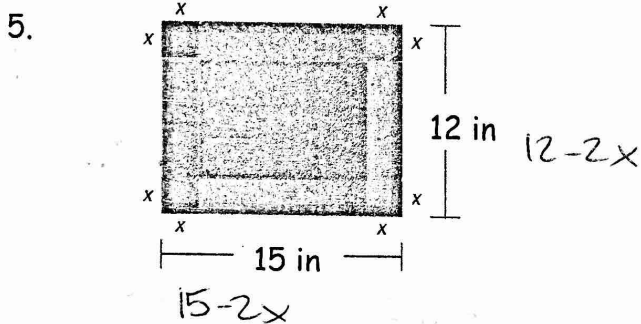
$22 = (10-x)(x+4)(2x)$

$x = .26 m$
$x = 9.925 m$

For problems 5-8, you have a piece of paper which you will use to make a box by cutting x inches from each corner as shown then folding up the sides.

a. Write and solve a polynomial equation to find the dimensions of the solid with the given volume.
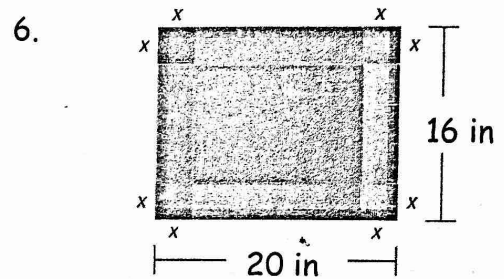
b. Find the maximum volume of the box.

5.

12 in   12-2x

15 in

15-2x

a. $V = 150$ in^3

$150 = x(15-2x)(12-2x)$

$x = 1.27$ in

$x = 3.29$ in

b. max volume = 177.23 in^3

6.

16 in

20 in

a. $V = 300$ in^3

$300 = x(20-2x)(16-2x)$

$x = 1.28$ in

$x = 5$

b. max volume = 420.11 in^3

7.

20 in

30 in
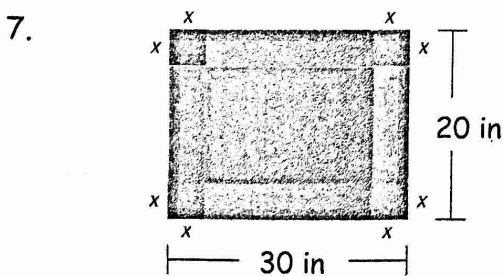
a. $V = 900$ in^3

$900 = x(30-2x)(20-2x)$

$x = 2.3$ in

$x = 5.77$ in

b. max volume = 1056.31 in^3

8.

5 in

10 in
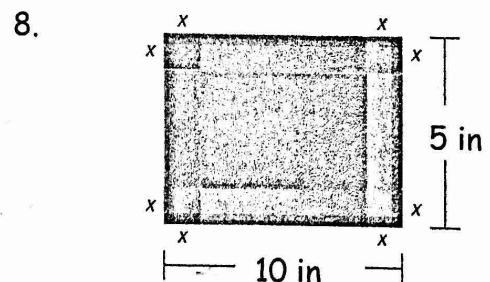
a. $V = 20$ in^3

$20 = x(10-2x)(5-2x)$

$x = .6$ in

$x = 1.57$ in

b. max volume = 24.06 in^3