

Instructions: Complete the following problems. You may work alone or in a group. Do not just copy answers from a group member, but be sure that you understand the problem. Similar questions will appear on exams. You may be asked to explain or present the answers to the class. This assignment is due at the end of the class period.

1. For each of the shapes below, find the dimensions based on the given information.

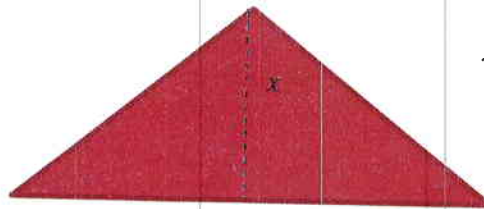
a. $A = 250$



$3x - 5$

$$\begin{aligned} x \quad 3x^2 - 5x - 250 &= 0 \\ X &= 10 \\ 3x - 5 &= 25 \end{aligned}$$

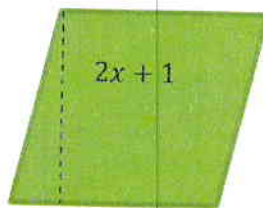
b. $A = 104$



$3x + 2$

$$\begin{aligned} \frac{1}{2} (3x^2 + 2x) &= 104 \\ 3x^2 + 2x - 208 &= 0 \\ X &= 8 \\ 3x + 2 &= 26 \end{aligned}$$

c. $A = 77$



$3x + 2$

$$\begin{aligned} (2x+1)(3x+2) &= 77 \\ 6x^2 + 4x + 3x + 2 &= 77 \\ 6x^2 + 7x - 75 &= 0 \\ X &= 3 \quad 2x+1=7 \quad 3x+2=11 \end{aligned}$$

d. $A = 70$

$$\frac{1}{2} (2x+1 + 3x+2) x = 70$$

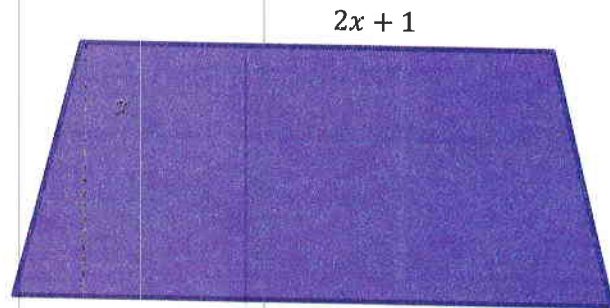
$$5x^2 + 3x = 140$$

$$5x^2 + 3x - 140 = 0$$

$$X = 5$$

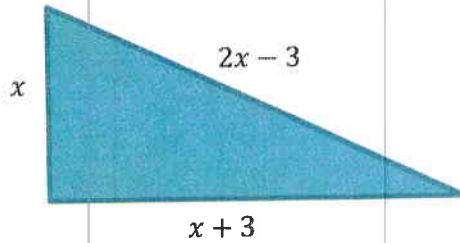
$$2x + 1 = 11$$

$$3x + 2 = 17$$



$3x + 2$

e.



$$x^2 + x^2 + 6x + 9 = 4x^2 - (2x + 9)$$

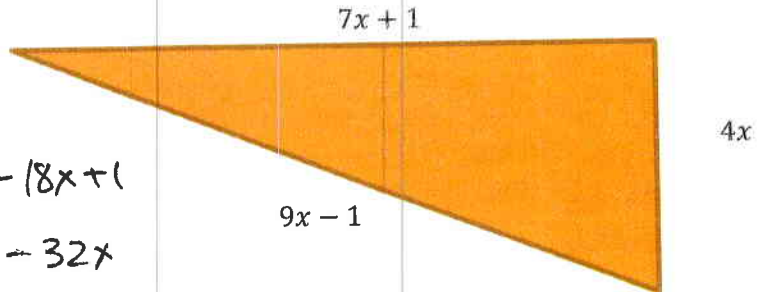
$$0 = 2x^2 - 18x \quad x \neq 0$$

$$x = 9$$

$$2x - 3 = 15$$

$$x + 3 = 12$$

f.



$$16x^2 + 49x^2 + 14x + 1 = 81x^2 - 18x + 1$$

$$0 = 16x^2 - 32x$$

$$16x(x-2) = 0$$

$$x \neq 0 \quad x = 2$$

$$9x - 1$$

$$4x = 8$$

$$7x + 1 = 15 \quad 9x - 1 = 17$$

2. If the height of a projectile is given by $h = -16t^2 + 96t$, where t is time after it's been fired, find the time when the rocket hits the ground.

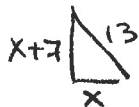
$$0 = -16t(t-6) \quad t=0 \text{ (launch)}$$

$$t=6$$

3. If you own a 29-inch TV (TV's are described by the measurement along the diagonal), and it's 20 inches tall, how wide is the TV?

$$29^2 = 20^2 + x^2 \quad x^2 = 441 \quad x = 21$$

4. A sail on a sailboat is in the shape of a right triangle. The longest side is 13 feet long and one side of the sail is 7 feet longer than the other side. Find the dimensions of the sail.



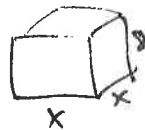
$$x^2 + x^2 + 14x + 49 = 169$$

$$2x^2 + 14x - 120 = 0 \quad (x^2 + 7x - 60) = 0$$

$$(x+12)(x-5) = 0 \quad x \neq 12$$

$$x = 5$$

5. A rectangular solid has a square base and is 8 meters high. What are the dimensions of the box if the volume is 128 meters?



$$128 = 8x^2$$

$$x^2 = 16$$

$$x = 4$$

$$4 \times 4 \times 8$$