Key

1. The perimeter of △ABC = 54 inches and the perimeter of △APQ = 18 inches. △ABC ~ △APQ. Find a, b, x, y, and z.

$PR = \frac{54}{18}$

Find b
$6 + b = 18$
$b = 12\,in$

$18 \div \frac{54}{18}$

Find a
$\frac{a}{18} = \frac{18}{54}$
$54a = 324$
$a = 6\,in$

12
2+4

A
4 in.   a
P   Q
  y
z
           b
18 in

B   x   C

Find z
$\frac{z+4}{4} = \frac{54}{18}$
$18(z+4) = 216$
$18z + 72 = 216$
$18z = 144$
$z = 8\,in$

Find x (after finding z)
$P = 18 + 12 + x = 54$
$x = 24\,in$

Find y (after z, and x)
$\frac{y}{24} = \frac{18}{54}$
$54y = 432$
$y = 8\,in$

a = 6in
b = 12in
x = 24in
y = 8in
z = 8in

2. △QPR ~ △OMN
Find a, b, and c if the perimeter of △MON is 45 inches. All measurements are in inches.

Q
        28 in.
14 in
  $P = 63\,in$

P   21 in.   R

O
        c
b $P = 45\,in$
M   a   N
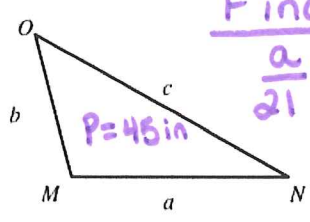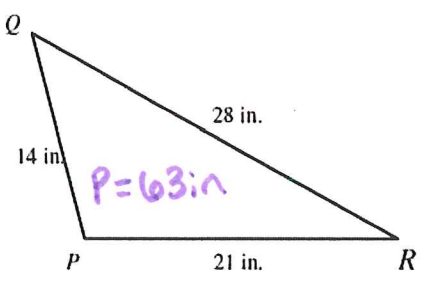
Find a
$\frac{a}{21} = \frac{45}{63}$
$63a = 945$
$a = 15\,in$

Find c
$\frac{c}{28} = \frac{45}{63}$ $63c = 1260$
$c = 20\,in$

PR: $\frac{45}{63}$
a = 15in
b = 10in
c = 20in

Find b
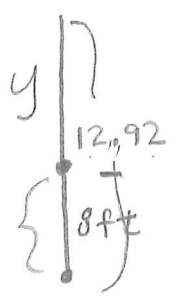$\frac{b}{14} = \frac{45}{63}$ $63b = 630$
$b = 10\,in$

3. **Show all work.** Romeo is trying to see his Juliet but the only way to do so is to climb through her window. Her window is 16.2 feet off the ground. He knows his 13 foot ladder is too short because it only reaches up 8 feet. He has an idea to use his 21 foot ladder, but he is unsure if the ladder will reach. Use the following information to help Romeo see his love: *The two ladders are leaning against a wall such that they make the same angle with the ground. The 10 foot ladder reaches 8 feet up the wall.*

How high does the 21 foot ladder reach? ___12.92 ft___
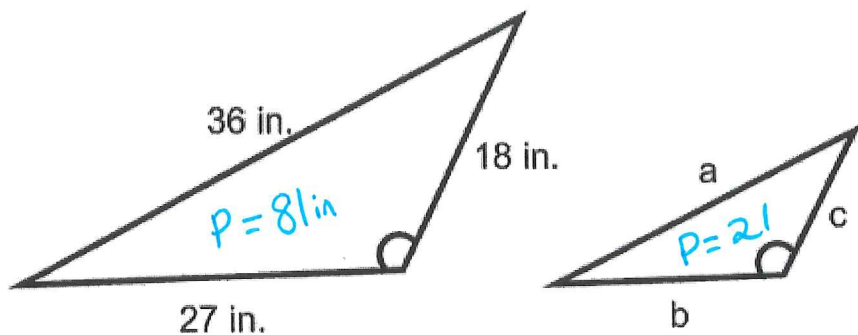
How much further does the 21 foot ladder reach than the 13 foot ladder? ___4.92 ft___
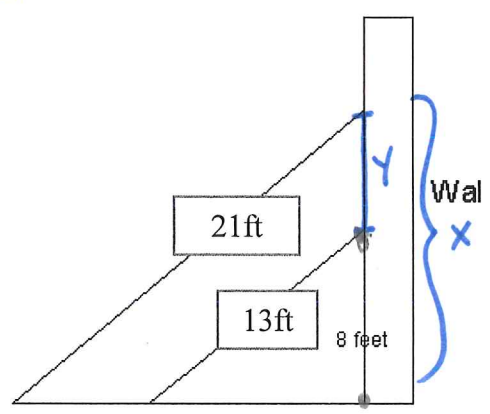
$\frac{x}{8} = \frac{21}{13}$ $13x = 168$
$x = 12.92$

Wall
y
21ft   x
13ft   8 feet

y
12.92
8 ft

4. The two triangles below are similar. Find a, b, and c if the perimeter of the small triangle is ~~in~~ 21in. Find the perimeter ratio of the larger triangle to the smaller triangle first.

$$\frac{21}{81} = \frac{7}{27}$$

PR= $\frac{21}{81}$

36 in. 18 in.

P=81in

27 in.

$$\frac{a}{36} = \frac{21}{81}$$

$$\frac{b}{27} = \frac{21}{81}$$

$$b = 7$$

$$\frac{c}{18} = \frac{21}{81}$$

$$c = 4.\overline{6}$$

a = 9.$\overline{3}$in

b = 7in

c = 4.$\overline{6}$

a

c

P=21

b

5. Show all work. Romeo is trying to see his Juliet but the only way to do so is to climb through her window. Her window is 16.2 feet off the ground. He knows his 13 foot ladder is too short because it only reaches up 8 feet. He has an idea to use his 21 foot ladder, but he is unsure if the ladder will reach. Use the following information to help Romeo see his love:
The two ladders are leaning against a wall such that they make the same angle with the ground. The 10 foot ladder reaches 8 feet up the wall.

$$\frac{x}{8} = \frac{30}{14}$$
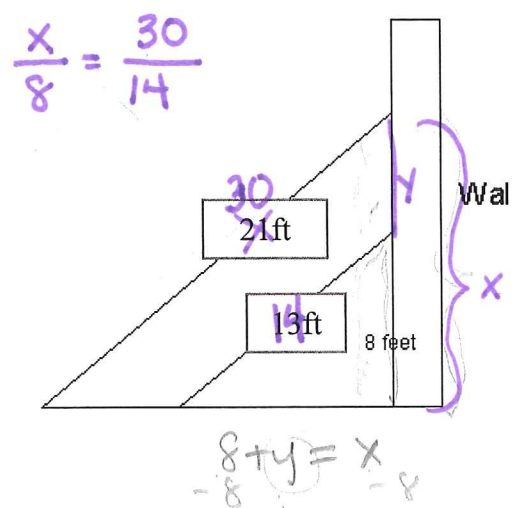
How high does the 21 foot ladder reach? 17.14 ft

How much further does the 21 foot ladder reach than the 13 foot ladder? 9.14 ft

$$\frac{8+y=x}{-8 \qquad -8}$$

30/14 21ft

13ft 8 feet

Wal

y

x

6. The local fire academy is practicing evacuating a hotel. Two teams are going through two windows. Window one, 12 feet above the ground and the other "z" ft above the ground. They are using a 30ft ladder to get to the lower window and a 75ft ladder to get to the higher window. Find the distance between the short ladder and the base of the building (x), the distance between the two ladders (y) and how far the 2nd window is above the ground. Keep answer in feet and round to the nearest tenth if needed.
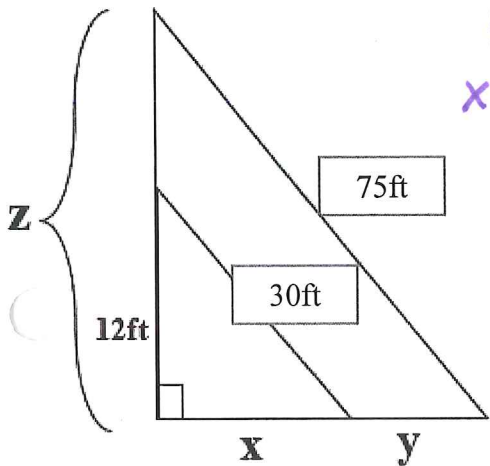
Find x

$$x^2 + 12^2 = 30^2$$

$$x^2 = 756$$

$$x = 27.5$$

$$\frac{27.5 + y}{27.5} = \frac{75}{30}$$

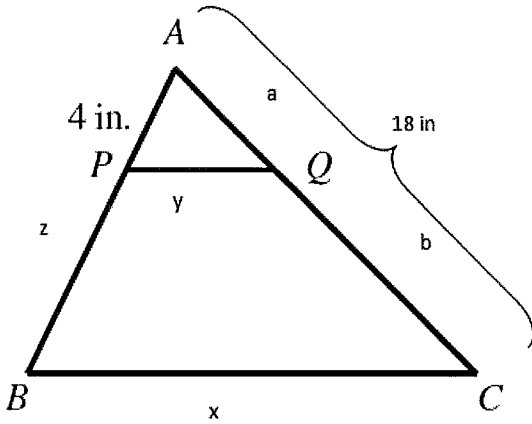$$825 + 30y = 2062.5$$

$$30y = 1237.5$$

$$y = 41.25$$

$$\frac{z}{12} = \frac{75}{30}$$

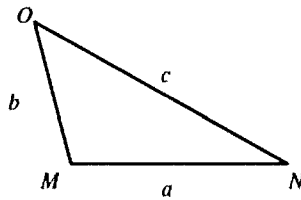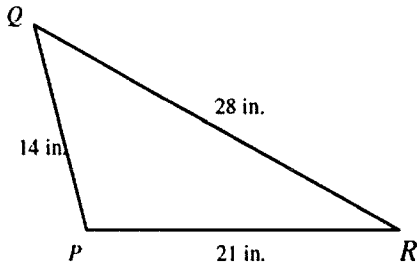x = 27.5 ft

y = 41.3 ft

z = 30 ft

75ft

30ft

12ft

x   y

Z

1. The perimeter of $\triangle ABC = 54$ inches and the perimeter of $\triangle APQ = 18$ inches. $\triangle ABC \sim \triangle APQ$. Find a, b, x, y, and z.

a = _____

b = _____

x = _____

y = _____

z = _____

A

4 in.

a

18 in

P

Q

y

z

b

B

x

C

2. $\triangle QPR \sim \triangle OMN$

Find *a*, *b*, and *c* if the perimeter of $\triangle MON$ is 45 inches. All measurements are in inches.

Q

28 in.
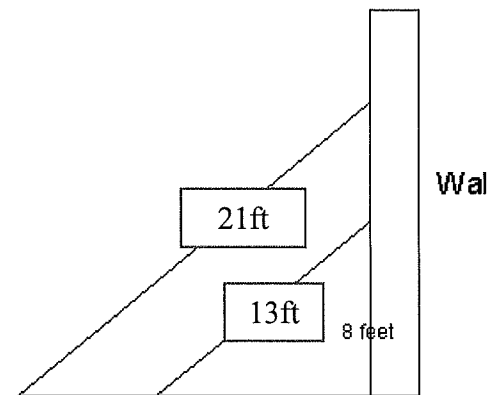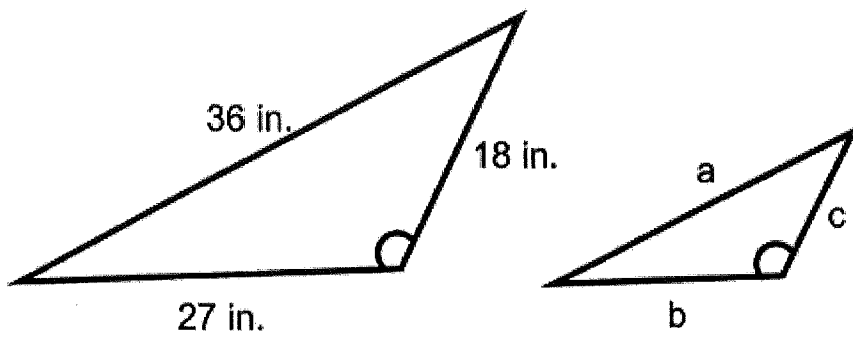
b

c

14 in

M

a

N

P

21 in.

R

x

3. **Show all work.** Romeo is trying to see his Juliet but the only way to do so is to climb through her window. Her window is 16.2 feet off the ground. He knows his 13 foot ladder is too short because it only reaches up 8 feet. He has an idea to use his 21 foot ladder, but he is unsure if the ladder will reach. Use the following information to help Romeo see his love:
The two ladders are leaning against a wall such that they make the same angle with the ground. The 10 foot ladder reaches 8 feet up the wall.

How high does the 21 foot ladder reach? _____

How much further does the 21 foot ladder reach than the 13 foot ladder? _____

Wal

21ft

13ft

8 feet

4. The two triangles below are similar. Find a, b, and c if the perimeter of the small triangle is 21in. Find the perimeter ratio of the larger triangle to the smaller triangle first.
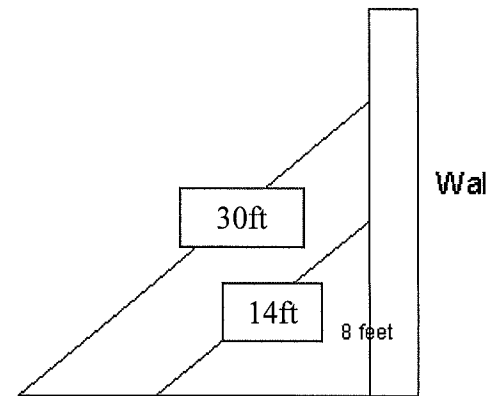

PR= _____

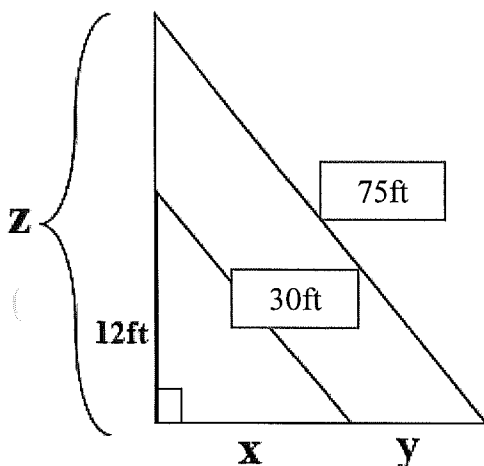a = _____

b = _____

c = _____

5. **Show all work.** Romeo is trying to see his Juliet but the only way to do so is to climb through her window. Her window is 16.2 feet off the ground. He knows his 14 foot ladder is too short because it only reaches up 8 feet. He has an idea to use his 30 foot ladder, but he is unsure if the ladder will reach. Use the following information to help Romeo see his love:

How high does the 30 foot ladder reach? _____

How much further does the 30 foot ladder reach than the 14 foot ladder? _____

Wal

30ft

14ft

8 feet

6. The local fire academy is practicing evacuating a hotel. Two teams are going through two windows. Window one, 12 feet above the ground and the other "z" ft above the ground. They are using a 30ft ladder to get to the lower window and a 75ft ladder to get to the higher window. Find the distance between the short ladder and the base of the building (x), the distance between the two ladders (y) and how far the 2nd window is above the ground. Keep answer in feet and round to the nearest tenth *if needed*.

Z

75ft

30ft

12ft

x   **y**

x = _____

y = _____

z = _____