# Similar Triangles: Part 3

## Distribution

**Distribution is an algebraic technique that allows you to multiply a monomial by an expression contained in a set of brackets.**

### Example 1

**Evaluate the following expression using two methods (Bedmas and Distribution):**

| BEDMAS | | Distribution | |
|---|---|---|---|
| $3(5+4)$ | or | $3(5+4)$ | $3(x+2)$ |
| $= 3(9)$ | | $= 3(5) + 3(4)$ | $= 3x + 6$ |
| $= 27$ | | $= 15 + 12$ | |
| | | $= 27$ | |

**When dealing with a numerical expression, it is more common to use BEDMAS. However, when an expression contains algebraic components, BEDMAS may not be an option.**

### Example 2

**Expand the following:**

**a)** $3(x + 2)$

$= 3x + 6$

**b)** $4(2 - 3x)$

$= 8 - 12x$

### Example 3

**Solve the following:**

**a)** $3(x - 3) = x + 1$

$3x - 9 = x + 1$

$3x - 1x = 1 + 9$

$\frac{2x}{2} = \frac{10}{2}$

$x = 5$

**b)** $4(x - 3) = 3(x - 2)$

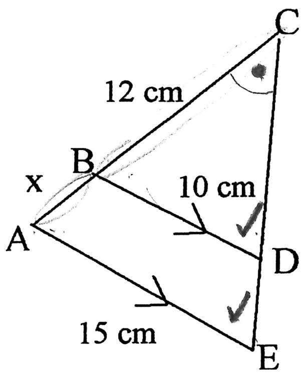
$4x - 12 = 3x - 6$

$4x - 3x = -6 + 12$

$x = 6$

# Similar Triangle Practice

## 1. Determine the length x in the following diagram.




proof

Since $\angle BCD = \angle ACE$ (common)

$\angle CDB = \angle CEA$ (PLT-F)

then $\triangle BCD \sim \triangle ACE$ (AA~)

Solution

Since $\triangle BCD \sim \triangle ACE$

then $BC : CD : DB = AC : CE : EA$

$12 : CD : 10 = x+12 : CE : 15$

$\frac{12}{x+12} = \cancel{\frac{CD}{CE}} = \frac{10}{15}$

$\frac{12}{x+12} = \frac{10}{15}$

$10(x+12) = 180$

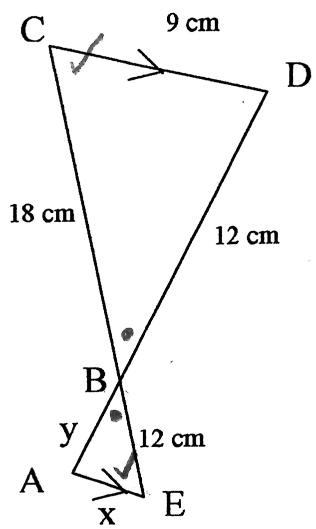
$10x + 120 = 180$

$10x = 180 - 120$

$\frac{10x}{10} = \frac{60}{10}$

$x = 6\text{ cm}$

## 2. Determine the lengths of x and y in the following diagram.




Since $\angle CBD = \angle ABE$ (OAT)

$\angle AEB = \angle DCB$ (PLT-Z)

then $\triangle ABE \sim \triangle DBC$ (AA~)

Since $\triangle ABE \sim \triangle DBC$

then $AB : BE : EA = DB : BC : CD$

$y : 12 : x = 12 : 18 : 9$

$\frac{y}{12} = \boxed{\frac{12}{18}} = \frac{x}{9}$

$\frac{y}{12} = \frac{12}{18}$

$\frac{18y}{18} = \frac{144}{18}$

$y = 8\text{ cm}$

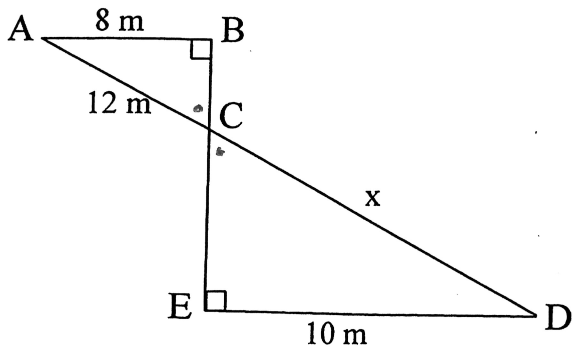
$\frac{12}{18} = \frac{x}{9}$

$\frac{18x}{18} = \frac{108}{18}$

$x = 6\text{ cm}$

Practice

1. Determine the length of the side marked x; be sure to include a proof.




Since $\angle ABC = \angle DEC$ (90°)

$\angle ACB = \angle DCE$ (OAT)

then $\triangle ABC \sim \triangle DEC$ (AA~)

Since $\triangle ABC \sim \triangle DEC$

then $AB : BC : CA = DE : EC : CD$

$8 : BC : 12 = 10 : EC : x$

$\frac{8}{10} = \cancel{\frac{BC}{EC}} = \frac{12}{x}$

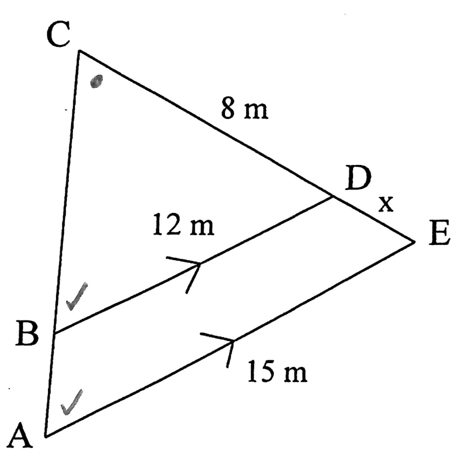
$\frac{8}{10} = \frac{12}{x}$

$\frac{8x}{8} = \frac{120}{8}$

$x = 15m$

2. Determine the length of the side marked x; be sure to include a proof.

a)




Since $\angle ACE = \angle BCD$ (common)

$\angle EAC = \angle DBC$ (PLT-F)

then $\triangle ACE \sim \triangle BCD$ (AA~)

Since $\triangle ACE \sim \triangle BCD$

$AC : CE : EA = BC : CD : DB$

$AC : x+8 : 15 = BC : 8 : 12$

$\cancel{\frac{AC}{BC}} = \frac{x+8}{8} = \frac{15}{12}$

$12(x+8) = 120$

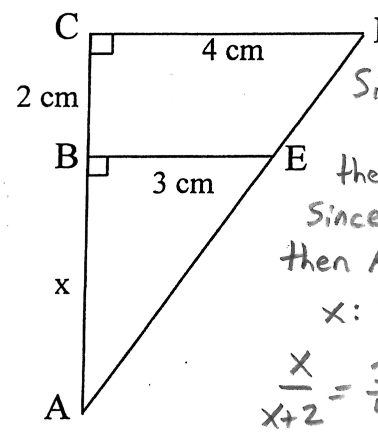
$12x + 96 = 120$

$12x = 120 - 96$

$\frac{12x}{12} = \frac{24}{12}$

$x = 2m$

b)




Since $\angle ABE = \angle ACD$ (90°)

$\angle BAE = \angle CAD$ (common)

then $\triangle ABE \sim \triangle ACD$ (AA~)

Since $\triangle ABE \sim \triangle ACD$

then $AB : BE : EA = AC : CD : DA$

$x : 3 : EA = x+2 : 4 : DA$

$\frac{x}{x+2} = \frac{3}{4} = \cancel{\frac{EA}{DA}}$

$4x = 3(x+2)$

$4x = 3x + 6$

$4x - 3x = 6$

$x = 6$ cm

Answers: 1) 15 m, 2a) 2 m, 2b) 6 cm