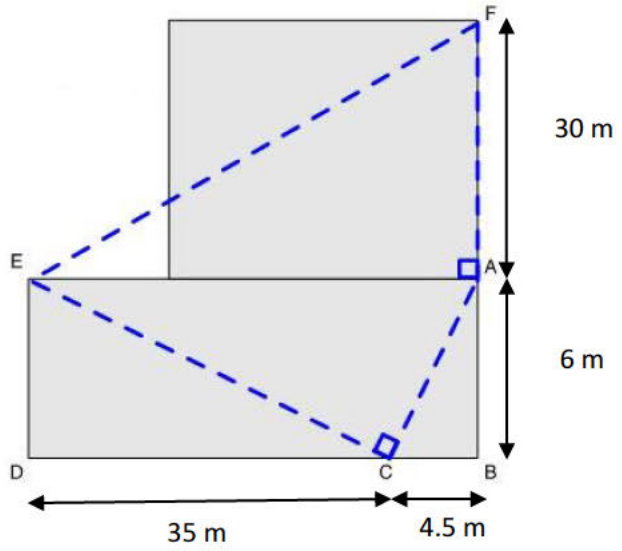
Student 1: Low Excellence

NZQA Intended for teacher use only



$AC^2 = 6^2 + 4.5^2$
$AC^2 = 36 + 20.25$
$AC^2 = 56.25$
AC = 7.5 m

$EC^2 = 35^2 + 6^2$
$EC^2 = 1225 + 36$
$EC^2 = 1261$
EC = 35.5 m to 1 dp

$EF^2 = 39.5^2 + 30^2$
$EF^2 = 1560.25 + 900$
$EF^2 = = 2460.25$
EF = 49.6 m to 1 dp

Perimeter of new building (4 sides)
A to F = 30 m
F to E = 49.6 m
E to C = 35.5 m
C to A = 7.5 m
Perimeter of new building is 30 m + 49.6 m + 35.5 m + 7.5 m = 122.6 m (1)

Angle EFA

$$\tan EFA = \frac{39.5}{30}$$

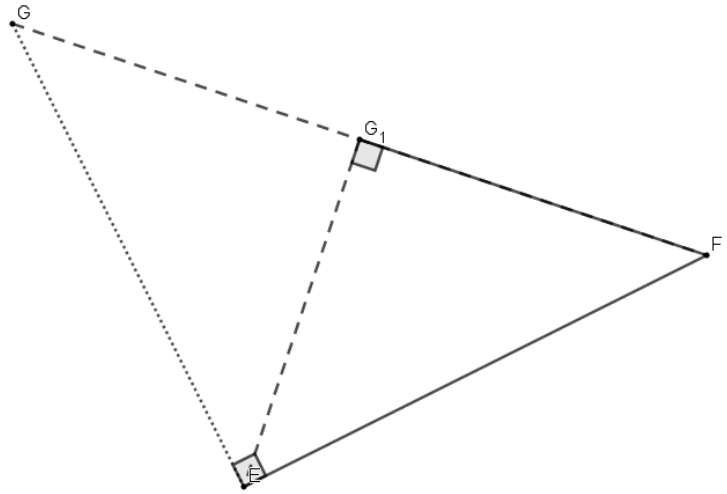
$$EFA = \tan^{-1}\frac{39.5}{30}$$

EFA = 52.8° The angle is less than 60° so does not meet the interior angle requirement.

Angle FEC
FEA = 90° - 52.8°
FEA = 37.2°

$$\sin AEC = \frac{7.5}{39.5}$$

AEC = 10.9°
FEC = 37.2 + 10.9 = 48.1° This angle is also less than 60° (2)



Point G and G_1 are there for two reasons. Reason one because the two sides needed to be even due to the board wanting an additional room to be an isosceles triangle. Reason two: the board also wanted the room to be right-angled and to find the right angle I could use FE and make the right angle and put G or find the middle of the E-F line and from that point I could put G_1.

$x^2 + x^2 = 49.6^2$
$2x^2 = 2460.16$
x = 35.1 m to 1 dp
$GF^2 = 49.6^2 + 49.6^2$
$GF^2 = 4920.32$
GF =70.1 m to 1 dp
A to F = 30 m
F to G = 35.1 m
G to E = 35.1 m
E to C = 35.5 m
C to A = 7.5 m
30 + 35.1 + 35.1 + 35.5 + 7.5 = 143.2 m

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A to F = 30 m
F to G = 70.1 m
G to E 49.6 m
E to C = 35.5 m
C to A = 7.5 m
30 + 70.1 + 49.6 + 35.5 + 7.5 = 192.7 m