



Figure 1

Figure 1 shows the plan view of a stage.

The plan view shows two congruent triangles ABO and GFO joined to a sector $OCDEO$ of a circle, centre O , where

- angle $COE = 2.3$ radians
- arc length $CDE = 27.6$ m
- AOG is a straight line of length 15 m

(a) Show that $OC = 12$ m. (2)

(b) Show that the size of angle AOB is 0.421 radians correct to 3 decimal places. (2)

Given that the total length of the front of the stage, $BCDEF$, is 35 m,

(c) find the total area of the stage, giving your answer to the nearest square metre. (6)

(a) arc length, $l = r\theta \Rightarrow 27.6 = r(2.3)$
 $\Rightarrow r = \frac{27.6}{2.3} = 12$ m.

(b) $\angle AOB = \frac{\pi - 2.3}{2} = 0.4207\dots = 0.421$ (3dp)

(c) $BC = EF = \frac{1}{2}(35 - 27.6) = 3.7$

$OB = OC + BC = 12 + 3.7 = 15.7$

Area each $\Delta = \frac{1}{2} \left(\frac{15}{2}\right)(15.7) \sin(0.4207\dots) = 24.049\dots$
 ($\frac{1}{2} ab \sin C$)

Area Sector = $(\frac{1}{2} r^2 \theta) = \frac{1}{2} (12^2)(2.3) = 165.6$

Total Area = $2(24.049\dots) + 165.6 = 213.699\dots = 214$ m² (to nearest m.)