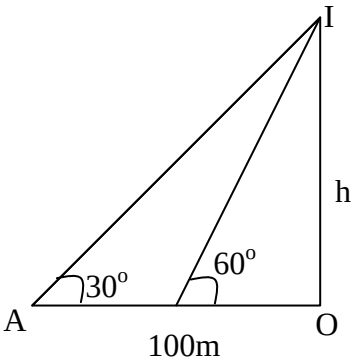
2. The trigometric ratio 1

1.



$Tan\ 30^o = \frac{x}{100+y}$ x

$x = (100 + y) \tan 30^o$

$(100 + y) \tan 30^o = y \tan 60^o$

$Tan\ 60^o = \frac{x}{y} = x = y \tan 60^o$

$(100 + y)\ 0.5774 = 1.1732y$

$57.74 = 1.155y$

$y = \frac{57.74}{1.155}$

$y = 49.99 \equiv 50m$

$\therefore x = 50 \tan 60$

$x = 86.6m$

2. $Sin\ \theta = 0.70$

$\theta = 44.43°, 135.57°$

3. (a) (i) Area of triangle $A^1B^1C^1 = ½ \times 4 \times 4$

$= 8$ sq. units

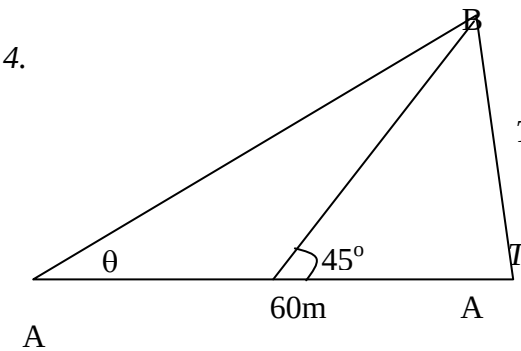
(b) (ii) Reflection in the line $y = x$

(c) combine transformation $= \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix} \begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix}$

$Det \begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix} 0 - 2 \times 2 = -4$

Inverse transformation $= -¼ \begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix} = \begin{pmatrix} 0 & -½ \\ -½ & 0 \end{pmatrix}$

4.



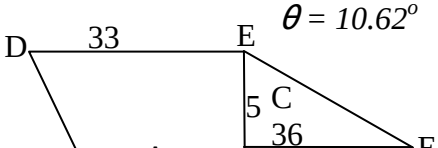
$Tan\ 45 = \frac{AB}{60}$

$AB = 45$

$Tan\ \theta = \frac{45}{240}$

$= 0.1875$

$\theta = 10.62^o$

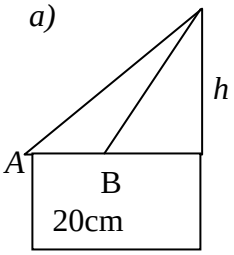


5.

Area A: ½ x 25 (33 + 21) = 675
Area B: ½ x 40 (21 x 42) = 1260
Area C: ½ x 30 x 42 = 630
Area D: ½ x 25 x 40 = 500
Area E: ½ x 5 (40 + 25) = 162.5
Area F: ½ X 60 (25 + 36) = 1830
Area G: ½ x 5 x 36 = 90 ✓
$= 5{,}147.5m^2$

6. *∴ Philip takes 10 days.*
2Cos 2x = 0.600
Cos 2x = 0.3000
$2x = 72.5^o, 287.5$
$x = 36.25^0, 143.75$

7. *a)*



$Tan32 = \frac{h}{20 + x}$
$h = (20 + x) \tan 32^o = 12.498 + 0.6249x$
$\tan 40^o = {}^{h}/_{x}$
$h = x \tan 40^o = 0.8391x$
$0.8391x = 12.498 + 0.6249x$
$0.8391x - 0.6249x = 12.498$
$0.2142x = 12.498$
$x = \frac{12.498}{0.2142} = 58.35m$
∴*The distance of A from the house*
= (20 + 58.35)m = 78.35

b) $h = x \tan 40^o = 58.35 \times 0.8391 = 48.96m$
∴ The total height of the house

$= 1.82m + 48.96m \quad = 50.78m$

11. $\tan 32^o c = \frac{h}{20 + x}$

$h = (20 + x) \tan 32^o$

$\tan 40^o = \frac{h}{x}$

$h = \tan 40^o$

$\therefore x \tan 40^o = (20 + x) \tan 32^o$

$0.8391x = (20 + x)\ 0.6249$

$0.8391x = 12.498 + 0.6249x$

$0.8391x - 0.6249x = 12.498$

$x = 58.35m$

$20 + 58.35 = 78.35m$

(b) The height of the house

$\text{Tan } 40^o = \frac{h}{58.35} = h = 58.35 \tan 40^o$

$h = 58.35 \times 0.8391$

$h = 48.96 + 1.82$

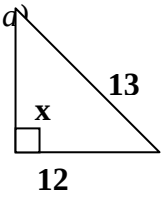
$h = 50.78$

12. $\frac{24}{\text{Sin } 48} = 2R \quad \Rightarrow R = 16.15 \text{ cm}$

$\text{Area} = 3.14 \times 16.15^2$

$= \underline{819.26 \text{ cm}^2}$

13. a)



$Hyp = \sqrt{5^2 + 12^2}$

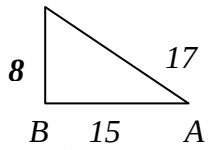
$= 13$

$\cos x = {}^{12}/_{13}$

(b) Sin2990-x)

$= ({}^{12}/_{13})^2 = {}^{144}/_{169}$

]14. $\tan \theta = {}^{8}/_{15}$



$AB^2 = 8^2 + 15^2$

$AB = \sqrt{289} = 17$

$\sin \theta = {}^{8}/_{17}, \cos \theta = {}^{15}/_{17}$

$\dfrac{\sin \theta - \cos \theta}{\cos \theta + \sin \theta} = \dfrac{{}^{8}/_{17} - {}^{15}/_{17}}{{}^{15}/_{17} + {}^{8}/_{17}} = {}^{-7}/_{17} \times {}^{17}/_{23}$

$= {}^{-7}/_{23}$