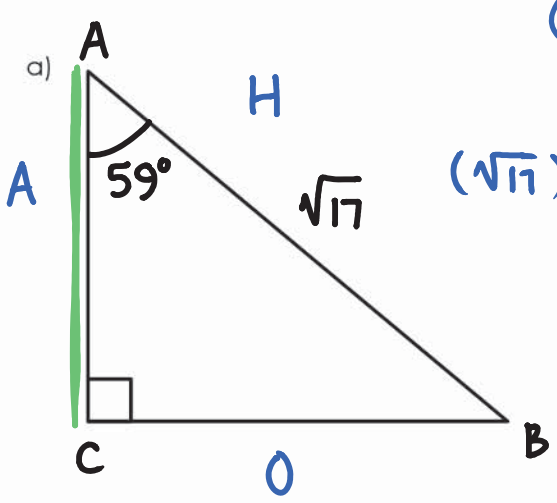
2.6 Applying the Trigonometric Ratios

When we calculate the measures of all the angles and all the sides in a right triangle, we solve the triangle.

EXAMPLE 1 : Solve. Give the measures to the nearest tenth.

a)



2 sides & 1 angle unknown

$\angle B = 180° - 90° - 59° = 31°$

$(\sqrt{17})\cos 59° = \frac{AC}{\sqrt{17}}(\sqrt{17})$

$AC = (\sqrt{17})\cos 59°$

$= (4.1231)(0.5150)$

$= 2.123$

$\angle ABC =$ 31°

side $AC =$ 2.1

side $BC =$ 3.5

$(\sqrt{17})\sin 59 = \frac{BC}{\sqrt{17}}(\sqrt{17})$

$BC = (\sqrt{17})(\sin 59) = (4.1231)(0.8572) = 3.534$

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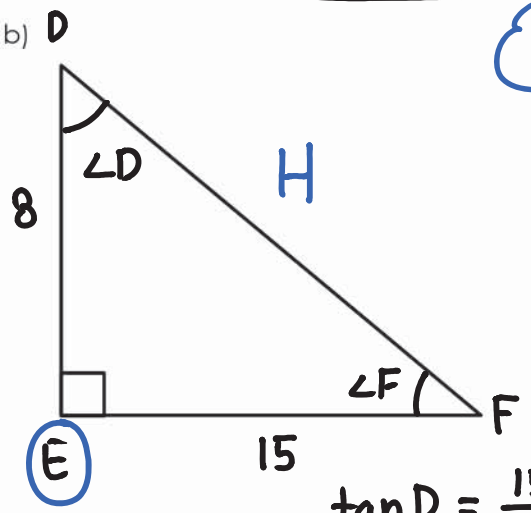
b)



2 angles and 1 side unknown

$8^2 + 15^2 = (DF)^2$

$64 + 225 = (DF)^2$

$\sqrt{289} = \sqrt{(DF)^2}$

$17 = DF$

$\tan F = \frac{8}{15}$

$\angle F = \tan^{-1}\left(\frac{8}{15}\right)$

$= 28.1°$

$\tan D = \frac{15}{8}$

$\angle D = \tan^{-1}\left(\frac{15}{8}\right)$

$= 61.9°$

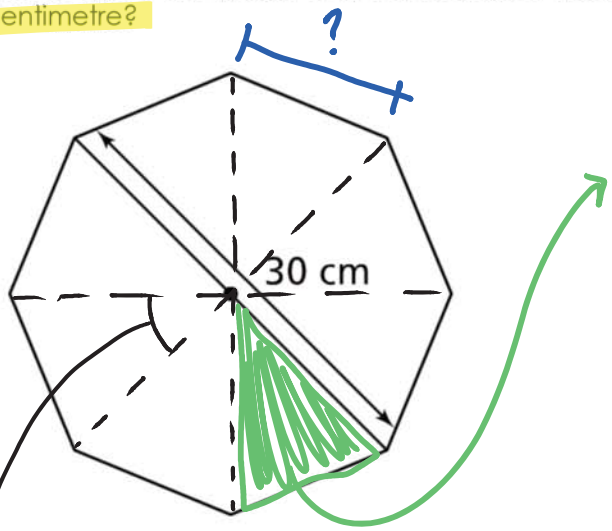
∠D

$\angle EDF =$ 61.9°

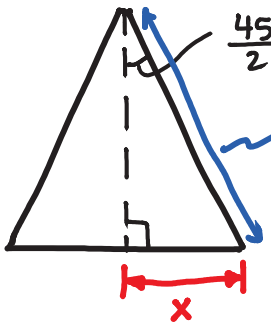
$\angle EFD =$ 28.1°

side $DF =$ 17

EXAMPLE 2 : A small table has the shape of a regular octagon. The distance from one vertex to the opposite vertex, measured through the centre of the table, is approximately 30 cm. There is a strip of wood veneer around the edge of the table. What is the length of this veneer to the nearest centimetre?



$\frac{360^\circ}{8} = 45^\circ$



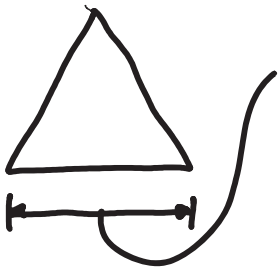
$\sin\theta = \frac{O}{H}$

$(15)(\sin 22.5) = \frac{x}{15}(15)$

$x = (15)(\sin 22.5)$

$= 5.740 \text{ cm}$

Now,



$2 \times 5.740 = 11.4805 \text{ cm}$

length of one side of the octagon.

Total length $= 8 \times 11.4805 = 91.8440 \text{ cm}$

(8 sides)

$= 92 \text{ cm}$

quiz tomorrow

Practice: p.111 #3a, 4a, 5a, 6a, 7, 8, 10, 12a, 14a, 15

Mrs. Donnelly

F. & P.-C. 10