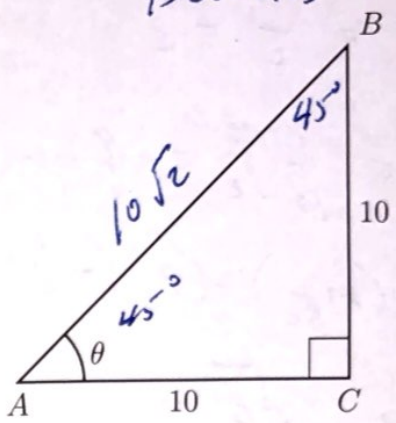
Name: Solutions

10.6 Special right triangles **HSG.SRT.C.8**

1. Isosceles right $\triangle ABC$ is shown with legs $AC = BC = 10$ as marked.



Isosceles

(a) Write down θ. 45°

(b) Find the length of hypotenuse AB.

$c^2 = 10^2 + 10^2$
$= 100 + 100 = 200$

$c = \sqrt{200}$
$= \sqrt{100}\sqrt{2}$
$= 10\sqrt{2}$

(c) Write down $\tan A =$ $10/10 = 1$

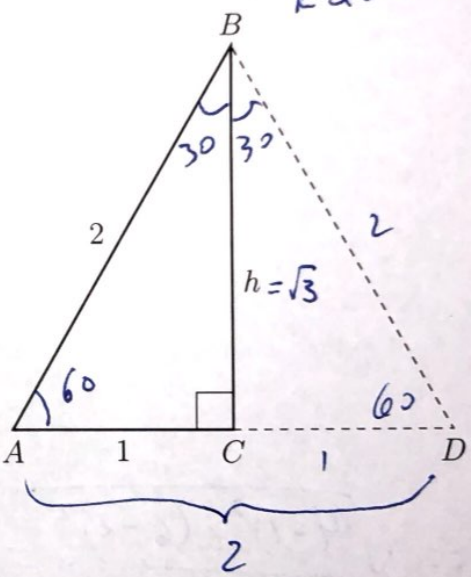
(d) Find $\cos A =$ $10/(10\sqrt{2}) = \frac{1}{\sqrt{2}}$

(e) Find $\sin A =$

$\frac{10}{10\sqrt{2}} = \frac{1}{\sqrt{2}}$

2. Given right triangle $\triangle ABC$ with base $AC = 1$ and hypotenuse $AB = 2$ as marked.

EQUILATERAL



(a) Find the altitude $BC = h$.

$h^2 + 1^2 = 2^2$
$h^2 = 4 - 1 = 3$
$h = \sqrt{3}$

(b) $\triangle ABC$ is reflected across $\overline{BC}$. Mark the lengths of the sides of its image $\triangle DBC$

(c) Write down the angle measure of $\angle A$.

60°

(d) Write down the angle measure of $\angle ABC$.

30°

(e) Write down $\cos A$. $= \frac{1}{2}$

(f) Write down $\sin A$. $= \frac{\sqrt{3}}{2}$

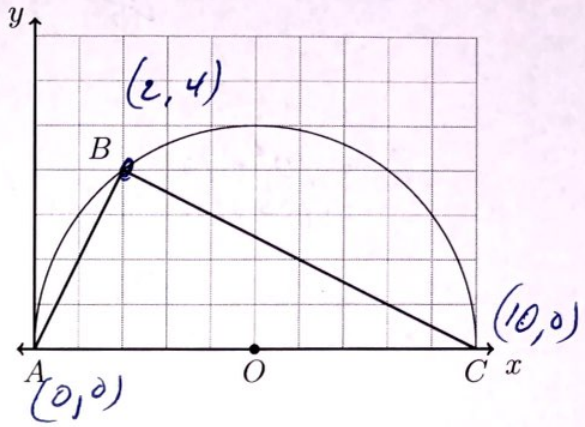
3. In the diagram below, $\triangle ABC$ is inscribed in circle O. Show that $\overline{AB} \perp \overline{BC}$.

$m_{\overline{AB}} = \frac{4}{2} = 2$

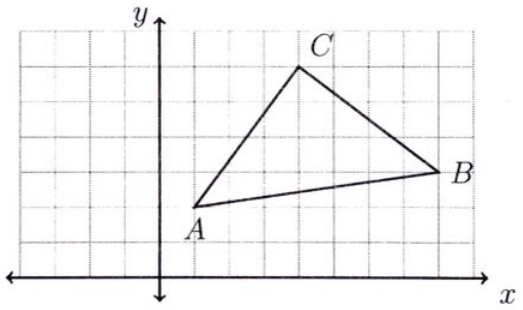
$m_{\overline{BC}} = \frac{0-4}{10-2} = -\frac{4}{8} = -\frac{1}{2}$

$(m_{\overline{AB}})(m_{\overline{BC}}) = (2)\left(-\frac{1}{2}\right) = -1$

$\Rightarrow \overline{AB} \perp \overline{BC}$



4. In the diagram below, $\triangle ABC$ has vertices with coordinates $A(1, 2)$, $B(8, 3)$ and $C(4, 6)$.



Find the length of each side of $\triangle ABC$, showing that it is isosceles and not equilateral.

$AC = \sqrt{(x_C - x_A)^2 + (y_C - y_A)^2}$

$= \sqrt{(4-1)^2 + (6-2)^2}$

$= \sqrt{3^2 + 4^2}$

$= \sqrt{25}$

$= 5$

$BC = \sqrt{(x_C - x_B)^2 + (y_C - y_B)^2}$

$= \sqrt{(4-8)^2 + (6-3)^2}$

$= \sqrt{(-4)^2 + 3^2}$

$= \sqrt{25}$

$= 5$

$AB = \sqrt{(x_B - x_A)^2 + (y_B - y_A)^2}$

$= \sqrt{(8-1)^2 + (3-2)^2}$

$= \sqrt{7^2 + 1^2}$

$= \sqrt{50}$

$= 5\sqrt{2}$