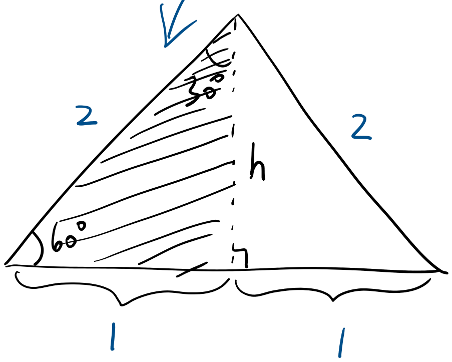
IV. Cont.

Now,



$$\Longleftrightarrow \quad 1^2 + h^2 = 2^2$$

$$1 + h^2 = 4$$

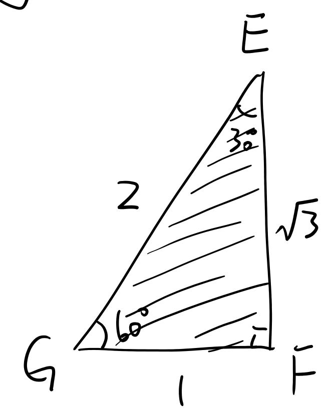
$$-1 \qquad -1$$

$$h^2 = 3$$

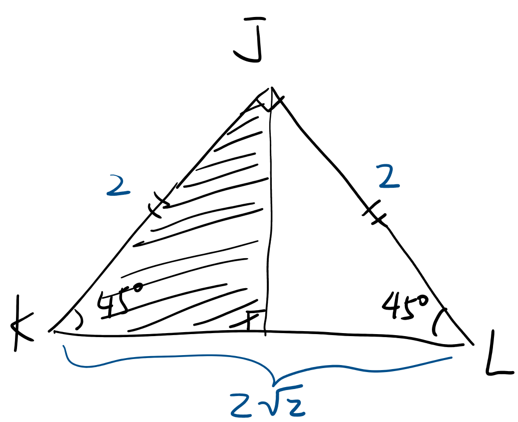
$$\sqrt{h^2} = \sqrt{3}$$

$$h = \pm\sqrt{3}$$

$$h = \sqrt{3}$$



Furthermore,



isosceles = two sides are same

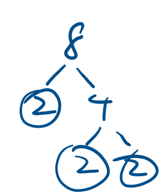
$$2^2 + 2^2 = j^2$$

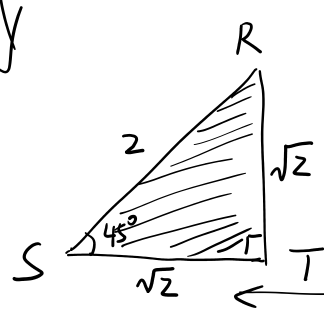
$$4 + 4 = j^2$$

$$8 = j^2$$

$$\sqrt{8} = j$$

$$\pm 2\sqrt{2} = j$$

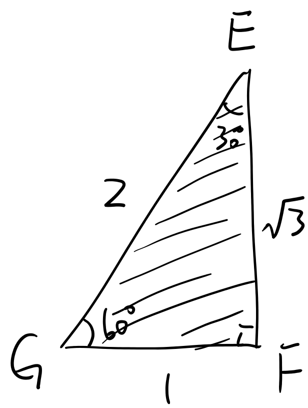




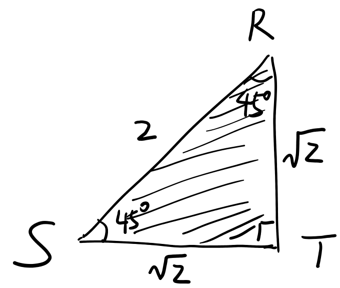
$\leftarrow$ half of $2\sqrt{2}$

Now,

$$\tan 30^\circ = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$



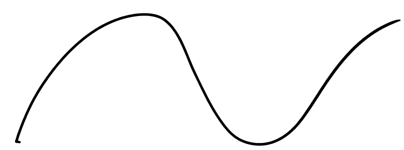
and



$\sin 60^\circ = \frac{\sqrt{3}}{2}$, $\cos 45^\circ = \frac{\sqrt{2}}{2}$, $\sin 45^\circ = \frac{\sqrt{2}}{2}$

We have the following:

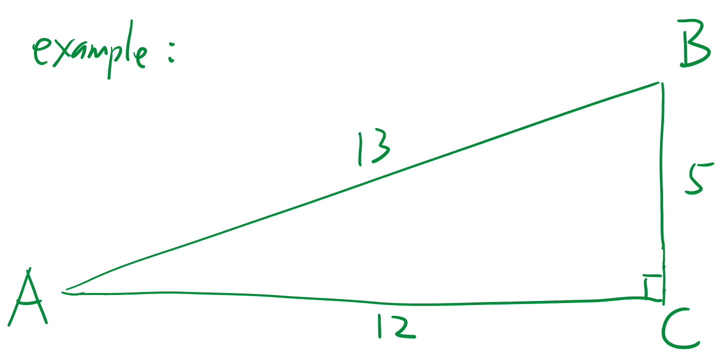
θ	0°	30°	45°	60°	90°
$\sin\theta$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan\theta$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	$+\infty$



← Remember them, well!

V. More Trig Function

For example:



Secant
Cosecant
Cotangent

We have $\sin A = \frac{5}{13}$ $\cos A = \frac{12}{13}$ $\tan A = \frac{5}{12}$ ...

We have $\sin A = \frac{5}{13}$, $\cos A = \frac{12}{13}$, $\tan A = \frac{5}{12}$ . . .

Now, we have

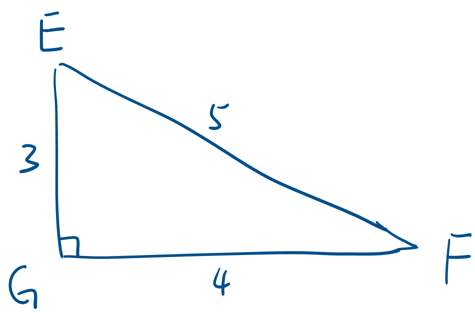
maybe this first would be helpful!

$$\sec A = \frac{1}{\cos A} = \frac{1}{\frac{12}{13}} = \boxed{\frac{13}{12}}$$

$$\csc A = \frac{1}{\sin A} = \frac{1}{\frac{5}{13}} = \boxed{\frac{13}{5}}$$

$$\cot A = \frac{1}{\tan A} = \frac{1}{\frac{5}{12}} = \boxed{\frac{12}{5}}$$

eg. Given



$\angle E$

$\angle GEF$

$\sin F = \frac{3}{5}$

$\tan E = \frac{4}{3}$

$\sin E = \frac{4}{5}$

$\cos F = \frac{4}{5}$

$\tan F = \frac{3}{4}$

$\cos E = \frac{3}{5}$,

⋮

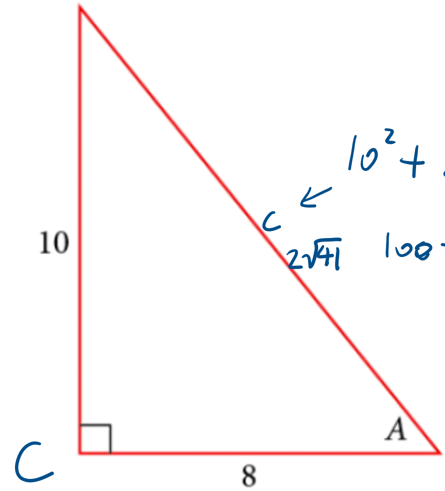
$$\csc E = \frac{1}{\sin E} = \frac{1}{\frac{4}{5}} = \frac{5}{4}$$

$$\sec F = \frac{1}{\cos F} = \frac{1}{\frac{4}{5}} = \frac{5}{4}$$

$$\cot F = \frac{1}{\tan F} = \frac{1}{\frac{3}{4}} = \frac{4}{3}$$

⋮

For the following exercises, use Figure 15 to evaluate each trigonometric function of angle A.



$$10^2 + 8^2 = c^2$$
$$100 + 64 = c^2$$
$$164 = c^2$$
$$\pm 2\sqrt{41} = c$$
$$2\sqrt{41} = c$$

Figure 15

23. $\sin A = \dfrac{\cancel{10}^{\,5}}{\cancel{2}_{1}\sqrt{41}} = \dfrac{5}{\sqrt{41}} = \boxed{\dfrac{5\sqrt{41}}{41}}$

24. $\cos A = \dfrac{\cancel{8}\,4}{\cancel{2}\sqrt{41}} = \dfrac{4}{\sqrt{41}} = \boxed{\dfrac{4\sqrt{41}}{41}}$

25. $\tan A = \dfrac{\cancel{10}^{\,5}}{\cancel{8}_{4}} = \boxed{\dfrac{5}{4}}$

26. $\csc A = \dfrac{1}{\sin A} = \dfrac{1}{\frac{5\sqrt{41}}{41}} = \dfrac{41}{5\sqrt{41}}$

$= \dfrac{41}{5\sqrt{41}} \cdot \dfrac{\sqrt{41}}{\sqrt{41}}$

$= \boxed{\dfrac{\sqrt{41}}{5}}$

27. $\sec A = \dfrac{1}{\cos A} = \dfrac{41}{4\sqrt{41}} \cdot \dfrac{\sqrt{41}}{\sqrt{41}}$

$= \boxed{\dfrac{\sqrt{41}}{4}}$

164

4 　 41

2 　 2

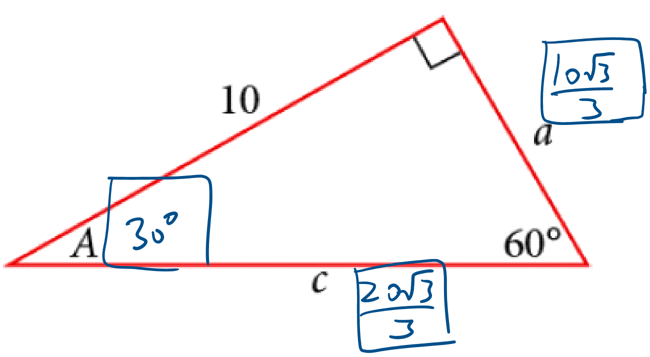
$\Longrightarrow \sqrt{2^2 \cdot 41}$

$= 2\sqrt{41}$

28. $\cot A = \dfrac{1}{\tan A} = \dfrac{1}{\frac{5}{4}}$

$= \boxed{\dfrac{4}{5}}$

eg. Solve the triangle below:



Sol:

$A = 180° - 60° - 90° = \boxed{30°}$

$\tan 30° = \dfrac{a}{10}$, $\cos 30° = \dfrac{10}{c}$

$10 \cdot \dfrac{\sqrt{3}}{3} = \dfrac{a}{\cancel{10}} \cdot \cancel{10}$ 　 $\dfrac{\sqrt{3}}{2} = \dfrac{10}{c}$

$\boxed{\dfrac{10\sqrt{3}}{3}} = a$ 　 $\sqrt{3}\,c = 2 \cdot 10$

Or:

$c^2 = 10^2 + a^2$,

$\vdots$

$$\boxed{\frac{10\sqrt{3}}{3}} = a$$

$$\sqrt{3}c = 2 \cdot 10$$

$$\frac{\cancel{\sqrt{3}}c}{\cancel{\sqrt{3}}} = \frac{20}{\sqrt{3}}$$

$$c = \frac{20}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$c = \boxed{\frac{20\sqrt{3}}{3}}$$