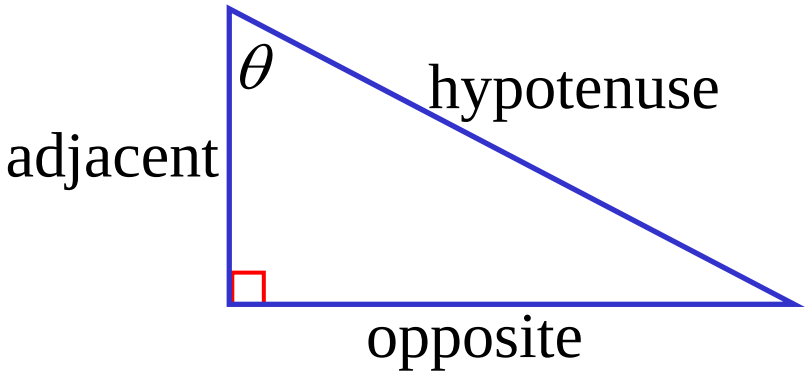
Trigonometric Ratios



$$\sin\theta = \frac{opp}{hyp} \qquad \operatorname{cosec}\theta = \frac{hyp}{opp}$$

$$\cos\theta = \frac{adj}{hyp} \qquad \sec\theta = \frac{hyp}{adj}$$

$$\tan\theta = \frac{opp}{adj} \qquad \cot\theta = \frac{adj}{opp}$$

e.g. $(i)\ \sin x = \cos 25^\circ$

$$x = 90 - 25$$

$$\underline{x = 65^\circ}$$

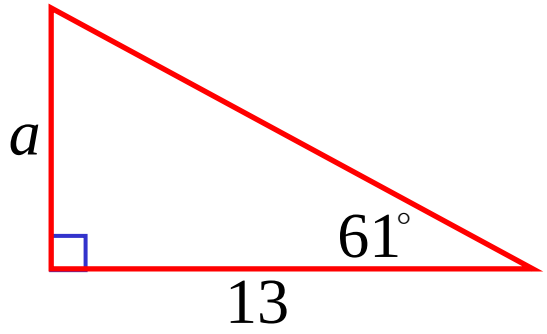
$(ii)\ \cot(x-20) = \tan(x+30)$

$$x - 20 + x + 30 = 90$$

$$2x = 80$$

$$\underline{x = 40}$$

(iii)

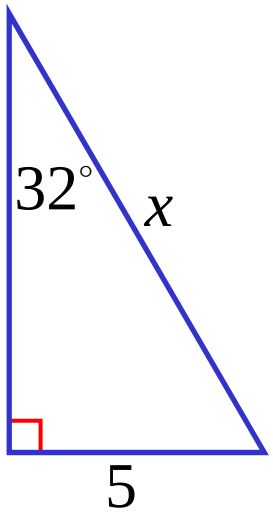


$$\frac{a}{13} = \tan 61^\circ$$

$$a = 13\tan 61^\circ$$

$$a = 23.5 \text{ units} \quad \text{(to 1 dp)}$$

(iv)

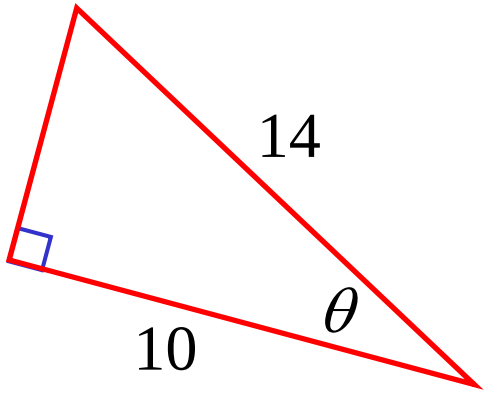


$$\frac{5}{x} = \sin 32^\circ$$

$$x = \frac{5}{\sin 32^\circ}$$

$$x = 9.4 \text{ units} \quad \text{(to 1 dp)}$$

(v)

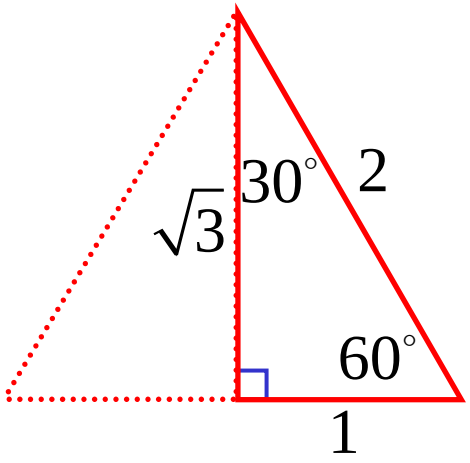


$$\cos\theta = \frac{10}{14}$$

$$\theta = \cos^{-1}\frac{10}{14}$$

$$\theta = 44^\circ 25'$$

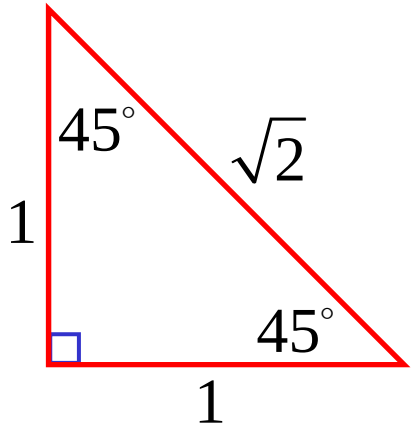
Exact Ratios



$$\sin 30^\circ = \frac{1}{2} \qquad \sin 60^\circ = \frac{\sqrt{3}}{2}$$

$$\cos 30^\circ = \frac{\sqrt{3}}{2} \qquad \cos 60^\circ = \frac{1}{2}$$

$$\tan 30^\circ = \frac{1}{\sqrt{3}} \qquad \tan 60^\circ = \sqrt{3}$$



$$\sin 45^\circ = \frac{1}{\sqrt{2}}$$

$$\cos 45^\circ = \frac{1}{\sqrt{2}}$$

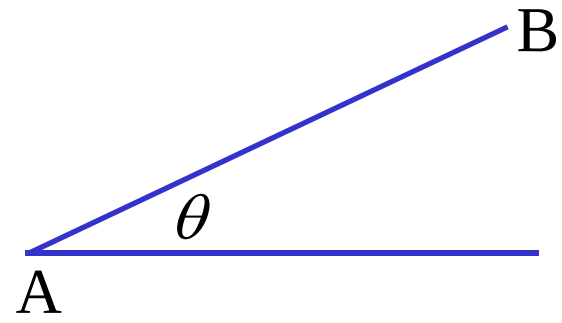
$$\tan 45^\circ = 1$$

Alternative way of remembering the exact ratios

	0°	30°	45°	60°	90°
$\sin$	$\frac{\sqrt{0}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{4}}{2}$
$\cos$	$\frac{\sqrt{4}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{0}}{2}$
$\tan = \frac{\sin}{\cos}$	$\frac{\sqrt{0}}{\sqrt{4}}$	$\frac{\sqrt{1}}{\sqrt{3}}$	$\frac{\sqrt{2}}{\sqrt{2}}$	$\frac{\sqrt{3}}{\sqrt{1}}$	$\frac{\sqrt{4}}{\sqrt{0}}$

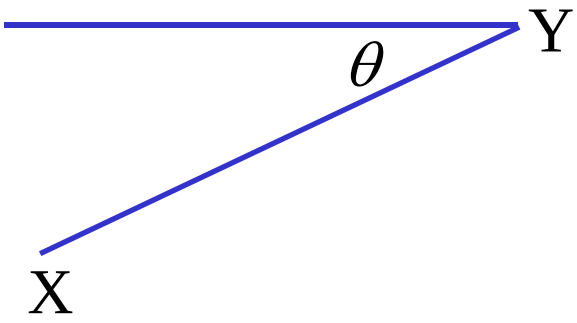
Measuring Angles

Angle of Elevation



angle of elevation **of B from A**

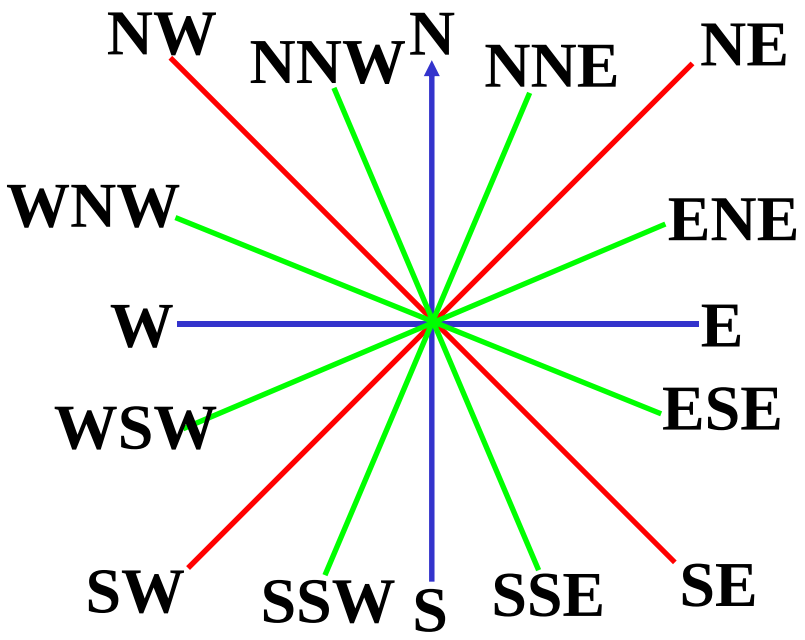
Angle of Depression



angle of depresion **of X from Y**

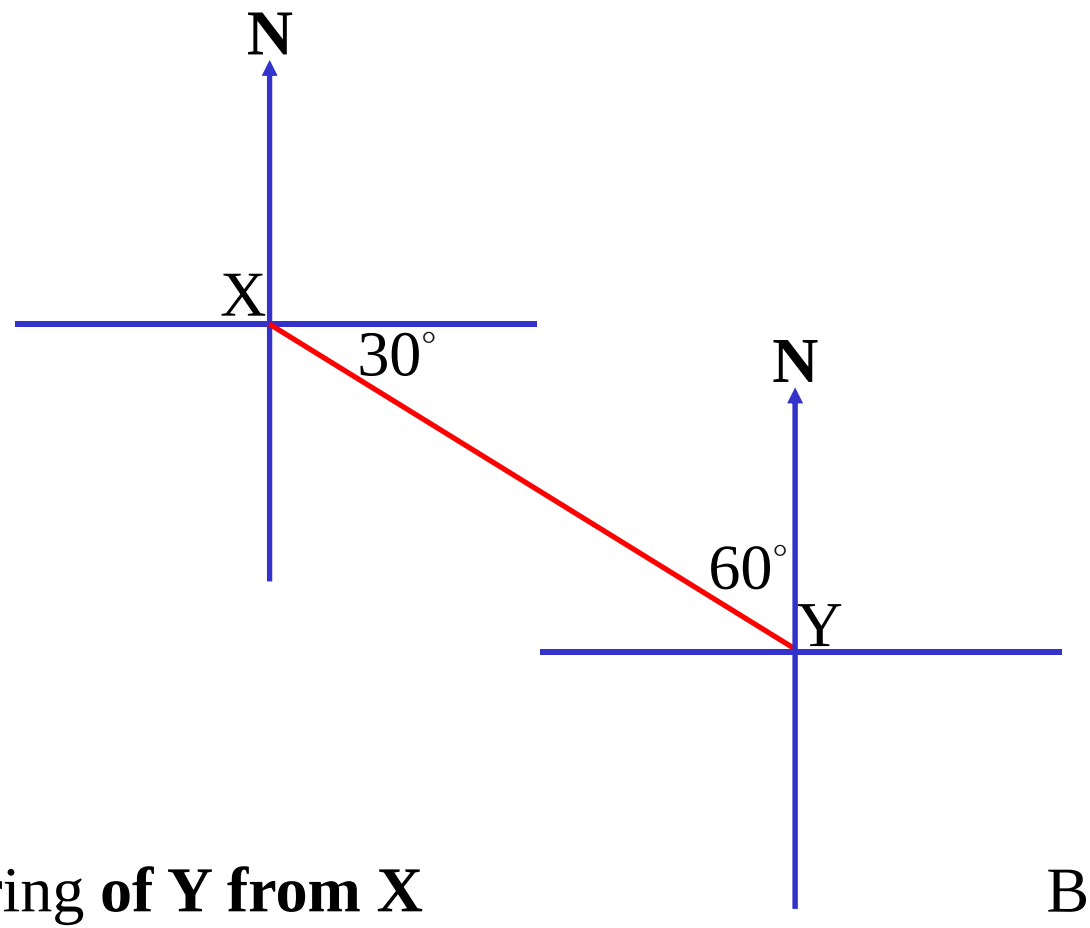
Note: angle of elevation = angle of depression

Compass Bearings



True Bearings

Always start **NORTH** and measure clockwise



Bearing **of Y from X**

120°T

or S60°E

Bearing **of X from Y**

300°T

or N60°W

Exercise 6A; 2 to 5 *(pick some)*, 6d, 7d, 8, 9, 11b, 12a, 13ef, 14, 15, 20, 21

Exercise 6B; 4, 6, 7, 8, 11, 13, 14, 15bc, 16b, 17, 18, 20