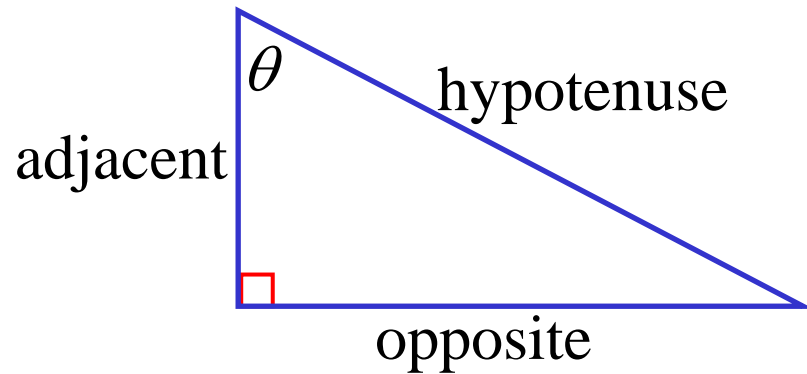


Trigonometric Ratios



$$\sin \theta = \frac{opp}{hyp}$$

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

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

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

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

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

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

$$x = 90 - 25$$

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

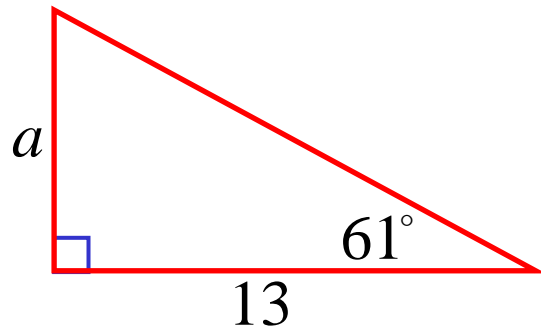
(ii) $\cot(x - 20) = \tan(x + 30)$

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

$$2x = 80$$

$$\underline{x = 40}$$

(iii)

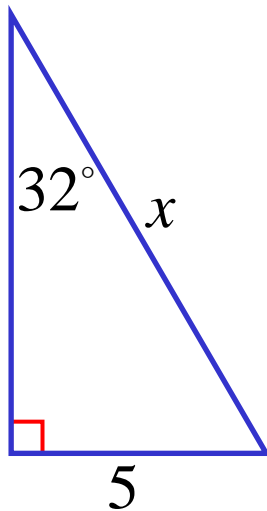


$$\frac{a}{13} = \tan 61^\circ$$

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

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

(iv)

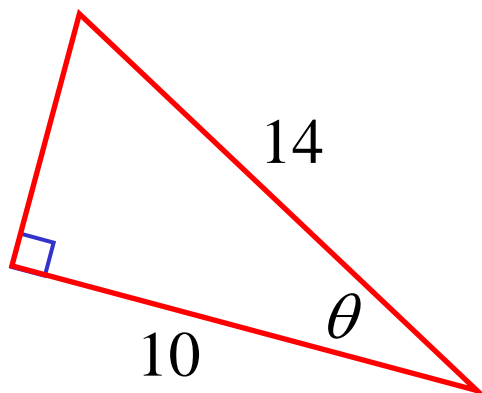


$$\frac{5}{x} = \sin 32^\circ$$

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

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

(v)

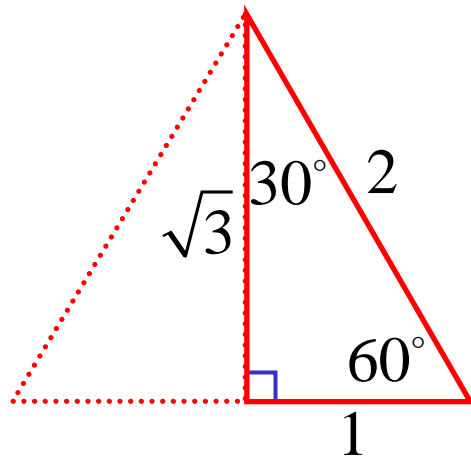


$$\cos \theta = \frac{10}{14}$$

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

$$\underline{\theta = 44^\circ 25'}$$

Exact Ratios



$$\sin 30^\circ = \frac{1}{2}$$

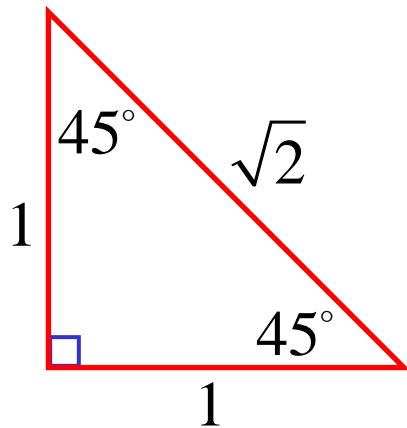
$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

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

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

$$\cos 60^\circ = \frac{1}{2}$$

$$\tan 60^\circ = \sqrt{3}$$



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

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

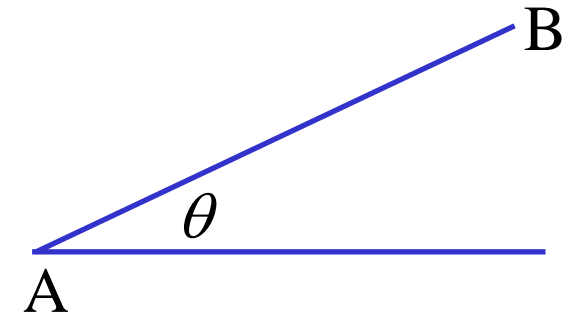
$$\tan 45^\circ = 1$$

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 = $\frac{\sin}{\cos}$	$\frac{\sqrt{0}}{\sqrt{4}}$	$\frac{\sqrt{1}}{\sqrt{3}}$	$\frac{\sqrt{2}}{\sqrt{2}}$	$\frac{\sqrt{3}}{\sqrt{1}}$	$\frac{\sqrt{4}}{\sqrt{0}}$

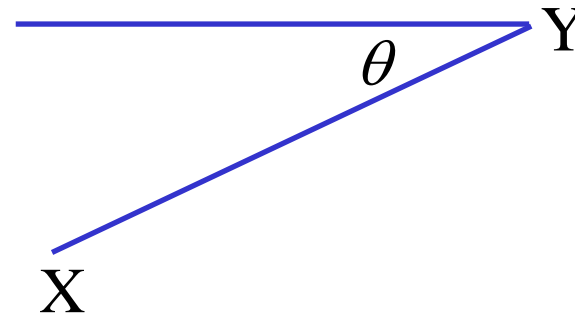
Measuring Angles

Angle of Elevation



angle of elevation of B from A

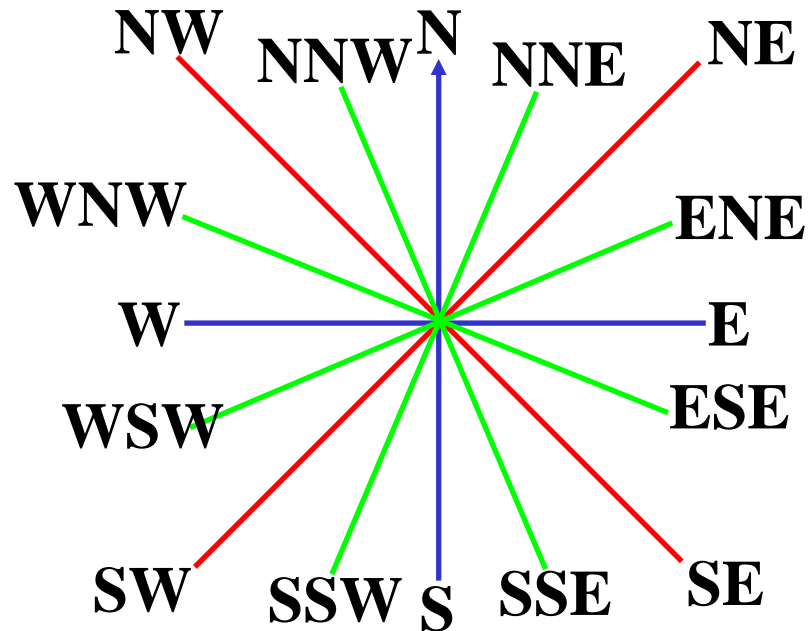
Angle of Depression



angle of depression of X from Y

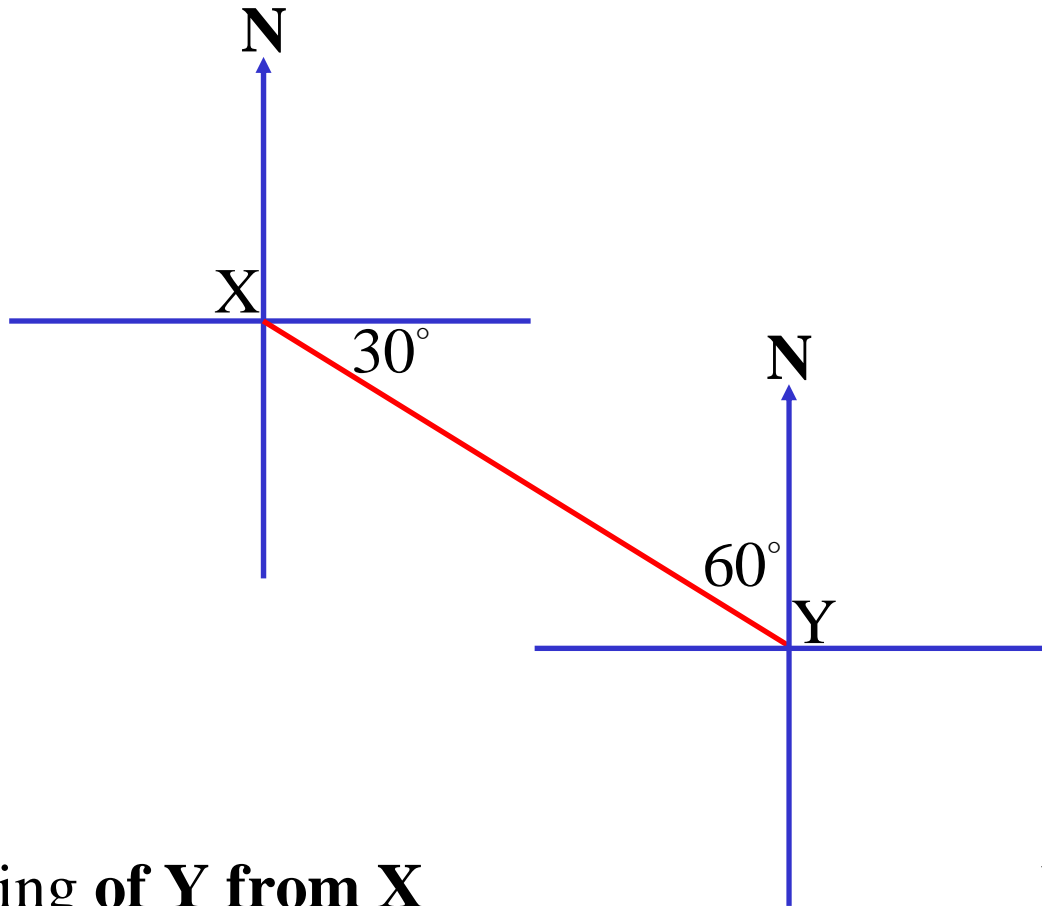
Note: angle of elevation = angle of depression

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 4A; 1 to 3 (*pick some*), 4acf, 5, 7bd, 8ac, 9bd, 11, 12,
14c, 17, 18, 19b, 21, 23, 24, 25**

Exercise 4B; 1b, 2b, 3, 4b, 6, 7, 10