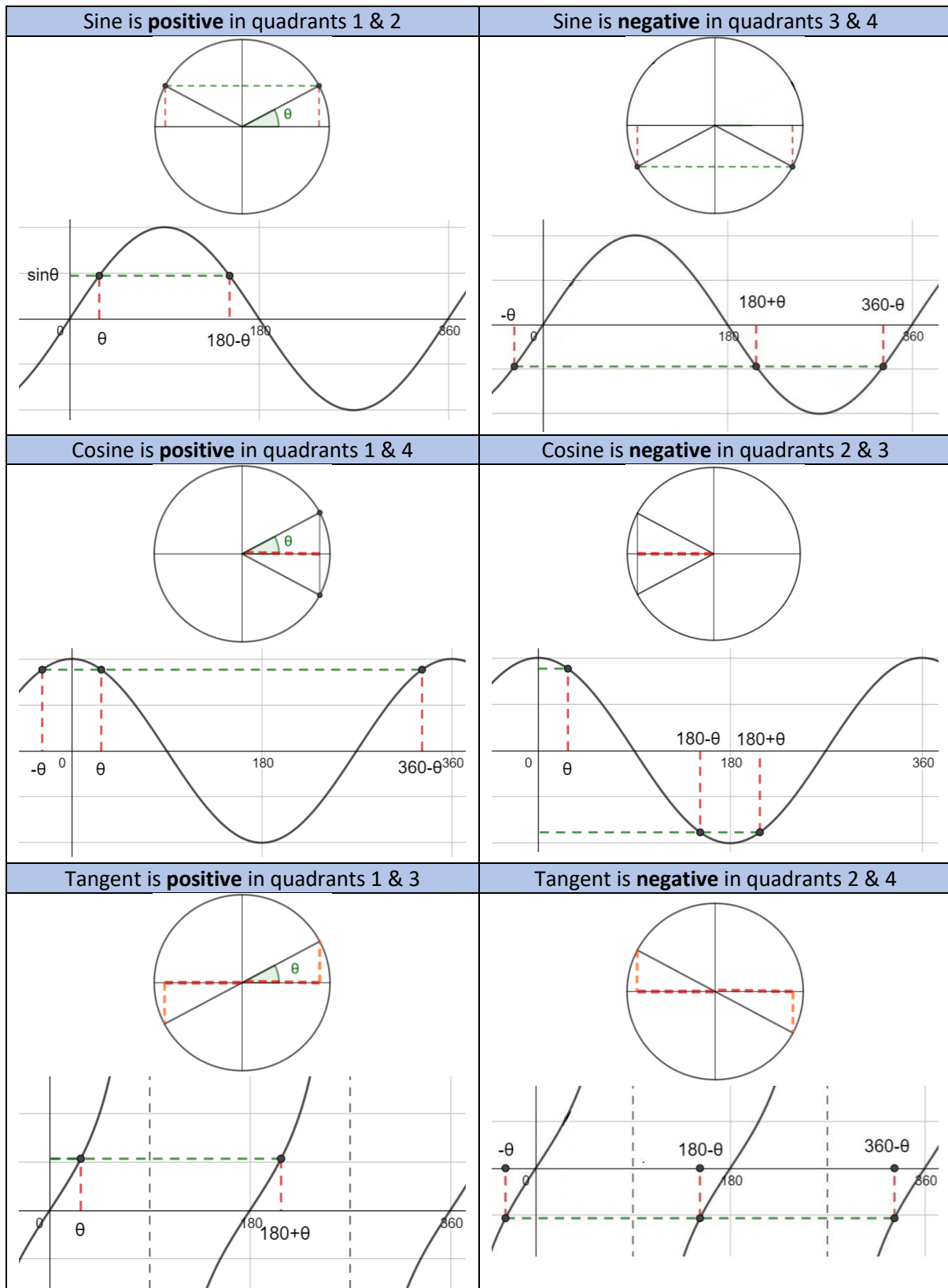# Trigonometric Equations

It is important to understand the properties of the sine, cosine and tangent functions, but it is up to you whether you prefer to use the unit circle or the graphs to help you remember this
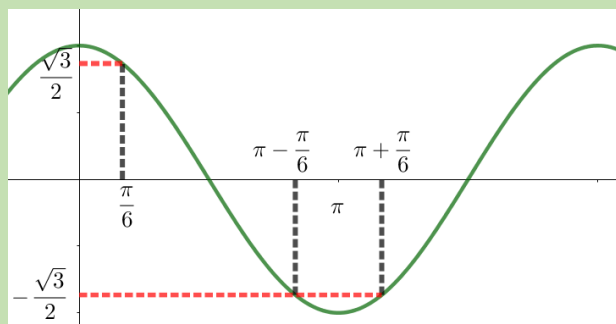
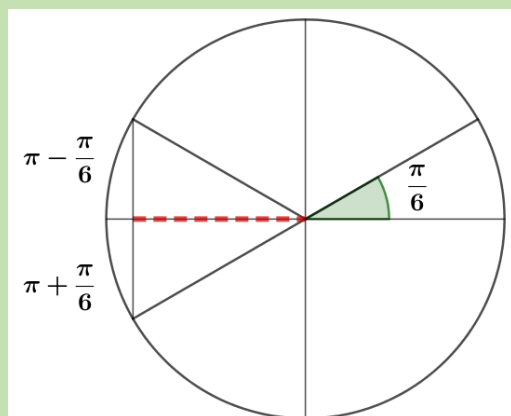| Sine is **positive** in quadrants 1 & 2	Sine is **negative** in quadrants 3 & 4
Cosine is **positive** in quadrants 1 & 4	Cosine is **negative** in quadrants 2 & 3
Tangent is **positive** in quadrants 1 & 3	Tangent is **negative** in quadrants 2 & 4

Often questions on this topic appear on the non-calculator exam, so the exact values for these angles need to be learnt. Remember that **180° = π radians**

θ in degrees	0	30	45	60	90
θ in radians	0	$\dfrac{\pi}{6}$	$\dfrac{\pi}{4}$	$\dfrac{\pi}{3}$	$\dfrac{\pi}{2}$
$sin\theta$	0	$\dfrac{1}{2}$	$\dfrac{\sqrt{2}}{2}$	$\dfrac{\sqrt{3}}{2}$	1
$cos\theta$	1	$\dfrac{\sqrt{3}}{2}$	$\dfrac{\sqrt{2}}{2}$	$\dfrac{1}{2}$	0
$tan\theta$	0	$\dfrac{\sqrt{3}}{3}$	1	$\sqrt{3}$	undefined

Example

Solve $2cos\theta + \sqrt{3} = 0$ for $0 < \theta < 2\pi$

$cos\theta = -\dfrac{\sqrt{3}}{2}$ $\qquad$ $\boldsymbol{arccos\left(+\dfrac{\sqrt{3}}{2}\right) = \dfrac{\pi}{6}}$

$\theta = \dfrac{5\pi}{6}, \dfrac{7\pi}{6}$