Double Angle Identities

Sine	Cosine	Tangent
$\sin 2\theta = 2\sin\theta\cos\theta$	$\cos 2\theta = \cos^2\theta - \sin^2\theta$ $\cos 2\theta = 2\cos^2\theta - 1$ $\cos 2\theta = 1 - 2\sin^2\theta$	$\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$

Finding Trig values

sin csc +	All +
tan cot +	sos sec +

sin: $\frac{y}{r}$

cos: $\frac{x}{r}$

tan: $\frac{y}{x}$

csc: $\frac{r}{y}$

sec: $\frac{r}{x}$

cot: $\frac{x}{y}$

If $\sin\theta = \frac{5}{13}$ and $0° < \theta < 90°$, find Q1 $\frac{y}{r}$ $x=12$ $y=5$ $r=13$

Q1: Everything Pos.

$\sin 2\theta = 2\sin\theta\cos\theta$

$2\left(\frac{5}{13}\right)\left(\frac{12}{13}\right) = \frac{120}{169}$

$\cos 2\theta = 1 - 2\sin^2\theta$

$1 - 2\left(\frac{5}{13}\right)^2 = \frac{49}{169}$

$\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$ $\frac{2(5/12)}{1-(5/12)^2} = \frac{120}{119}$

If $\cos\theta = \frac{-7}{25}$ and $180° < \theta < 270°$, find Q3 $x=-7$ $y=-24$ $r=25$

Q3: sin −, cos −, tan +

$\sin 2\theta = 2\left(\frac{-24}{25}\right)\left(\frac{-7}{25}\right) = \frac{336}{625}$

$\cos 2\theta = 2\left(\frac{-7}{25}\right)^2 - 1 = \frac{-527}{625}$

$\tan 2\theta = \frac{2(24/7)}{1-(24/7)^2} = \frac{-336}{527}$

If $\tan\theta = \frac{-20}{21}$ and $90° < \theta < 180°$, find Q2 $\frac{y}{x}$ $x=21$ $y=20$ $r=29$

Q2: sin +, cos −, tan −

$\sin 2\theta = 2\left(\frac{20}{29}\right)\left(\frac{-21}{29}\right) = \frac{-840}{841}$

$\cos 2\theta = 2\left(\frac{21}{29}\right)^2 - 1 = \frac{41}{841}$

$\tan 2\theta = \frac{2\left(\frac{-20}{21}\right)}{1-\left(\frac{-20}{21}\right)^2} = \frac{-840}{41}$

If $\csc\theta = \frac{-29}{20}$ and $270° < \theta < 360°$, find Q4 $\frac{r}{y}$ $x=21$ $y=20$ $r=29$

Q4: sin −, cos +, tan −

$\sin 2\theta = 2\left(\frac{-20}{29}\right)\left(\frac{21}{29}\right) = \frac{-840}{841}$

$\cos 2\theta = 2\left(\frac{21}{29}\right)^2 - 1 = \frac{41}{841}$

$\tan 2\theta = \frac{2\left(\frac{-20}{21}\right)}{1-\left(\frac{-20}{21}\right)^2} = \frac{-840}{41}$