



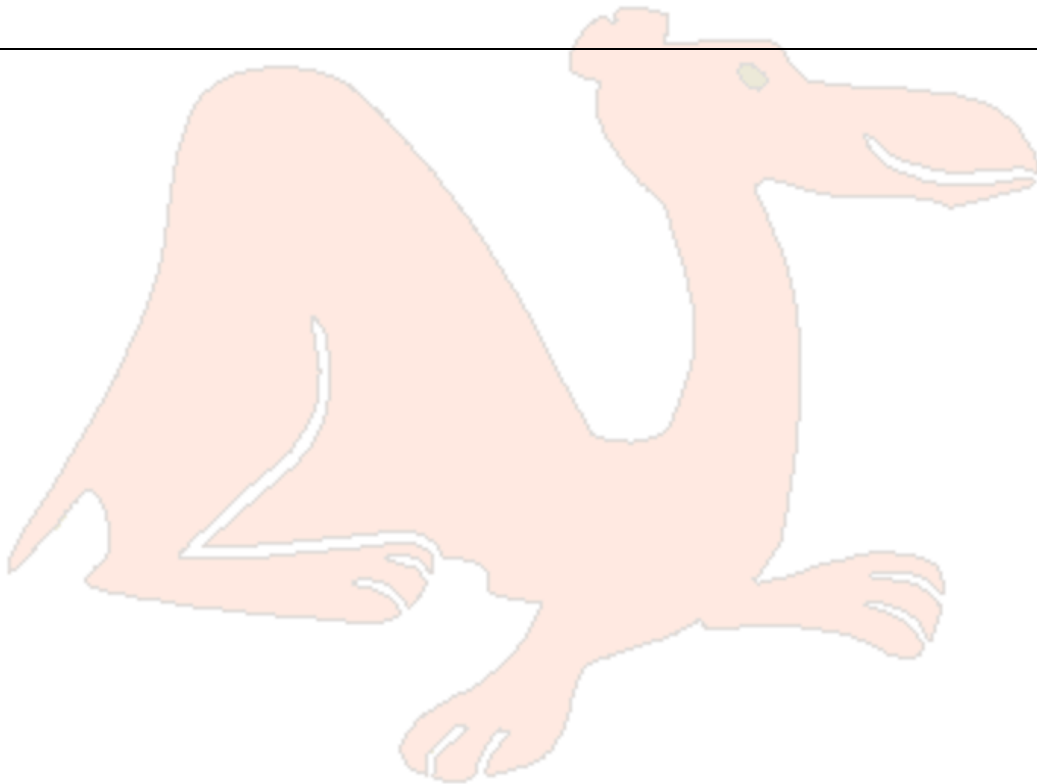
CAMI Mathematics: Grade 12

12.9 Trigonometry

12.9 Double angle identities

1. Simplify by using double angle identities.

- (a) $\cos 154^\circ$
- (b) $\sin 48^\circ$
- (c) $\cos 20^\circ$
- (d) $\sin 172^\circ$
- (e) $\cos 60^\circ$





MEMO

1. Simplify by using double angle identities. [7.5.4.9]

(a)

$$\cos 154^\circ = \cos(77^\circ + 77^\circ)$$

$$\cos 154^\circ = \cos 77^\circ \cdot \cos 77^\circ - \sin 77^\circ \cdot \sin 77^\circ$$

$$\cos 154^\circ = \cos^2 77^\circ - \sin^2 77^\circ$$

$$\cos 154^\circ = \cos^2 77^\circ - (1 - \cos^2 77^\circ)$$

$$\cos 154^\circ = 2\cos^2 77^\circ - 1$$

(b)

$$\sin 48^\circ = \sin(24^\circ + 24^\circ)$$

$$\sin 48^\circ = \sin 24^\circ \cdot \cos 24^\circ + \cos 24^\circ \cdot \sin 24^\circ$$

$$\sin 48^\circ = 2\sin 24^\circ \cos 24^\circ$$

(c)

$$\cos 20^\circ = \cos(10^\circ + 10^\circ)$$

$$\cos 20^\circ = \cos 10^\circ \cdot \cos 10^\circ - \sin 10^\circ \cdot \sin 10^\circ$$

$$\cos 20^\circ = \cos^2 10^\circ - \sin^2 10^\circ$$

$$\cos 20^\circ = \cos^2 10^\circ - (1 - \cos^2 10^\circ)$$

$$\cos 20^\circ = 2\cos^2 10^\circ - 1$$

(d)

$$\sin 172^\circ = \sin(86^\circ + 86^\circ)$$

$$\sin 172^\circ = \sin 86^\circ \cdot \cos 86^\circ + \cos 86^\circ \cdot \sin 86^\circ$$

$$\sin 172^\circ = 2\sin 86^\circ \cos 86^\circ$$

(e)

$$\cos 60^\circ = \cos(30^\circ + 30^\circ)$$

$$\cos 60^\circ = \cos 30^\circ \cdot \cos 30^\circ - \sin 30^\circ \cdot \sin 30^\circ$$

$$\cos 60^\circ = \cos^2 30^\circ - \sin^2 30^\circ$$

$$\cos 60^\circ = (1 - \sin^2 30^\circ) - \sin^2 30^\circ$$

$$\cos 60^\circ = 1 - 2\sin^2 30^\circ$$