MCR 3UI – *Trigonometric Ratios of Special Angles*

1. Find the *exact* value of the following:

a) $\sin^2 45^\circ + 2\sin 30^\circ \sec 30^\circ$

b) $\sin 30^\circ \sin 45^\circ \sin 60^\circ$

c) $\sin^2 30^\circ + \cos^2 30^\circ$

d) $\sin 30^\circ \cos 30^\circ + \sin 60^\circ \cos 60^\circ$

e) $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$

f) $2\sin 30^\circ \cos 30^\circ$

g) $5\sec 30^\circ \tan 60^\circ$

h) $\cos^2 60^\circ + 3\sec^2 30^\circ$

i) $3\sin^2 45^\circ + 4\cos^2 45^\circ$

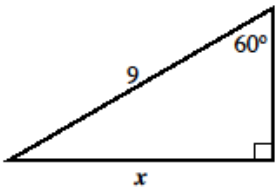
j) $\sin 60^\circ \cos 60^\circ \tan 60^\circ$

k) $\sec^2 45^\circ \csc^2 45^\circ - 1$

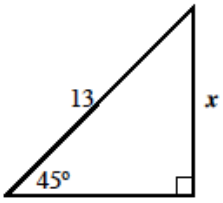
l) $\sin 30^\circ + \cos 60^\circ + \sec 60^\circ$

2. State the *exact* value for x in each of the following:

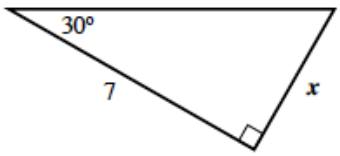
a)



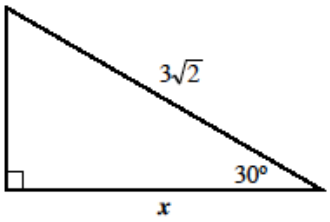
b)



c)



d)



3. Prove the following

a) $\sin^2 30^\circ + \cos^2 30^\circ = \sin^2 60^\circ + \cos^2 60$

b) $1 + \tan^2 45^\circ = \sec^2 45^\circ$

c) $\csc^2 60^\circ = 1 + \cot^2 60^\circ$

d) $\cos 60^\circ \sec 30^\circ = \tan 30^\circ$

ANSWERS

1a) $\frac{3+4\sqrt{3}}{6}$ **b)** $\frac{\sqrt{6}}{8}$ **c)** 1 **d)** $\frac{\sqrt{3}}{2}$ **e)** 1 **f)** $\frac{\sqrt{3}}{2}$

g) 10 **h)** $\frac{17}{4}$ **i)** $\frac{7}{2}$ **j)** $\frac{3}{4}$ **k)** 3 **l)** 3

2a) $\frac{9\sqrt{3}}{2}$ **b)** $\frac{13\sqrt{2}}{2}$ **c)** $\frac{7\sqrt{3}}{3}$ **d)** $\frac{3\sqrt{6}}{2}$