1. (a) Select the **value of each expression** in List I, from the values listed in List II:

List I (The Expression)	The Value
1. $\cos\left(\frac{2n+1}{2}p\right), n = 0, \pm1, \pm2, \ldots$	
2. $\sec^2 20^\circ - \tan^2 20^\circ$	
3. $\sqrt{\frac{1-\cos 40^\circ}{2}}$	
4. $\frac{\tan 115^\circ + \tan 5^\circ}{1 - \tan 115^\circ \tan 5^\circ}$	
5. $\cot 20^\circ \sec 20^\circ$	

List II
a) 1
b) $-\sqrt{3}$
c) $\tan 120^\circ$
d) 0
e) $\cos 20^\circ$
f) $\csc 20^\circ$
g) $\cos 70^\circ$

1. (b) Find the **exact value** of

i. $\cos\left(\frac{19p}{12}\right)$

ii. $5\cot(150^\circ) - 6\tan(-300^\circ)$

2. (a) If $\tan x = -\sqrt{8}$, $\frac{3p}{2} < x < 2p$, find the **value** of $\cos\left(\frac{x}{2}\right)$.

2 (b) **Verify the identity**: $2\csc 2q = \tan q + \cot q$

3. (a) Using the **reduction identity,** rewrite $f(x)=\frac{\sqrt{3}}{2}\sin 2x-\frac{1}{2}\cos 2x$:

Also, find:

i. **range** of f.

ii. **period** of f.

iii. **amplitude** of f.

iv. **phase shift** of f.

3. (b) **Verify the identity**: $\frac{1}{1-\sin q}+\frac{1}{1+\sin q}=2\sec^2 q$

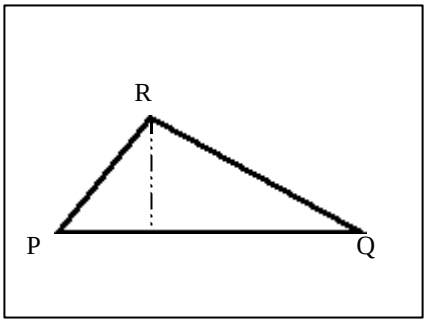
4. (a) i. If $\alpha + \beta = \pi$, find $\cos\alpha + \cos\beta$.

ii. Use part (i) to find the value of

$$\cos\left(\frac{\pi}{5}\right)+\cos\left(\frac{2\pi}{5}\right)+\cos\left(\frac{3\pi}{5}\right)+\cos\left(\frac{4\pi}{5}\right)+\cos\left(\frac{5\pi}{5}\right)$$

4. (b) Given $\tan\alpha = -\frac{3}{4}$ for α in Quadrant II and $\csc\beta = -\frac{5}{4}$ for β in Quadrant IV, **find** $\sec(\alpha - \beta)$

5. (a) The following figure shows that **two ships** are at **points P and Q** and also, an **airplane** is at **point R**. When the airplane is at the **height** of 3500 ft, the **angle of depression** from airplane to P is 45^{-} and to Q is 30^{-}. **Find the distance** between the two ships.

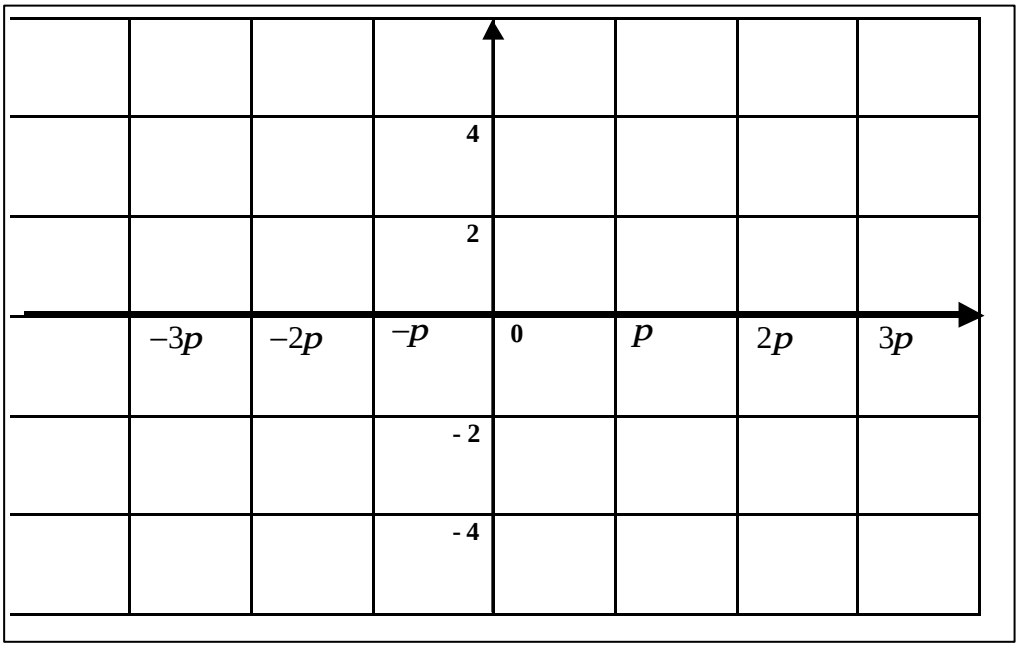


5. (b) Find the **solution set** of the equation $\cos^2 2x - 2\cos 2x = 3$ in the interval $p \le x \le 4p$.

6. (a) If $f(x)=4\cos\left(\frac{1}{2}x+\frac{p}{4}\right)$, then find its

i. **amplitude**	ii. **period**	iii. **phase shift**

Also, **draw the graph** of the function f over **one cycle**



6. (b) The **graph** of the function

$$f(x)=2\cot(bx+c)$$

has **period** $\frac{2p}{3}$ and **phase shift** $\frac{p}{2}$ to the left. **Find** $f(p)$.