TRIGONOMETRIC RATIOS OF COMPOUND ANGLES

1) Show that $\tan(45^0 + A).\tan(45^0 - A) = 1$
2) Prove that $\sin^2 52\frac{1^0}{2} - \sin^2 22\frac{1^0}{2} = \frac{\sqrt{3}+1}{4\sqrt{2}}$
3) Prove that $\frac{\cos 27^0+\sin 27^0}{\cos 27^0-\sin 27^0}$=cot 18^0(or) tan 72^0
4) If A+B=45^0,show that (1+tanA)(1+tanB)=2
5) Prove that $\cos 70^0 \cos 10^0+\sin 70^0 \sin 10^0=\frac{1}{2}$
6) **Prove that** $\frac{(\tan A+\sec A-1)\cos A}{\sin A+\cos A-1}=\frac{1+\sin A}{\cos A}$
7) **Prove that** $\sin^2 45^0-\sin^2 15^0=\frac{\sqrt{3}}{4}$.
8) **Prove that** $\sin^2 75^0 - \cos^2 45^0=\frac{\sqrt{3}}{4}$
9) **Prove that** $\cos^2 48^0-\sin^2 12^0=\frac{\sqrt{5}+1}{8}$
10) **Prove that** $\cos^2 15^0-\cos^2 75^0=\frac{\sqrt{3}}{2}$.
11) If $\tan\theta=\sqrt{3}$ and $\tan\emptyset=2-\sqrt{3}$, show that $(\theta - \emptyset)=\frac{\pi}{4}$.
12) If $\sin A=\frac{3}{5}$, $\cos B=\frac{5}{13}$ find sin(A+B) Ans. $\frac{63}{65}$
13) **Prove that** $\frac{\cos 11^0+\sin 11^0}{\cos 11^0-\sin 11^0}$ = tan 56^0 or cot34^0
14) **Prove that** $\frac{\cos 37^0+\sin 37^0}{\cos 37^0-\sin 37^0}$=cot 8^0
15) **Prove that** $\frac{\cos 19^0-\sin 19^0}{\cos 19^0+\sin 19^0}$= tan 26^0
16) if A+B =135^0, prove that (1+cotA) (1+cotB)=2
17) Prove that tan8A-tan5A-tan3A= tan8A.tan5A.tan3A
18) If A+B+C= 90^0 ,then prove that
    (1) tanA.tanB+tanBtanC+tanCtanA=1
    (2) cotA+cotB+cotC=cotA.cotB.cotC
19) **Prove that** $\frac{\cos(\alpha-\beta)}{\cos}=\frac{1+\sin A}{\cos A}$

TRIGONOMETRIC (MULTIPLE AND SUB MULTIPLE ANGLES)

1) Prove that $(\cos A + \sin A)^2$= 1+ $\sin^2 A$
2) If $\sin A=\frac{3}{5}$, find (i) sin2A cos2A (ii) sin3A
3) Prove that
    1+cos2A=cotA sin2A
    $\cos^4 A$ - $\sin^4 A$=cos2A.
4) Prove that
    a. $\sin x.\sin(60^0 - x).\sin(60^0 + x) = \frac{1}{4}\sin 3x$
    b. $\cos x.\cos(60^0 + x).\cos(60^0 - x)=\frac{1}{4}\cos 3x$
    c. $\tan A.\tan\left(\frac{\pi}{3} + A\right).\tan\left(\frac{\pi}{3} - A\right)$=tan3a
    d. $\cot\theta-\cot 2\theta=\operatorname{cosec} 2\theta$
5) Prove that $\frac{\sin 2\theta}{1-\cos 2\theta}=\cot\theta$
6) Prove that $\frac{\tan 2\theta}{1+\sec 2\theta}=\tan\theta$
7) Prove that $\frac{\sin 2\theta}{1+\cos 2\theta}=\tan\theta$
8) Prove that $\frac{1-\cos 2\theta}{\sin 2\theta}=\tan\theta$
9) Prove that $\frac{\sin 2A}{1+\cos 2\theta}.\frac{\cos A}{1+\cos A} = \operatorname{Tan}\frac{A}{2}$
10) **Prove that** $\frac{\sin 2\theta}{1+\cos 2\theta}.\frac{\cos\theta}{1+\cos\theta}=\tan\frac{\theta}{2}$
11) **Prove that** $\frac{\sin 2\theta}{1-\cos 2\theta}.\frac{1-\cos\theta}{\cos\theta}=\tan\frac{\theta}{2}$
12) Prove that $\frac{\operatorname{cosec}\theta}{\operatorname{cosec} 3\theta}-\frac{\sec\theta}{\sec 3\theta}=2$
13) **Prove that** $\frac{\cos 2A}{1-\sin 2A}$=Cot(45-A)
14) **Prove that** $\operatorname{Tan}\left(\frac{\pi}{4} + A\right)$- $\operatorname{Tan}\left(\frac{\pi}{4} - A\right)$=2tan2A
15) Show that $\cot\left(\frac{\pi}{4} + A\right)$+ $\cot\left(\frac{\pi}{4} - A\right)$=2sec2A
16) **Show that** $\frac{\sin\theta+\sin 2\theta}{1+\cos\theta+\cos 2\theta}=\tan\theta$
17) Prove that $\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}-\frac{\cos\theta-\sin\theta}{\cos\theta+\sin\theta}=2\tan 2\theta$
18) Show that $\cos^6\theta - \sin^6\theta=1-\frac{3}{4}\sin^2 2\theta$
19) Show that $\cos 5\theta = 16\cos^5\theta - 20\cos^3\theta+5\cos\theta$
20) Prove that $\cos 10^0\cos 30^0\cos 50^0\cos 70^0=\frac{3}{16}$.
21) Show that $\cos 10^0\cos 50^0\cos 70^0=\frac{\sqrt{3}}{8}$.
22) Show that $\sin 10^0\sin 50^0\sin 70^0=\frac{1}{8}$
23) Show that $\cos 20^0\cos 30^0\cos 40^0\cos 80^0=\frac{\sqrt{3}}{16}$.
24) If a. sin ∝ = b cos ∝,
    show that a cos 2∝ + b sin∝ = a.
25) Prove that $\frac{\sec 8\theta-1}{\sec 4\theta-1} = \frac{\tan 8\theta}{\tan 2\theta}$.

26) If tan a $=\frac{1-\cos B}{\sin B}$, then prove that tan 2a = tan b

27) Express sin5θ in terms of sin θ (or)
Show that sin 5θ =16$\sin^5\theta - 20\sin^3\theta$+5sin$\theta$

28) If x+$\frac{1}{x} = 2\cos\theta$, then show that $x^2+\frac{1}{x^2}$=2cos2θ

29) Prove that $\sin(60^0 - A)\sin(60^0 + A)=\frac{1}{4}[3 - 4\sin^2 A]$

30) Prove that $\tan\left(\frac{\pi}{4} + A\right)\tan\left(\frac{\pi}{4} - A\right)$=1

TRANSFORMATION OF PRODUCTS AND SUMS

1) Prove that
   a) cos (2x-3y) – cos (3x-2y)=2sin$\left(\frac{5x-5y}{2}\right)$.sin$\left(\frac{x+y}{2}\right)$
   b) $\frac{\sin^2A+\sin^2B}{\sin A\cos A-\sin B\cos B}$=tan$(A+B)$
   c) $\cos 10^0\cos 30^0\cos 50^0\cos 70^0=\frac{\sqrt{3}}{8}$
   d) $\cos 20^0\cos 30^0\cos 40^0\cos 80^0=\frac{\sqrt{3}}{16}$.
   e) $\sin 6^0\sin 42^0\sin 66^0\sin 78^0=\frac{1}{16}$.
   f) $\cos 6^0\cos 42^0\cos 66^0\cos 78^0=\frac{1}{16}$.

2) If sin x + sin y =$\frac{3}{4}$ and sin x - sin y = $\frac{2}{5}$
   Prove that
   8cot$\left(\frac{X-Y}{2}\right)$=15 cot$\left(\frac{X+Y}{2}\right)$ (or)
   8tan$\left(\frac{X+Y}{2}\right)$=15 tan$\left(\frac{X-Y}{2}\right)$

3) If sinx + siny = a and cosx - cosy =b
   Show that
   sin(x+y)=$\frac{2ab}{a^2+b^2}$ and cos(x+y)= $\frac{b^2-a^2}{a^2+b^2}$.

4) sin $\propto$ + sin β = a and cos $\propto$ - cos β =b,then prove that tan$\left(\frac{\propto+\beta}{2}\right)=\frac{a}{b}$

5) Show that b tan$\propto$ = a tanβ, if $\frac{\sin(\propto+\beta)}{\sin(\propto-\beta)}=\frac{a+b}{a-b}$.

6) If tan($\propto$+β)= 3tan $\propto$,then
   show that
   sin (2$\propto$+β)+sin$\propto$ =2sin 2β.

7) A+B+C=90^0,show that
   TanA.tanB + tanB tanC +tanCtanA =1
   cotA +cotB+cotC= cotA.cotB.cotC

8) Prove that $\frac{\cos 7A}{\sec A}-\frac{\sin 7A}{\operatorname{cosec} A}$ =cos8A

9) $\frac{\sin 3A\sin 7A+\sin A\sin 11A}{\sin 3A\cos 7A+\sin A\cos 11A}$ = tan8A

10) $\frac{\sin 7A+\sin 17A}{\cos 7A+\cos 17A}$ =tan12A

11) $\frac{\cos 7A+\cos 5A}{\sin 7A+\sin 5A}$ = cot6A

12) $\frac{\sin 15A+\sin 5A}{\cos 15A+\cos 5A}$ = tan10A

13) $\frac{\sin 8A+\sin 6A}{\cos 8A+\cos 6A}$ = tan7A

14) $\frac{\sin A+\sin 2A+\sin 3A+\sin 4A}{\cos A+\cos 2A-\cos 3A-\cos 4A}$ = cotA

15) If A+B+C=π(or 180^0) , then prove that following identities
   a) sin2A +sin2B +sin2C= 4sinA.sinB.sinC
   b) sin2A-sin2B+sin2C=4cosAsinBcosC
   c) sin2A+sin2B-sin2C=4cosAcosBsinC
   d) sin2A-sin2B-sin2C=-4sinAcosbBcosC
   e) cos2A+cos2B+cos2c=-1-4cosAcosBcosC
   f) cos2A-cos2B+cos2C=1-4sinAcosBsinC
   g) cos 2A + cos2B –cos 2C =1-4 sinA sinB sinC
   h) tanA+tanB+tanC=tanAtanBtanC
   i) tan2A+tan2B+tan2C=tan2Atan2Btan2C
   j) $\tan\frac{A}{2}\tan\frac{B}{2}+\tan\frac{B}{2}\tan\frac{C}{2}+\tan\frac{C}{2}\tan\frac{A}{2}$=1
   k) $\sin^2$A+$\sin^2$B+$\sin^2 C$ =2+2cosAcosBcosC
   l) $\sin^2$A-$\sin^2$B - $\sin^2 C$ =-2cosAsinBsinC

16) if A+B+C =270, then prove
   cos2A+cos2B+cos2C=1-4sinAsinBsinC

17) If A+B+C = $\frac{\pi}{2}$ prove thAt,
   sin2A+sin2B+sin2C=4cosAcosBcosC

INVERSE TRIGONOMETRIC FUNCTIONS

1) Prove that $\sin^{-1}x + \cos^{-1}X=\frac{\pi}{2}$

2) Prove that $\sec^{-1}x$ + $\text{coses}^{-1}X=\frac{\pi}{2}$

3) Prove that $\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{7}\right)=\tan^{-1}\left(\frac{1}{2}\right)$.

4) Prove that $\tan^{-1}\left(\frac{2}{7}\right) + \tan^{-1}\left(\frac{1}{5}\right) =\tan^{-1}\left(\frac{17}{33}\right)$.

5) Prove that $\tan^{-1}1 + \tan^{-1}2 + \tan^{-1}3=\pi$.

6) If $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z=\pi$.
   Show that xy+yz+zx=1
   Then prove that $x^2 + y^2 + z^2$ +2xyz=1.

7) $\tan^{-1}x + \tan^{-1}y + \tan^{-1}z=\pi$,
   Prove that x+y+z = xyz.

8) show that
   $\sin^{-1}\left(\frac{2x}{1+x^2}\right) +\cos^{-1}\left(\frac{1-y^2}{1+y^2}\right) =2\tan^{-1}\left(\frac{x+y}{1-xy}\right)$.

9) Solve $\tan^{-1}(x-1) + \tan^{-1}x + \tan^{-1}(x+)=\tan^{-1}3x$.

10) Prove that $\sin^{-1}\left(\frac{3}{5}\right) + \sin^{-1}\left(\frac{5}{13}\right) =\cos^{-1}\left(\frac{33}{65}\right)$.

11) Prove that $\sin^{-1}\left(\frac{4}{5}\right) + \sin^{-1}\left(\frac{5}{13}\right) =\cos^{-1}\left(\frac{16}{65}\right)$.

12) Prove that $\cot^{-1}\left(\frac{4}{3}\right) - \tan^{-1}\left(\frac{5}{12}\right) =\cos^{-1}\left(\frac{63}{65}\right)$.

13) Prove that $\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{5}\right) =\tan^{-1}\left(\frac{4}{7}\right)$.

14) Prove that $\tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{13}\right) =\tan^{-1}\left(\frac{2}{9}\right)$.

15) Prove that $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{3}{5}\right) =\tan^{-1}\left(\frac{\pi}{4}\right)$.

16) Prove that $\sec^{-1}\left(\frac{5}{4}\right) + \tan^{-1}\left(\frac{5}{12}\right) = \cot^{-1}\left(\frac{33}{56}\right)$.

17) Prove that $\tan^{-1}x + \cot^{-1}\left(\frac{1+x}{1-x}\right) = \frac{\pi}{4}$.

18) $\tan^{-1}\left(\frac{2}{3}\right) + \cot^{-1}\left(\frac{4}{3}\right) = \tan^{-1}\left(\frac{17}{6}\right)$ or $\cot^{-1}\left(\frac{6}{17}\right)$

19) $\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{8}\right) = \frac{\pi}{4}$

20) $\tan^{-1}(n) - \tan^{-1}(n^2+n+1) + \cot^{-1}(n+1) = 0$.

21) $\tan^{-1}\left(\frac{3}{5}\right) + \sin^{-1}\left(\frac{3}{5}\right) = \cot^{-1}\left(\frac{11}{27}\right)$.

22) $\tan^{-1}\left(\frac{3}{5}\right) + \tan^{-1}\left(\frac{3}{4}\right) = \cot^{-1}\left(\frac{11}{27}\right)$.

23) $\operatorname{cosec}^{-1}\left(\frac{5}{4}\right) + 2\cot^{-1}3 = \left(\frac{\pi}{2}\right)$.

24) $\sin\left[\cot^{-1}\frac{23}{7} + 2\tan^{-1}\frac{1}{4}\right] = \frac{1}{\sqrt{2}}.0$

25) $\cos^{-1}\frac{x}{A} + \cos^{-1}\left(\frac{y}{b}\right) = \theta$,
Show that $\frac{x^2}{A^2} - \frac{2xy}{Ab}\cos\theta + \frac{y^2}{b^2} = \sin^2\theta$.

26) If $\cos^{-1}\left(\frac{x}{2}\right) + \cos^{-1}\left(\frac{y}{3}\right) = \theta$, prove that
$9x^2 - 12xy\cos\theta + 4y^2 = 36\sin^2\theta$.

27) Solve $\sin^{-1}(1-x) + \cos^{-1}X = \sin^{-1}(3x-2)$.

28) $\tan^{-1}\left(\frac{x}{1+x}\right) + \tan^{-1}\left(\frac{x}{1-x}\right) = \tan^{-1}2$.

29) $\tan^{-1}(1+x) + \tan^{-1}(1-x) = \tan^{-1}\left(\frac{1}{2}\right)$

30) $\cos^{-1}\left(\frac{1-A^2}{1+A^2}\right) + \sec^{-1}\left(\frac{1+b^2}{1-b^2}\right) = 2\tan^{-1}x$.

TRIGONOMETRIC EQUATIONS

1) Solve $\tan^2\theta = 3$ Ans. (i) $\theta = n\pi - \frac{\pi}{6}$, $\theta = n\pi \pm \frac{\pi}{6}$

$4\sin^2 A - 3 = 0$ Ans. (ii) $n\pi + (-1)^n\frac{\pi}{6}$, $n\pi \pm (-1)^n\frac{\pi}{6}$

2) Solve $2\sin^2 x - 5\cos x = 4$.A Ans. cosx=-2,cosx= $-1/2$

3) Solve sinx-sin 2x + sin3x – sin 4x = 0

4) Solve $\sin 4\theta - \sin 3\theta + \sin 2\theta - \sin\theta = 0$

5) Solve $8\sin^3\theta = \sin 3\theta$

6) Solve a tan x + b sec x = c, show that $\tan(\propto + \beta) = \frac{2ac}{a^2 - c^2}$.

7) Solve $\cos\theta + \sqrt{3}\sin\theta = 1$ Ans. $\theta = 2n\pi \pm \frac{\pi}{3} + \frac{\pi}{3}$

8) Solve cos x + sin x = cos 2x

9) Solve $\cos 8\theta + \cos 2\theta - \cos 5\theta = 0$ Ans. case(i) $\frac{\pi}{2}$ case(ii) $\theta = \frac{2n\pi}{3} \pm \frac{\pi}{9}$

10) Solve $\sin 6\theta \cos 2\theta = \sin 5\theta \cos\theta = 0$ Ans. case(i) $\frac{2n\pi}{7} \pm \frac{\pi}{14}$ case(ii) $n\pi$

11) Solve the following trigonometric equations.

a. $4 + \cos\theta - 6\sin^2\theta = 0$ Ans. $\theta = 2n\pi \pm \frac{\pi}{3}$, $2n\pi \pm \cos^{-1}\left(-\frac{2}{3}\right)$

b. $2\sin^2\theta + 3\cos\theta - 3 = 0$ Ans. $\theta = 2n\pi$, $\theta = 2n\pi \pm \frac{\pi}{3}$

c. $2\cos^2\theta + 3\sin\theta = 0$ Ans. $\theta = n\pi + (-1)^n\left(-\frac{\pi}{6}\right)$

d. $\sin^2\theta + \sin\theta - 1 = 0$ Ans. $\theta = n\pi + (-1)^n\frac{\pi}{6}$, $\theta = n\pi + (-1)^n\left(\frac{\pi}{2}\right)$

e. $2\sin^2\theta = 1 + co$ Ans. $\theta = n\pi + (-1)^n\left(-\frac{\pi}{6}\right)$

f. $\cos 3x + 8\cos^3 x = 0$ Ans. $\theta = n\pi \pm \frac{\pi}{3}$, $\theta = (2n+1)\frac{\pi}{3}$

g. $\sin\theta + \sin 2\theta + \sin 3\theta = 0$

h. $\cos\theta + \cos 5\theta = \cos 3\theta$ Ans. $\theta = \frac{2n\pi}{3} \pm \frac{\pi}{6}, n\pi \pm \frac{\pi}{6}$

i. $\sin 5\theta + \sin\theta = \sin 3\theta$ Ans. $\theta = \frac{n\pi}{3}, n\pi \pm \frac{\pi}{6}$

j. $\tan^2(\theta/2) + \sec(\theta/2) = 1$

k. $\sin^3\theta+\sin^2\theta\cos\theta-\cos^2\theta\sin\theta-\cos^3\theta=0$

l. $\tan\theta+\tan 2\theta+\tan 3\theta=0$ Ans. $\theta=\frac{n\pi}{3}, n\pi\pm \operatorname{Tan}^{-1}\left(\frac{1}{\sqrt{2}}\right)$

m. $\sin\theta \sin 3\theta=\sin 5\theta \sin 7\theta$

n. $\cos 2\theta \cos 4\theta=\cos 6\theta \cos 8\theta$ Ans. $\theta=\frac{n\pi}{10}, \theta=\frac{n\pi}{4}$

o. $\sin 6\theta \cos 2\theta=\sin 5\theta \cos\theta$ Ans. $\theta=n\pi, \frac{2n\pi}{7}\pm\frac{\pi}{14}$

p. $\sqrt{3}\cos\theta+\sin\theta=\sqrt{2}$ Ans. $\theta=n\pi+(-1)^n\frac{\pi}{4}+\frac{\pi}{3}$

q. $2\operatorname{cosec}\theta-\cot\theta=\sqrt{3}$

r. $2\cos\theta+4\sin\theta+\cos 2\theta-\sin 2\theta=3$ Ans. $\theta=n\pi+(-1)^n\frac{\pi}{2}, \theta=2n\pi+\frac{\pi}{2}$

SOLUTIONS OF TRIANGLES

SOLVE THE TRIANGLE ΔABC

a) A=2, b=$\sqrt{2}$, c =$\sqrt{3}$+1
Ans. A=45^0, b=30^0, c =105^0

b) A= 13, b = 14, c= 15
Ans. A=$53^0 13'$, b=$59^0 49'$, c =$67^0 38'$

c) A=2, b=$2\sqrt{3}$, c =4
Ans. A=30^0, b=60^0, c =90^0

d) A=1, b = 2 , c =$\sqrt{3}$
Ans. A=30^0, b=90^0, c =60^0

e) A=1, b=$\sqrt{3}$, c=2
Ans. A=30^0, b=60^0, c =90^0

f) b=1, c=$\sqrt{3}$, A=30^0
Ans. A=1, b=30^0, c =120^0

g) A=2, c=$\sqrt{3}$ +1,b=60^0
Ans. b=$\sqrt{6}$, b=45^0, c =75^0

h) A=2, c=$\sqrt{6}$, c=60^0
Ans. A=1, b=30^0, c =120^0

i) A=10,b=45^0,c=$68^0$18'
Ans. A=$66^0 42'$, b=7.71, c =10.12

j) b=34,A=$31^0$32'c=$98^0$51'
Ans. A=23.34, b =$49^0 37'$,c=44.1

k) A=2, A=30^0, c =30^0
Ans. A=$\sqrt[2]{3}$, b =120^0, c=2

l) c=$\sqrt{2}$,A=45^0, b=105^0
Ans. A=2, b =$\sqrt{3+1}$, c=30^0

m) c=3.78, A=37^0, b=84^0
Ans. A=2.654, b =4.385,c=59^0

n) A=9, b=65^0,c=15^0
Ans. A=100^0, b =8.3,c=2.4

o) A=18,A=43^0,b=64^0
Ans. c=25.24, b =23.73, c=73^0

p) A=2,b=$\sqrt{6}$,b=120^0
Ans. A=45^0, c=15^0,c =$\sqrt{3-1}$

q) A=10, b= 10$\sqrt{2}$, A=30^0
Ans. c=19.32, b =105^0, c=45^0

COMPLEX NUMBERS

1. Express the following in the form a+ib;

a) $\frac{1+i}{1-i}$ Ans. 0+i(1)

b) $\left(\frac{3+i}{3-i}\right)^2$ Ans. A= $\frac{7}{25}$ b=$\frac{24}{25}$

c) $\frac{(1+i)(1+3i)}{(1+5i)}$ Ans. $\frac{9}{17}+\frac{7}{13}i$

d) $\frac{1+8i}{5-2i}$ Ans. -$\frac{11}{29}+i\left(\frac{42}{39}\right)$

e) $\frac{(1+i)(2+i)}{(3+i)}$ Ans. $\frac{3}{5}+i\left(\frac{4}{5}\right)$

f) $\frac{2-3i}{3+4i}$ Ans. $-\frac{6}{25} - i\left(\frac{17}{25}\right)$

1) Find the conjugate of the following complex numbers (2+5i) (-4+6i) Ans. -38+8i
2) Find the Additive inverse of

   (2+3i)(4+2i) Ans.2+i16 is -2-i16

   $\frac{2i}{1-2i}$ Ans. $\frac{2}{5}$ $\mathbf{i} - \frac{4}{5}$ is $\frac{2}{5}$ i+ $\frac{4}{5}$
3) Find the multiplicative inverse of

   2+3i Ans. $\frac{2-3i}{13}$

   -14+8i
4) Express the following in the modulus Amplitude form (polAr form)

   1+i$\sqrt{3}$ $\sqrt{3}$+i
5) find the real And imaginary parts of the following

   $\frac{4+2i}{1-2i}$ Ans.0, 2

   $\frac{2}{5}$ Ans. $\frac{13}{65}, \frac{26}{65}$

   $\left(\frac{1+i}{1-i}\right)^5$ Ans. 0, 1
6) Find the modulus of the following complex numbers

   (3-4i)(2-3i) Ans.2

   $\frac{(3+2i)^2}{4-3i}$ Ans. $\frac{13}{5}$

   $\frac{3-4i}{5+7i}$ Ans. $\frac{5}{\sqrt{74}}$

   $\frac{3-4i}{5+7i}$ Ans. $\frac{1}{\sqrt{2}}$
7) Find the Additive And multiplicative inverse of the following complex numbers

   4+3i Ans. -4-3i, $\frac{4}{25} - i\frac{3}{25}$

   $\frac{9}{2+i\sqrt{5}}$ Ans. -2+i$\sqrt{5}$, $\frac{2}{9} + i\frac{\sqrt{5}}{9}$

   $\frac{9}{2-i\sqrt{5}}$ Ans. -2-i$\sqrt{5}$, $\frac{2}{9} - i\frac{\sqrt{5}}{9}$

   $\frac{2i}{1-2i}$ Ans. $\frac{4-2i}{5}$,-1-$\frac{i}{2}$
8) Find the z$\bar{z}$, if z=1+i4$\sqrt{3}$ Ans. 49
9) Express the following in the modulus-Amplitude form

   $\sqrt{3+i}$ Ans. $2\left[\cos\left(\frac{\pi}{6}\right) + i\sin\left(\frac{\pi}{6}\right)\right]$

   3+4i Ans. $5\left[\cos\left(\tan^{-1}\frac{4}{3}\right) + i\sin\left(\tan^{-1}\frac{4}{3}\right)\right]$