TEACHING AND LEARNING MODULE
ADDITIONAL MATHEMATICS FORM 5

Trigonometric Functions

CHAPTER 5

NAME:……………………………………………….

FORM :………………………………………………

Date received : ………………………………

Date completed ………………………….

Marks of the Topical Test : …………………………….

Prepared by :
Additional Mathematics Department
Sek Men Sains Muzaffar Syah Melaka

Formulae

a) $\sin^2 A + \cos^2 A = 1$

b) $\text{sek}^2 A = 1 + \tan^2 A$

c) $\text{kosek}^2 A = 1 + \text{kot}^2 A$

d) $\sin 2A = 2 \sin A \cos A$

e) $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

f) $\sin (A \pm B) = \sin A \cos B \pm \cos A \sin B$

g) $\cos (A \pm B) = \cos A \cos B \mp \sin A \sin B$

h) $\tan (A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

LEARNING OUTCOMES

Students will be able to:

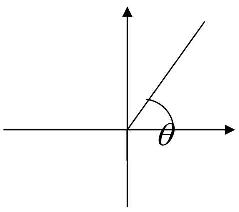
1. Understand the concept of positive and negative angles measured in degrees and radians.

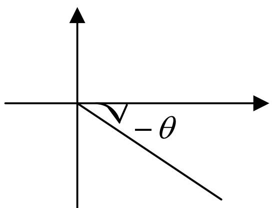
1.1 Represent in a Cartesian plane, angles greater than 360° or 2π radians for:
   a) positive angles
   b) negative angles.

1

a) Positive angles are angle measured in the anticlockwise direction from the positive x –axis.

b) Negative angle are angle measured in the clockwise direction from the positive x – axis





C) The Position of an angle θ that is greater than 360^o or 2π radians can be obtained using the relation $\theta = n(360^o) + \alpha$ or $\theta = n(2\pi) + \alpha$

c) One full rotation = 360^o or 2π, so two full rotation = 720^o or 4π

d) A Cartesian plane can be divided into four quadrant

Quadrant 1I

$180^o \le \theta \le 90^o$ or $\pi < \theta < \frac{\pi}{2}$

Quadrant 1

$90^o < \theta < 0^o$ or $\frac{\pi}{2} < \theta < 0^o$

Quadrant III

$1270^o < \theta < 180^o$ or $\frac{3\pi}{2} < \theta < \pi$

Quadrant 1V

$270^o \le \theta \le 360^o$ or $\frac{3\pi}{2} < \theta < 2\pi$

Sketch the angle for each of the following angle in separate Cartesian planes Hence which quadrant the angle is in .

Example 1

a) 520^o	b) 1050^o	c) 780^o	d) $\frac{7}{2}\pi$ rad	e) $\frac{10}{3}\pi$ rad	f) $\frac{19}{6}\pi$

Exercise 1

g) - 135^o	h) -45^o	i) -430^o	j) $-\frac{\pi}{4}rad$	k) $-\frac{7}{2}\pi$	l) $-\frac{8}{3}\pi$

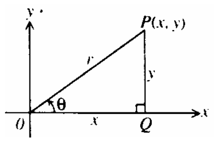
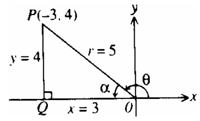
Homework Text book Page 111 Exercise 5.1 No 1 – 2

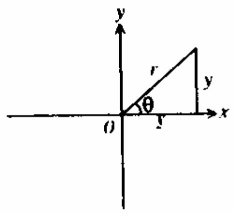
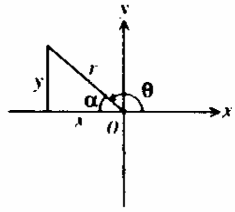
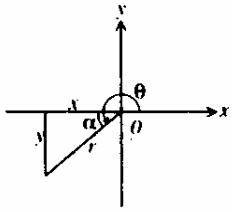
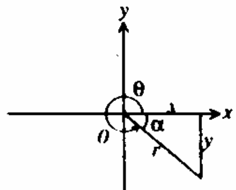
LEARNING OUTCOMES

Students will be able to:

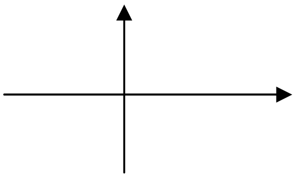
2.0 Understand and use the six trigonometric functions of any angle
   2.1 Define sine, cosine and tangent of any angle in a Cartesian plane.
   2.2 Define cotangent, secant and cosecant of any angle in a Cartesian plane.
   2.3 Find values of the six trigonometric functions of any angle.
   2.4 Solve trigonometric equations.

2.1 Define sine, cosine and tangent of any angle in a Cartesian plane.

When θ lies on the first quadrant as shown in the diagram below , $OQ = x$, $PQ = y$ and $r = \sqrt{x^2 + y^2}$. Refer to ΔOPQ, Then $\sin\theta = \frac{y}{r}$, $\cos\theta = \frac{x}{r}$, $\tan\theta = \frac{x}{y}$ 	Refer to the following diagram , sin θ = sin α = $\frac{y}{r}$ = cos θ = cos α = $\frac{x}{r}$ = tan θ = tan α = $\frac{y}{x}$ = 

Quadrant	I	II	III	IV
(x, y)	(3, 4)	(−3, 4)	(−3, −4)	(3, −4)
$r = \sqrt{x^2 + y^2}$	5	5	5	5
Graphs				
$\sin\theta = \frac{y}{r}$	$\frac{4}{5}$ (+)	$\frac{4}{5}$ (+)	$\frac{-4}{5}$ (−)	$\frac{-4}{5}$ (−)
$kos\ \theta = \frac{x}{r}$	$\frac{3}{5}$ (+)	$\frac{-3}{5}$ (−)	$\frac{-3}{5}$ (−)	$\frac{-4}{5}$ (+)
$\tan\theta = \frac{y}{x}$	$\frac{4}{3}$ (+)	$\frac{4}{-3}$ (−)	$\frac{-4}{-3}$ (+)	$\frac{-4}{3}$ (−)

Conclusion :



2.2 Define cotangent, secant and cosecant of any angle in a Cartesian plane.

Definition :

cotangent θ = $\cot\theta = \frac{1}{\tan\theta}$	secant θ = $sek\theta = \frac{1}{\cos\theta}$	cosecant θ = $\cos ek\theta = \frac{1}{\sin\theta}$

Example 2:

1. Given sin 45^o = 0.707 and cos45^o = 0,707 , Find the value of tan 45^o,cot45^o,sec45^o and cosek45^o Solution : tan 45^o = = = cot45^o = = = sek45^o = = = cosek45^o = = =	2 Given sin $\frac{2}{3}\pi$ = 0.866 and cos $\frac{2}{3}\pi$ = - 0.5 .Find the value of tan $\frac{2}{3}\pi$, cot $\frac{2}{3}\pi$,sec $\frac{2}{3}\pi$ and cosec $\frac{2}{3}\pi$ Solution : tan $\frac{2}{3}\pi$ = = = cot $\frac{2}{3}\pi$ = = = sec $\frac{2}{3}\pi$ = = = cosec $\frac{2}{3}\pi$ = = =

Exercise 2

1 Given sin 15^o = 0.259 and cos15^o = 0.966 , Find the value of tan 15 ^{o},cot15^o,sec15^o and cosek15^o Solution : tan 15^o = cot15^o = sec15^o = cosek15^o =	2 Given sin $\frac{4}{3}\pi$ =- 0.866 and cos $\frac{4}{3}\pi$ = - 0.5 Find the value of tan $\frac{4}{3}\pi$,cot $\frac{4}{3}\pi$,sec $\frac{4}{3}\pi$ and cosec $\frac{4}{3}\pi$ Solution tan $\frac{4}{3}\pi$ = sec $\frac{4}{3}\pi$ = cot $\frac{4}{3}\pi$ = cosec $\frac{4}{3}\pi$ =

Complementary angles

Two angle are called complementary angles if the sum of these angles is equal to 90^o . Foe example the angle 65^O is said to be the complement of angle 25^o

a) $\sin\theta = \cos(90^o - \theta)$ c) $\tan\theta = \cot(90^o - \theta)$ e) $\sec\theta = \cos ec(90^o - \theta)$

b) $\cos\theta = \sin(90^o - \theta)$ d) $\cot\theta = \tan(90^o - \theta)$ f) $\cos ec\theta = \sec(90^o - \theta)$

Example 3 : Given that sin 52 ^{o} = *p* and cos52^o = *q* find the value of each of the following trigonometric functions in terms of *p* and / or *q*

a) sin 38 ^{o}	b) sec 38 ^{o}	c) cot 38 ^{o}

Exercise 3 : Given that tan 47 ^{o} = *r* and cos47 ^{o} = *s* find the value of each of the following trigonometric functions in terms of *r* and / or *s*

a) cot 43 ^{o} [*r*]	b) sin 43 ^{o} [*s*]	c) sec43 ^{o} [1/*(rs)*]

Homework Text book Page 122 Exercise 5.2 No 1 – 10

2.3 Find values of the six trigonometric functions of any angle

The value of any trigonometric function of an angle θ is obtained by following the steps below

a) Find the reference angle, α ,which is the acute angle form by the rotating ray and the x-axis in the respective quadrant

b) Find the value of the trigonometric function of the reference angle, α .

c) Determine the correct sign of the value of the trigonometric function of angle θ according to the respective quadrant.

Example 4.: For each of the following trigonometric functions determine the reference angle . Hence ,find the value of trigonometric function .

a) sin 135^o	b) cos(-150^o)	tan $143^0 13'$	cot325^o	sek340^o	cosec(-230^o 12')

Exercise 4.: For each of the following trigonometric functions determine the reference angle . Hence ,find the value of trigonometric function

a) sin 290^o	b)cosec350^o	c)cot 300^o	d)sec(-330^o)	e)cos(-300^o)	f) tan (-200^o)
[0.9397]	[-5.760]	[-0.5773]	[1.1547]	[0.5]	[-0.3640]

Example 5 : Given that sin $\theta = -\frac{5}{13}$, $90^o < \theta < 270^o$ Find the value of each the following trigonometric function without using a calculator

a) cos θ	b)cosec θ	c)sec θ	d) tan θ	e) cot θ

Exercise 5 : Given that cos $\theta = -\frac{12}{13}$, $90^o < \theta < 180^o$. Find the value of each the following trigonometric function without using a calculator

a) cos θ	cosec θ	sec θ	tan θ ,	cot θ

Homework Text book Page 122 Exercise 5.2 No 11 – 13

2.4 Solving trigonometric equations.

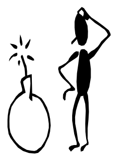
:

When solving trigonometric equation, we follow the step below

S1 : Obtain the reference angle for the angle using calculator

S2 : Determine the relevant quadrants in which angle lie

S3 : Determine all the possible solutions in the given range of the angle.



Example 6 : Solve each of the following trigonometric equation for $0^o \le \theta \le 360^o$

a) sin θ = 0.6428	b) sin θ = - 0.9421	b) cos θ = 0.4392

Exercise e 6 : Solve each of the following trigonometric equation for $0^o \le \theta \le 360^o$:

a) cos θ = -0.6428	b) tan θ = 0.5	c) sin θ =-0.7382
[130^o,230^o]	[26^o34', 206^o 34']	[227^o34',312^o26']

Example 7 Example 6 : Solve each of the following trigonometric equation for $0^o \le \theta \le 360^o$:

(a) cos (θ-25^o) = 0.9848	tan 2θ = 1 .732 [30^o,120^o,210^o,300^o]	Cos $\frac{\theta}{2}$= -0.8192	2tanθ = 3 [56^o 19', 236^o 19']

Exercise 7 : Solve each of the following trigonometric equation for $0^o \le \theta \le 360^o$

a) Cos 2θ= $\frac{1}{2}$ [30^o,150^o,210^o,330^o]	b) tan (θ + 60^o) = -1 [75^o,, 240^o]	c) tan ($\frac{1}{2}\theta$ -15^o) = 0.8687 [111o 58']	d) 2 tan3θ= -1 [51^{o}7',111^{o}7',171^{o}7',231^{o}9',291^{o}9',513^{o}9']

Example 8 : Solve each of the following trigonometric equation for $0^o \le \theta \le 360^o$

a) sin θ= - cos48^o [222^o, 318^o]	b) 5 cosθsinθ = cosθ [11^o 32', 168^o,28',90^o,270^o]	c) 2sinθ = cosθ [26^{o}34', 206^{o}34']

Exercise 8 : Solve each of the following trigonometric equation for $0^o \le \theta \le 360^o$

a) cosθ = - tan 42^o [154^o,318^o]	b) tan 3θ = cot 15^o [25^o,85^o,87^o,205^o,159^o,195^o]	c) cosθ = sin θ [45^o,225^o]

Example 9 : Solve each of the following trigonometric equation for $0^o \le \theta \le 360^o$
:

a) (1 + sin x)(cos ^{2}x) = 0 [270^o,225^o…]	b) 6 sin x + cosec x = 5 [19^{o}28', 160^o 32' , 30^o, 150^o]	c) 2 tanx-1 = cot x [153^{o}26', 333^o,26',45^o]

Exercise 9 : Solve each of the following trigonometric equation for $0^o \le \theta \le 360^o$

a) $2kos^2x + 5\cos x - 3 = 0$	b) 3sinx = tan x	c) $2\tan^2x + \tan x - 3 = 0$
$[60^o, 300^o]$	$[0^o, 70^o 40', 289^o 20']$	[45^o,12' 303^o….]

Homework Text book Page 123 Exercise 5.2 No 14– 20
Further Practice Text Book Page 124 No 21 - 30

SPM Question

1) Given sin x = *p*/3 where *x* is a acute angle. Express cot *x* in terms of *p* [Answer $\frac{\sqrt{9-p^2}}{p}$]	2.Solve the equation $4\tan^2 x = 1$ for $90^o < x < 360^o$ [Answer $26^o34'$, $153^o26'$, $206^o43'$, $333^o26'$]	1. Solve the equation $6kos^2(\theta - \frac{\pi}{3}) - kos(\theta - \frac{\pi}{3}) = 2$ for $0^o < \theta < 360^o$ [Ans $\theta = 11.8^o, 108.2^o\ 180^o\ , 300^o$]

LEARNING OUTCOMES

Students will be able to:
3.0 Understand and use graphs of sine, cosine and tangent functions.
3.1 Draw and sketch graphs of trigonometric functions:
a) $y = c + a \sin bx$,
b) $y = c + a \cos bx$,
c) $y = c + a \tan bx$,
where *a*, *b* and *c* are constants and *b*>0.

3.2 Determine the number of solutions to a trigonometric equation using sketched graphs.
3.3 Solve trigonometric equations using drawn graphs.

Refer to the text book page 124 – 125 to understand and recognise the characteristics of the graph of trigonometric functions

Example 10

Using a scale of 2 cm to 0.5 unit on the x-axis and 2 cm to 1 unit on the y – axis, draw the graph of $y = 4\sin\frac{\pi}{2}x$ for $0 \le x \le 4$. Hence find the solution of equation $4\sin\frac{\pi}{2}x + \frac{3}{2}x - 3 = 0$

Solution

x	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	0	2.83	4	2.83	0	-2.83	-4	-2.8	0

Exercise 10

Using a scale of 2 cm to $\frac{\pi}{8}$ unit on the x-axis and 2 cm to 1 unit on the y – axis, draw the graph of y = cos 2x + 1 for $0 \le x \le \pi$. Hence determine the values of x that satisfy the equation

$\frac{\pi}{2}$ (cos 2x + 1) = $\pi - x$ for $0 \le x \le \pi$.

Example 11

1. Sketch the graph of y = 3 sin 2x for 0º ≤ x ≤ 360º. Determine the number of solution to the equation 3 sin 2x + $\frac{1}{2}x - 2$ = 0	2. Sketch the graph of y = | tan x | for 0 ≤ x ≤ 2π . Determine the number of solution to the equation | tan x | = $\frac{1}{3}x + 3$ = 0

Exercise 11

1. Sketch the graph of y = 3 cos2x for 0º ≤ x ≤ 360º. Determine the number of solutions to the equation 3 π cos2x – 2x = 0 (Answer 3 solution)	2. Sketch the graph of y = 1-2sin x for 0 ≤ x ≤ 2π . Hence , draw a suitable straight line on the same axis to find the number of solutions to the equation $\pi - 2\pi \sin x = 3x$, for 0 ≤ x ≤ 2π .State the number of solutions.

Homework Text book Page 130 Exercise 5.3 N0 1 – 10

LEARNING OUTCOMES

Students will be able to:

4.0 Understand and use basic identities. .

4.1 Prove basic identities:

a) $\sin^2 A + \cos^2 A = 1$

b) $1 + \tan^2 A = \sec^2 A$

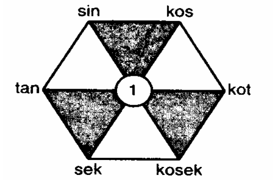
c) $1 + \cot^2 A = \mathrm{cosec}^2 A$

4.2 Prove trigonometric identities using basic identities.

4.3 Solve trigonometric equations using basic identities.

Basic Identities

1. $\sin^2 x + \cos^2 x \equiv 1$
2. $\sec^2 x \equiv 1 + \tan^2 x$
3. $\text{cosec}^2 x = 1 + \cot^2 x$
4. $\tan x \equiv \dfrac{\sin x}{\cos x}$
5. $\sec x \equiv \dfrac{1}{\cos x}$
6. $\text{cosec } x \equiv \dfrac{1}{\sin x}$
7. $\cot x \equiv \dfrac{1}{\tan x} = \dfrac{kosx}{\sin x}$



Guide to proving trigonometric identities

1. Pecahkan menggunakan gantian rumus no 4 hingga no 7
1. Samakan penyebut
2. faktorkan atau cari identiti iaitu no 1 hingga 3

Example 12 : Prove each of the following trigonometric identities

a) $kos^2 x - \sin^2 x \equiv 1 - 2\sin^2 x$	b) $\cot x \cos x \equiv \text{cosec } x - \sin x$	c) $\sin y + \cos^2 y \text{ cosec } y \equiv \text{cosec } y$

Exercise 12 : Prove each of the following trigonometric identities

a) $\tan^2 x - \sin^2 x \equiv \tan^2 x \sin^2 x$	b) $\tan x + \cot x \equiv \text{cosec } x \sec x$	b) $\dfrac{1}{1+\sin y} + \dfrac{1}{1-\sin y} = 2sek^2 y$

Homework Text book Page 134 Exercise 5.4 N0 1 – 2

Example 13 : Solve each of the following trigonometric equation $0^o < x < 360^o$

a) $6 \cos x = 1 + 2 \sec x$	b) $2\, cosek^2 x = 7 + \dfrac{3}{\tan x}$	c) $6 \text{ cosec } x = 11 - 4 \sin x$
[$48^o11'$, 120^o, 240^o 311^o $49'$]	[$21^o48'$, 135^o, $201^o48'$ 315^o]	[$48^o35'$, $131^o25'$]

Exercise 13 : Solve each of the following trigonometric equation $0^o < x < 360^o$

a) $5\sin^2 x - 2 = 2\cos x$	b) $4\cos x - 3\cot x = 0$	c) $\tan^2 x + 8 = 7$ sekx
[53.13^o 180^o, 306.87^o]	[48.59^o, 90^o, 131.41^o, 270^o]	[$48^o11'$, 60^o, 300^o , $311^0 49'$]

Homework Text book Page 134 Exercise 5.4 N0 3 – 7

SPM Question

a) Solve the equation 6 cos x = 1 + 2 sec x for $0 \le x \le 360^o$ [Answer $48^o11'$, 120^o, 240^o, 311^o 49']	b) Solve the equation $2\text{cosec}^2 x = 7 + \frac{3}{\tan x}$ for $0 \le x \le 360^o$ [Answer $21^o48'$, 135^o, $201^o48'$, 315^o]

LEARNING OUTCOMES

Students will be able to:

5. Understand and use addition formulae and double-angle formulae.
5.1 Prove trigonometric identities using addition formulae for sin (*A* ± *B*), cos (*A* ± *B*) and tan (*A* ± *B*).
5.2 Derive double-angle formulae for sin 2*A*, cos 2*A* and tan 2*A*.
5.3 Prove trigonometric identities using addition formulae and/or double-angle formulae.
5.4 Solve trigonometric equations.

Addition Formulae and double Angle Formulae

Addition Formulae	Double angle Formulae	Half-angle formulae.
$\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$ $\cos(A \pm B) = \cos A\cos B \mp \sin A\sin B$ $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A\tan B}$	sin2*A* = 2sin*A*cos*A* Cos2*A* =Cos^2*A*-sin^2*A* = 1 - 2sin^2*A* = 2Cos^2*A* -1 tan2*A* = $\frac{2\tan A}{1-\tan^2 A}$	sin *A* = 2sin$\frac{A}{2}$ $kos\frac{A}{2}$ cos A = $kos^2\frac{A}{2} - \sin^2\frac{A}{2}$ = = tan A = $\frac{2\tan\frac{A}{2}}{1-\tan^2\frac{A}{2}}$

Example I4

Find the value of sin 15^o and tan 165^o without using Calculator	Given sin A = $\frac{12}{13}$, cos $B = -\frac{4}{5}$ where A and B are obtuse angle Without using calculator find the value of a) cos (A - B) b) tan (A + B)	IF h = cos10^o and k = sin40^o, Express each of the following in terms h and / or k a) sin 50^o b) sin 20^o c) cos 5^o

Exercise 14 :

a) Find the value each of the following without using Calculator a) sin 15^o b) tan75^o c)tan105^o d) cos 165^o	b) If tan A = $\frac{5}{12}$ and cot B $\frac{4}{3}$ where A and B are acute angle . Find the value each of the following without using Calculator a) sin (A -B) c) tan 2B b) cos (A+B) d) tan $\frac{A}{2}$	c) Find the value each of the following without using Calculator a) 2 cos30^osin30^o a) 1-2sin^{2}22.5

Homework Text book Page 134 Exercise 5.5 N0 1- 7

Example 15 : Prove each of the following trigonometric Identities

a) cos 3x = 4 cos^2 x – 3 cos x	b) sin 2x = $\frac{1-\cos 2x}{\tan x}$	c) 2 cot 2x + tan x = cot x

Exercise 15 : Prove each of the following trigonometric Identities

a) $\sin 3x = 3\sin x - 4\sin^2 x$	b) $\cot x - \operatorname{cosec} 2x = \cot 2x$	c) $\frac{2\tan x}{\tan 2x} = 2 - \sec^2 x$

Homework Text book Page 134 Exercise 5.5 N0 8 - 10

Example 16 : Solve the following equation for $0^o < x < 360^o$

a) 3 sin2x = 2sinx	b) 3 kos2x - 7kosx = -5	c)tan2x = 10 tan x
[70°32',180°,289°28']	[48°11' , 60°,300°,311°49']	[41°49',138°11',180°,221°49', 318°11']

Example 16 : Solve the following equation for $0^o < x < 360^o$

a) cos x + 2 sin2x = 0	b) 3 tan2x + 2 tan x = 0	c)3 kos2x + 4 cosx = 1
[90°,194°29',270°,345°31']	[63°26',116°34',180°,243°26' ,296°34']	[70°32',180°,289°28']

Homework Text book Page 134 Exercise 5.5 N0 11 – 15

SPM Questions

a) Find the value of A and B that satisfy the equation sin (*A* -3*B*)=0.33 and sin (A+B) = 0.91 for $0^o \le (A-3B) \le 90^o$,and $0^o \le (A+3B) \le 90^o$ [Answer A=42^o23' B= 7^o42']	b) Given sin (x – y) = $\frac{1}{2}$ and cos x sin y = $\frac{3}{4}$. Find the value each of the following a) sin x cos y b) sin (x + y)	c) Prove that sin 2x $\equiv$ cot x (1 – cos 2x)
d)Prove that 2 cot 2x + tan x $\equiv$ cot x	e)Show that tan x $\equiv$ $\frac{\sin x - \sin 2x}{kosx - 1 - kos2x}$	f) Given 3 tan2x = 4 for $90^o \le x \le 180^o$. Find the value of sin ^{2}x [Ans 4/ /5]

g) Solve $16kos(x-\pi)\sin(x-\pi)=5$ for $0^o \le x \le 360^o$

[Answer 19°21',70°40',199°21'250°40']

h) Given sin x = *m* for $0^o \le x \le 90^o$ find

i) cos2x in term of *m* [Ans $1-2m^2$]

ii) the positive value for *m* if sin 2x = $\frac{2m}{3}$

[Answer 2/2/3]

a)Solve the equation

2 sek^2x = 3 – tan *x for* $0^o \le x < 360^o$

(b) Given tan $\theta = \frac{1}{3}$ without using calculator find the value of

(i) tan2θ

(ii) tan (135° - θ) [SPM 93]

b) Prove cos 2θ = 2$\cos^2\theta$ -1

Given θ is a acute angle and sinθ = *p* express each of the following in term of *p* [SPM 94]

(i) tanθ

(ii) cos(-θ)

(iii) cos 2θ

c) Solve each of the following for $90^o \le \beta \le 270^o$ [SPM95]

(a) $2\tan^2\beta = 1$

(b) 2 - 3 $\sin\beta - \cos 2\beta = 0$

Solve 4 sin (x-π)cos(x-π) = 1 for $0 \le x \le 2\pi$

Given tan2y = $\frac{5}{12}$ for 90°<y<180°, Find the value of $\cos^2y$ [SPM 97]

Given sinθ = *k* where θ is a acute angle find

i)sin 2θ in term of *k*

ii)the positive value of *k* if kos2θ = k

[SPM 98]

Prove that (cos 2θ + 1)tanθ = sin 2θ [SPM 95]

Prove that Cosek2A + Cot2A = Cot A

[SPM 93]

Prove that $\tan^2\theta - \cot^2\theta = \text{sek}^2\theta - \text{cosec}^2\theta$ [SPM 98]	Show $\dfrac{\sin 2\theta + \sin\theta}{1 + kos\theta + kos2\theta} = \tan\theta$ [SPM 97]