44 DAYS PROGRAMME

Day 01 to Day 22

Name

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44 DAYS PROGRAMME

- Program ini terdiri dari dua siri;
    - Siri 1 (Hari 1 hingga Hari 22) merangkumi topik *Functions* sehingga Topik *Quadratic Functions*
    - Siri 2 (Hari 23 hingga Hari 44) merangkumi topik *Simultaneous Equations* sehingga *Coordinates Geometry*.

- Pelajar yang terlibat dalam program ini diminta menyelesaikan setiap soalan yang diberi mengikut hari yang telah ditetapkan. Sila berjumpa MANA MANA guru MATEMATIK atau MATEMATIK TAMBAHAN atau WARDEN untuk pengesahan setiap hari.

- Siri 1 (Hari 1 hingga Hari 22) akan bermula pada 13 Julai 2011 dan berakhir pada 04 Ogos 2011.

CHECKLIST					
Programme	**Date**	**Check**	**Programme**	**Date**	**Check**
Day 01	13 July 2011		Day 12	24 July 2011	
Day 02	14 July 2011		Day 13	25 July 2011	
Day 03	15 July 2011		Day 14	26 July 2011	
Day 04	16 July 2011		Day 15	27 July 2011	
Day 05	17 July 2011		Day 16	28 July 2011	
Day 06	18 July 2011		Day 17	29 July 2011	
Day 07	19 July 2011		Day 18	30 July 2011	
Day 08	20 July 2011		Day 19	01 August 2011	
Day 09	21 July 2011		Day 20	02 August 2011	
Day 10	22 July 2011		Day 21	03 August 2011	
Day 11	23 July 2011		Day 22	04 August 2011	

DAY 01	
EXAMPLE 01 Given that $f : x \rightarrow 3x-4$ and $g : x \rightarrow 2x$, find fg(3). Answer : f(x) = 3x - 4 , g(x) = 2x $\qquad\qquad$ g(3) = 2(3) $\qquad\qquad\qquad$ = 6 $\qquad\quad$ fg(3) = f [g(3)] $\qquad\qquad\quad$ = f (6) $\qquad\qquad\quad$ = 3 (6) - 4 $\qquad\qquad\quad$ = 14	**EXAMPLE 02** Given that $g : x \rightarrow 3-4x$, evaluate gg(1). Answer : $\quad$ g(x) = 3 − 4x $\qquad\qquad$ g(1) = 3 − 4(1) = **-1** $\qquad\qquad$ gg(1) = g [g(1)] $\qquad\qquad\qquad$ = g (-1) $\qquad\qquad\qquad$ = 3 − 4 (**-1**) $\qquad\qquad\qquad$ = 3 + 4 $\qquad\qquad\qquad$ = 7
QUESTION 01 Given that $f : x \rightarrow 2x+1$ and $g : x \rightarrow 3x$, find f g(1).	**QUESTION 03** Given $f : x \rightarrow 2x^2-4x+3$. Find $f^2(0)$.
QUESTION 02 Given that $f : x \rightarrow 2x-9$ and $g : x \rightarrow 1+3x$, find gf(3).	**QUESTION 04** Given that $f : x \rightarrow 3x^2-1$, find $ff(1)$
Checked by:	**Note:**

DAY 02	
EXAMPLE 01	**QUESTION 01**
Given that $f : x \rightarrow 3x - 4$ and $g : x \rightarrow 2x$, find fg(x).	Given that $f : x \rightarrow 2x - 5$ and $g : x \rightarrow 5x$, find the composite function gf.

Answer :   f(x) = 3x - 4 , g(x) = 2x

      fg(x) = f [g(x)]

         = f (2x)

         = 3 (2x) - 4

         = 6x – 4

<u>OR</u>

      fg(x) = f [g(x)]

         = 3 [g(x)] - 4

         = 3 (2x) – 4

         = 6 x - 4

QUESTION 02	**QUESTION 03**
Given the functions $f : x \rightarrow 3x + 2$ and $g : x \rightarrow 2 - 2x$, find (a) fg(x) (b) gf(x)	Given that $f : x \rightarrow 3 + 4x$, find $f^2(x)$.
Checked by:	**Note:**

DAY 03	
EXAMPLE 01 Given $f(x) = 2x - 3$, then $f^{-1}(2x - 3) = x$. $f^{-1}(y) = x$ when $y = 2x - 3$ $y + 3 = 2x$ $x = \dfrac{y + 3}{2}$ $f^{-1}(y) = \dfrac{y + 3}{2}$ $\therefore \quad f^{-1}(x) = \dfrac{x + 3}{2}$	**QUESTION 01**
QUESTION 02 Given that $f : x \rightarrow 4 + 8x$, find f^{-1}.	**QUESTION 03** Given that $g : x \rightarrow 3 - 2x$, find g^{-1}.
QUESTION 04 Given that $g : x \rightarrow 3 - \dfrac{3}{4}x$, find g^{-1}.	**QUESTION 05** Given that $h(x) = 6x - 1$, find $h^{-1}(x)$.
Checked by:	**Note:**

DAY 04	
TYPE 1 (Easier Type) Given the functions f and fg, find the function g. OR Given the functions g and gf, find the function f.	**TYPE 2 (More Challenging Type)** Given the functions f and gf , find the function g . OR Given the functions g and fg , find the function f .
EXAMPLE 01 Given the functions $f : x \rightarrow 2x + 3$ and $fg : x \rightarrow 6x - 1$, find the function g . Answer : f(x) = 2x + 3 fg(x) = 6x – 1 Find g(x) from fg(x) = 6x – 1 f [**g(x)**] = 6x – 1 2 **g(x)** + 3 = 6x – 1 2 **g(x)** = 6x – 4 ∴ **g(x)** = 3x - 2	**EXAMPLE 02** Given the functions $f : x \rightarrow 2x - 5$ and $g\,f : x \rightarrow 10x - 25$, find the function g . Answer : f(x) = 2x – 5 gf(x) = 10x – 25 Find g(x) from gf(x) = 10x – 25 g [f(x)] = 10x – 25 g (2x – 5) = 10x – 25 g (2y – 5) = 10y – 25 g(x) = 10y – 25 when x = 2y – 5 x + 5 = 2y y = $\dfrac{x+5}{2}$ So : g(x) = 10 $(\dfrac{x+5}{2})$ – 25 = 5x + 25 – 25 ∴ g(x) = 5x
QUESTION 01 Given the functions $f : x \rightarrow 2x + 2$ and $fg : x \rightarrow 4 - 6x$, find the function g	**QUESTION 02** Given the functions $f : x \rightarrow 2x + 2$ and $g\,f : x \rightarrow -5 - 6x$, find the function g
Checked by:	**Note:**

DAY 05	
QUESTION 01 Given the functions $f : x \rightarrow 2x - 3$ and $fg : x \rightarrow 2x + 3$, find the function g	**QUESTION 02** Given the functions $g : x \rightarrow 2x - 1$ and $fg : x \rightarrow 6x + 1$, find the function f
QUESTION 03 Given the functions $p : x \rightarrow 2x$ and $pq : x \rightarrow 4 - 2x$, find the function q	**QUESTION 04** Given the functions $f : x \rightarrow 3x$ and $gf : x \rightarrow 1 - 3x$, find the function g
QUESTION 05 Given the functions $h : x \rightarrow 3x + 1$ and $hf : x \rightarrow 7 - 9x^2$, find the function f	**QUESTION 06** Given the functions $f : x \rightarrow 2 + 4x$ and $gf : x \rightarrow 5 + 16x + 16x^2$, find the function g
Checked by:	**Note:**

DAY 06 QUESTIONS BASED ON SPM FORMAT I	

QUESTION 01

> P = { 1, 2}
>
> Q = {2, 4, 6, 8, 10}

Base on the information above, a relation from P into Q is defined by the set of ordered pairs { (1, 4), (1, 6), (2, 6), (2, 8) }.

State
  (a) the images of 1,   Ans:
  (b) the object of 4,   Ans:
  (c) the domain,   Ans:
  (d) the codomain,   Ans:
  (e) the range,   Ans:
  (f) the type of relation   Ans:

QUESTION 02

Diagram 1 shows the graph of $f(x) = |2x - 1|$ for the domain $0 \le x \le 5$.
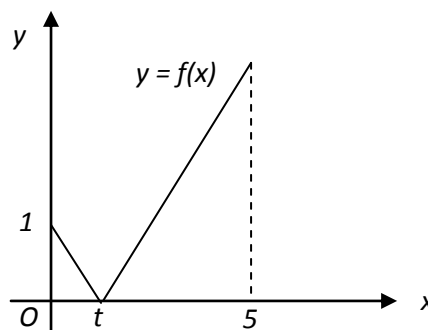
State
  (a) the value of *t*,
  (b) the range of *f(x)* corresponding to the given domain.

QUESTION 03

Given the functions $f : x \to 2x + 1$ and $h : x \to 2 - x^2$, find
  (a) $f^{-1}(-1)$,
  (b) hf (x) ,
  (c) f h(x).

QUESTION 04

Given that $f : x \to 2x - 1$, $g : x \to 4x$ and $fg : x \to ax + b$, find the values of *a* and *b*

QUESTION 05

Given that g(x) = mx + n and $g^2(x) = 16x - 25$, find the values of m and n

QUESTION 06

Given the functions $g : x \to 4x + 1$ and $h : x \to x^2 - 3$, find
  (a) $g^{-1}(3)$,   (b) hg (x) .

Checked by:

Note:

DAY 07 QUESTIONS BASED ON SPM FORMAT II	
QUESTION 01	**QUESTION 02**

QUESTION 01

Given the function $f : x \to |x-3|$, find the values of x such that
   (a) *f(x)* = 5
   (b) *f(x)* < 5

QUESTION 02

Given the functions *f(x) = x – 1* and *g(x) = kx + 2*, find
   (a) *f(5)*,
   (b) the value of k such that *gf(k)* = 14.

QUESTION 03

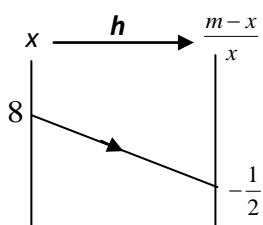Diagram 2 shows the function $h : x \to \dfrac{m-x}{x}$, $x \neq 0$, where m is a constant.

Diagram 2

Find the value of m.

QUESTION 04

Diagram 3 shows the function $g : x \to \dfrac{p+3x}{x-2}$, $x \neq 2$, where p is a constant.
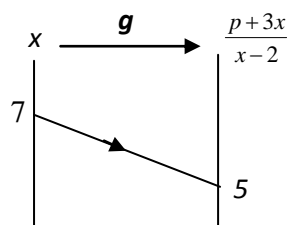
Diagram 3

Find the value of p.

Checked by:

Note:

DAY 08 FACTORISATION	

EXAMPLE 01
 	
Solve the quadratic equation $x^2 + 5x + 6 = 0$.
 	
Answer: $x^2 + 5x + 6 = 0$
         $(x + 2)(x + 3) = 0$
         $x + 2 = 0$ or $x + 3 = 0$
          $x = -2$ or $x = -3$
	QUESTION 02
	
	Solve $x^2 - 4x - 5 = 0$.

QUESTION 03 Solve the quadratic equation $2x(x - 1) = 6$.	**QUESTION 04** Solve $x(1 + x) = 6$.
QUESTION 05 Solve $5x^2 - 45 = 0$.	**QUESTION 06** Solve $2(x^2 - 9) = 5x$.
QUESTION 07 Solve $x(x + 2) = 24$.	**QUESTION 06** Solve $(2x - 1)^2 = 2x - 1$.
Checked by:	**Note:**

| **DAY 09 COMPLETING THE SQUARE:** by expressing $ax^2 + bx + c$ in the form $a(x + p)^2 + q$ | |

EXAMPLE 01

Solve $x^2 + 4x - 5 = 0$ by method of 'completing the square'.

$x^2 + 4x - 5 = 0$

$x^2 + 4x + \left(\dfrac{4}{2}\right)^2 - \left(\dfrac{4}{2}\right)^2 - 5 = 0$

$(x + 2)^2 \quad - \quad 4 \quad - \quad 5 \quad = 0$

$(x + 2)^2 - 9 = 0$

$(x + 2)^2 = 9$

$x + 2 = \pm 3$

$x = -2 \pm 3$

$x = -5$ or $x = 1$

EXAMPLE 02

Solve $2x^2 - 8x + 7 = 0$ by completing the square.

$2x^2 - 8x + 7 = 0$

$x^2 - 4x + \dfrac{7}{2} = 0 \qquad [\div 2 \text{ first}]$

$x^2 - 4x + \left(\dfrac{-4}{2}\right)^2 - \left(\dfrac{-4}{2}\right)^2 + \dfrac{7}{2} = 0$

$(x - 2)^2 - 4 + \dfrac{7}{2} = 0$

$(x - 2)^2 = \text{½}$

$x - 2 = \pm\sqrt{\dfrac{1}{2}}$

$x = 2 \pm \sqrt{\dfrac{1}{2}}$

$= \textbf{2.707 atau 1.293}$

QUESTION 01

Solve $x^2 + 5x - 4 = 0$. Give your answer correct to 4 significant figures.

QUESTION 03

Solve $2x^2 - 12x + 5 = 0$ correct to two decimal places.

Checked by:

Note:

DAY 10 USING FORMULA	
EXAMPLE 01 Solve $2x^2 - 8x + 7 = 0$ by using formul. Give your answer correct to 4 significant figures. a = 2, b = -8 , c = 7 $x = \dfrac{-(-8) \pm \sqrt{(-8)^2 - 4(2)(7)}}{2(2)}$ $ = \dfrac{8 \pm \sqrt{8}}{4}$ $ =$ **2.707 atau 1.293**	**QUESTION 01** By using formula, solve $2x^2 - 12x + 5 = 0$. Give your answer correct to 4 significant figures
QUESTION 02 Solve $2x(2 - 3x) = -5$ by using formula, qive your answer correct to two decimal places	**QUESTION 03** By using formula, solve $3 - x^2 = -3(4x - 3)$ correct to two decimal places.
QUESTION 04 By using formula, solve $3 - x^2 = -3(4x - 3)$ correct to two decimal places.	**QUESTION 05** Solve the quadratic equation $x(x - 4) = (3 - x)(x + 3)$. Give your answer correct to two decimal places.
Checked by:	**Note:**
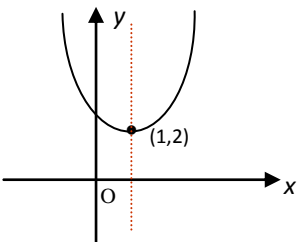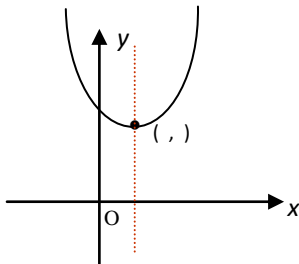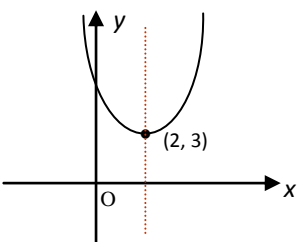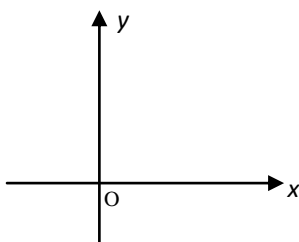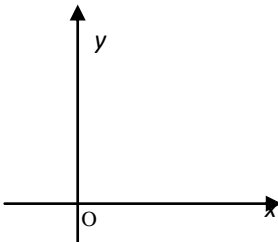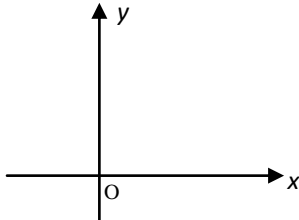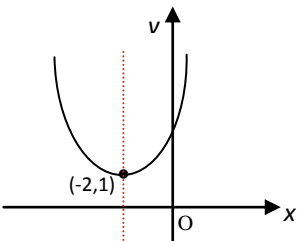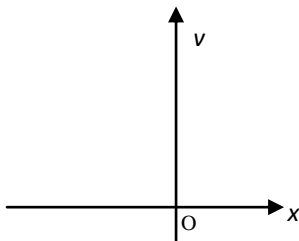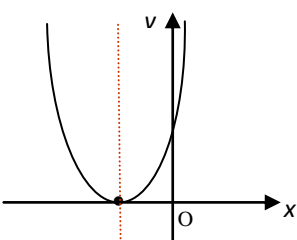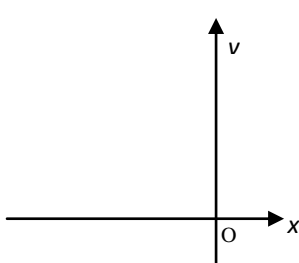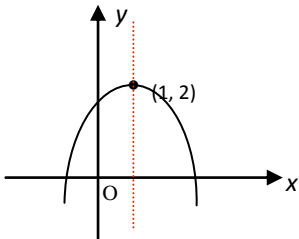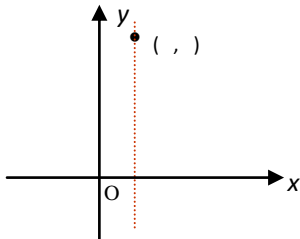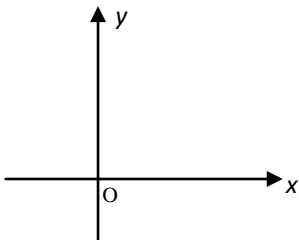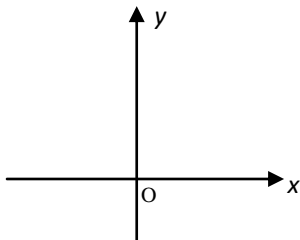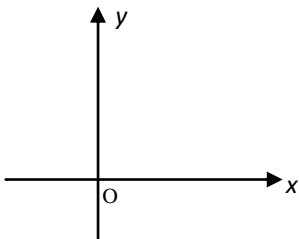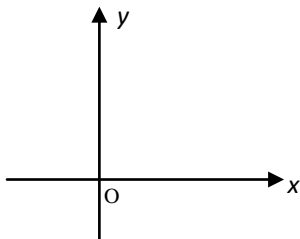
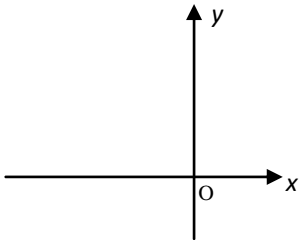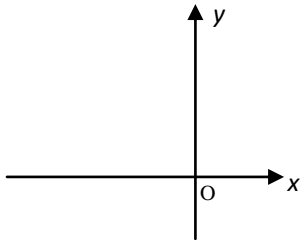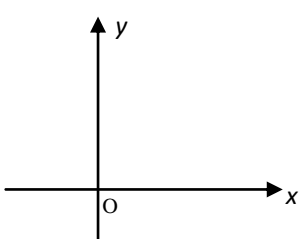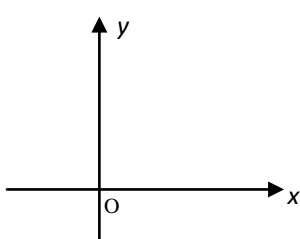| DAY 11	
EXAMPLE 01	**QUESTION 01**
Find the quadratic equation with roots 2 dan - 4. $x = 2$, $x = -4$ $x - 2 = 0$ or $x + 4 = 0$ $(x - 2)(x + 4) = 0$ $x^2 + 2x - 8 = 0$	Find the quadratic equation with roots -3 dan 5.
QUESTION 02	**QUESTION 03**
Find the quadratic equation with roots 0 dan - 3.	Find the quadratic equation with roots - ½ dan 6.
EXAMPLE 02	**QUESTION 01**
Given that the roots of the quadratic equation $2x^2 + (p+1)x + q - 2 = 0$ are -3 and ½ . Find the value of p and q. $x = -3$, $x = $ ½ $x + 3 = 0$ or $2x - 1 = 0$ $(x + 3)(2x - 1) = 0$ $2x^2 + 5x - 3 = 0$ Comparing with the original equation : $p + 1 = 5$, $q - 2 = -3$ $p = 4$, $q = -1$	Given that the roots of the quadratic equation $2x^2 + (3 - k)x + 8p = 0$ are p and 2p , $p \neq 0$. Find k and p.
Checked by:	**Note:**

DAY 12 TYPES OF ROOT AND DISCRIMINANT ($b^2 - 4ac$)	
QUESTION 01 Find the range of k if the quadratic equation $2x^2 - x = k$ has real and distinct roots.	**QUESTION 02** The quadratic equation $9 + 4x^2 = px$ has equal roots. Find the possible values of p.
QUESTION 03 Find the range of p if the quadratic equation $2x^2 + 4x + 5 + p = 0$ has real roots.	**QUESTION 04** Find the range of p if the quadratic equation $x^2 + px$ $= 2p$ does not have real roots.
QUESTION 05 The roots of the quadratic equation $2x^2 + 8 = (k - 3)x$ are real and different. Determine the range of values of k.	**QUESTION 06** Find the range of values of k if the quadratic equation $x^2 + 2kx + k + 6 = 0$ has equal roots.
Checked by:	**Note:**

DAY 13 COMPLETING THE SQUARE (a = 1)	
EXAMPLE 01 $f(x) = x^2 + 4x + 5$ $= x^2 + 4x + \left(\dfrac{4}{2}\right)^2 - \left(\dfrac{4}{2}\right)^2 + 5$ $= \quad (x+2)^2 \quad - 4 \quad + 5$ $= \quad (x+2)^2 + 1$	**QUESTION 01** $f(x) = x^2 + 4x + 3$
QUESTION 02 $f(x) = x^2 - 6x - 7$	**QUESTION 03** $f(x) = x^2 + 2x$
QUESTION 04 $f(x) = x^2 + 5x + 6$	**QUESTION 05** $f(x) = x^2 + 3x + 2$
Checked by:	**Note:**

DAY 14 COMPLETING THE SQUARE (a > 0 , a ≠ 1)	
EXAMPLE 01	**QUESTION 01**
$f(x) = 2x^2 + 4x + 6$	$f(x) = 2x^2 + 8x + 4$

$$= 2\left[x^2 + 2x + 3 \right]$$

$$= 2\left[x^2 + 2x + \left(\frac{2}{2}\right)^2 - \left(\frac{2}{2}\right)^2 + 3 \right]$$

$$= 2\left[(x+1)^2 - 1 + 3 \right]$$

$$= 2\left[(x+1)^2 + 2 \right]$$

$$= 2(x+1)^2 + 4$$

QUESTION 02	**QUESTION 03**
$f(x) = 2x^2 + 6x - 5$	$f(x) = 2x^2 - 6x + 3$

QUESTION 04	**QUESTION 05**
$f(x) = 3x^2 + 6x - 12$	$f(x) = 3x^2 - 12x + 10$

Checked by:	**Note:**

DAY 15 SHAPE OF THE GRAPH		
f(x) = (x − 1)² + 2 Min. Point : $(1, 2)$ Axis of Symmetry : **x = 1**		**f(x) = (x − 1)² + 4** Min. Point. : (,) Axis of Symmetry : **x =**
f(x) = (x − 2)² + 3 Min. Point. : $(2, 3)$ Axis of Symmetry : **x = 2**		**f(x) = (x − 3)² + 2** Min. Point : (,) Axis of Symmetry : **x =**
f(x) = (x − 4)² + 2 Min. Point. : $(4,)$ Axis of Symmetry : **x =**		**f(x) = (x − 1)² + 3** Min. Point : (,) Axis of Symmetry : **x =**
f(x) = (x + 2)² + 1 Min. Point. : $(-2, 1)$ Axis of Symmetry : **x = -2**		**f(x) = (x + 1)² + 2** Min. Point. : (, 2) Axis of Symmetry : **x =**
f(x) = (x + 3)² Min. Point. : (,) Axis of Symmetry : **x =**		**f(x) = (x + 4)²** Min. Point. : (,) Axis of Symmetry : **x =**
Checked by:		**Note:**

DAY 16 SHAPE OF THE GRAPH			
$f(x) = -(x-1)^2 + 2$ Max.Point : $(1, 2)$ Axis of Symmetry : $x = 1$		$f(x) = -(x-1)^2 + 4$ Max.Point : $(\ , \ )$ Axis of Symmetry : $x =$	
$f(x) = -(x-3)^2 + 1$ Max.Point : $(3, 1)$ Axis of Symmetry : $x =$		$f(x) = -x^2 + 2$ Max. Point : $(\ , \ )$ Axis of Symmetry : $=$	
$f(x) = 3 - (x-1)^2$ Max.Point. : $(\ , 3)$ Axis of Symmetry : $x =$		$f(x) = 5 - (x-2)^2$ Max.Point : $(\ , \ )$ Axis of Symmetry :	
$f(x) = -(x+1)^2 + 4$ Max.Point: $(-1, 4)$ Axis of Symmetry : $x = -1$		$f(x) = -(x+2)^2 + 2$ Max.Point : $(-2, \ )$ Axis of Symmetry : $x =$	
$f(x) = -2(x-1)^2$ Max.Point: $(1, \ )$ Axis of Symmetry : $x =$		$f(x) = -(x-3)^2$ Max.Point : $(\ , \ )$ Axis of Symmetry : $x =$	
Checked by:		Note:	

DAY 17 QUESTIONS BASED ON SPM FORMAT I

EXAMPLE 01

Express $f(x) = x^2 - 4x + 3$ in the form $(x + p)^2 + q$; with p and q as constants. Hence

    (i)   State the minimum value of f(x) and the corresponding value of x,

    (ii)   Sketch the graph of y = f(x) and state the equation of the axis of symmetry.

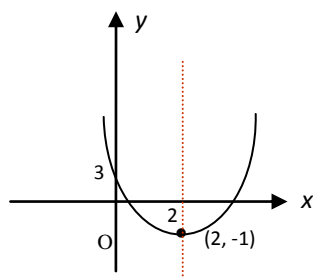***Answers*** : $a = 1\,(>0) \Rightarrow$ f has minimum value.

$f(x) = x^2 - 4x + 3$

$$= x^2 - 4x + \left(\frac{-4}{2}\right)^2 - \left(\frac{-4}{2}\right)^2 + 3$$

$$= (x-2)^2 \quad - \quad 4 \quad + \quad 3$$

$$= (x-2)^2 \quad - \quad 1$$

(i)   Minimum value of f(x) = -1 , when x = 2.

(ii)

  Equation of axis of symmetry :   x = 2.

QUESTION 01

Express $f(x) = x^2 - 6x + 8$ in the form $(x + p)^2 + q$; with p and q as constants. Hence

    (i)   State the minimum value of f(x) and the corresponding value of x,

    (ii)   Sketch the graph of y = f(x) and state the equation of the axis of symmetry.

QUESTION 02

Express $f(x) = x^2 + 2x - 3$ in the form $(x + p)^2 + q$. Hence

    (i)   State the minimum value of f(x) and the corresponding value of x.

    (ii)   Sketch the graph of y = f(x) and state the equation of the axis of symmetry

Checked by:

Note:

DAY 18 QUESTIONS BASED ON SPM FORMAT II

EXAMPLE 01	**QUESTION 01**

EXAMPLE 01

Express $f(x) = -x^2 + 6x + 7$ in the form $k - (x + p)^2$, k and p are constants. Hence
- (i) State the maximum value of f(x) and state the coressponding value of x,
- (ii) Sketch the graph of y = f(x) and state the equation of the axis of symmetry.

Ans: a = -1 (< 0) $\Rightarrow$ f has maximum value

$= -x^2 + 6x + 7$

$= -\left[x^2 - 6x - 7\right]$

$= -\left[(x^2 - 6x + \left(\dfrac{-6}{3}\right)^2 - \left(\dfrac{-6}{2}\right)^2 - 7\right]$
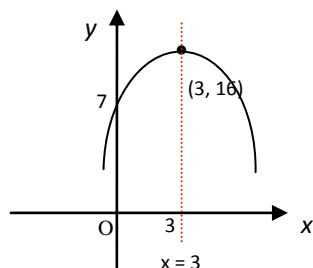
$= -\left[(x-3)^2 - 9 - 7\right]$

$= -\left[(x-3)^2 - 16\right]$

$= 16 - (x-3)^2$

(i) Maximum f(x) = 16, when x = 3.

(ii)

Axis of symmetry is : x = 3.

QUESTION 01

Express $f(x) = -x^2 - 8x + 9$ in the form $-(x + p)^2 + q$. Hence
- (i) State the maximum value of f(x) and state the coressponding value of x,
- (ii) Sketch the graph of y = f(x) and state the equation of the axis of symmetry.

QUESTION 02

QUESTION 02

Express $f(x) = 4 - 3x - x^2$ in the form $q - (x + p)^2$ Hence
- (i) State the maximum value of f(x) and state the coressponding value of x,
- (ii) Sketch the graph of y = f(x) and state the equation of the axis of symmetry.
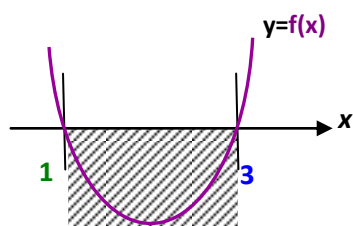
Checked by:	**Note:**

DAY 19	
EXAMPLE 01 Solve $x^2 - 4x < -3$ $x^2 - 4x + 3 < 0$ [In the form f(x) < 0] $(x - 1)(x - 3) < 0$ [faktorise] Consider $f(x) = (x - 1)(x - 3)$ $f(x) = 0 \implies x = 1$ atau $x = 3$ From the graph above, the range of x which satisfies the inequality f(x) < 0 ialah $\underline{1 < x < 3}$.	**QUESTION 01** Solve $x^2 - 5x + 6 < 0$
QUESTION 02 Solve the inequality $x^2 + 3x - 10 \geq 0$	**QUESTION 03** Solve the inequality $x(4 - x) \geq 0$.
QUESTION 04 Solve the inequality $x^2 + x - 6 \geq 0$	**QUESTION 05** Solve the $x(x + 4) < 12$
Checked by:	**Note:**

DAY 20	
EXAMPLE 01	**QUESTION 01**

EXAMPLE 01

Show that the function $2x - 3 - x^2$ is always negative for all values of x.

Ans : Let

$$f(x) = 2x - 3 - x^2$$
$$= -x^2 + 2x - 3$$
$$a = -1, \ b = 2, \ c = -3$$
$$b^2 - 4ac = 2^2 - 4(-1)(-3)$$
$$= 4 - 12$$
$$< 0$$

Since $a < 0$ dan $b^2 - 4ac < 0$,

the graph y = f(x) always lies above

the x-axis

∴ f(x) is always negative for all x

QUESTION 01

Show that the function $4x - 2x^2 - 5$ is always negative for all values of x.

QUESTION 02

Show that the function $2x^2 - 3x + 2x^2$ is always positive for all values of x.

QUESTION 03

Show that the curve $y = 9 + 4x^2 - 12x$ touches the x-axis.

Checked by:

Note:

DAY 21 QUESTIONS BASED ON SPM FORMAT I	
EXAMPLE 01	**QUESTION 01**

EXAMPLE 01

a) Given $f(x) = 9x^2 - 4$.
    Find the range of x for which f(x) is positive.
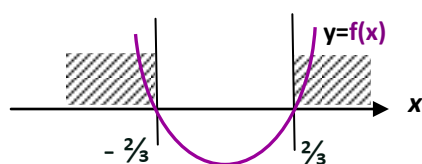(b) Find the range of x which satisfy the inequality
$(x - 2)^2 < x - 2$

Ans : (a) f(x) > 0
$\qquad 9x^2 - 4 > 0$
$\qquad (3x + 2)(3x - 2) > 0$
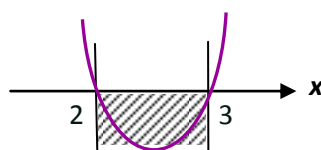$\qquad f(x) = 0 \Rightarrow x = -\frac{2}{3}, \frac{2}{3}$

$\therefore$ x < -⅔ or x > ⅔

(b) $(x - 2)^2 < x - 2$
$\quad x^2 - 4x + 4 - x + 2 < 0$
$\quad x^2 - 5x + 6 < 0$
$\quad (x - 2)(x - 3) < 0$

Range of x is   2 < x < 3.

QUESTION 01

(a) Given $f(x) = 2x^2 - 8$. Find the range of x so that
f(x) is positive.

(b) Find the range of x which satisfy the inequality
$(x - 1)^2 > x - 1$

QUESTION 02

(a) Find the range of x if   x (x + 2) ≥ 15

(b) State the range of x if $5x > 2 - 3x^2$.

QUESTION 03

(a) Solve -2x (x + 3) > 0

(b) Find the range of x if $9x^2 > 4$

Checked by:

Note:

DAY 21 QUESTIONS BASED ON SPM FORMAT II	
EXAMPLE 01	**QUESTION 01**

Given $f(x) = x^2 + 2kx + 5k$ (k constant) has a minimum value 4.

    (a) By completing the square, determine the TWO positive values of k

    (b) Sketch the graph of y = f(x) for the bigger value of k and state the equation of the axis of symmetry.

Answer:

(a) $f(x) = x^2 + 2kx + 5k$

$$= x^2 + 2kx + \left(\frac{2k}{2}\right)^2 - \left(\frac{2k}{2}\right)^2 + 5k$$

$$= (x + k)^2 \quad - \quad k^2 \quad + \quad 5k$$

$$\therefore \quad -k^2 + 5k = \mathbf{4} \qquad (\text{minimum value})$$
$$k^2 - 5k + 4 = 0$$
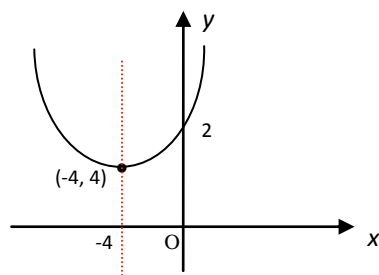$$(k - 1)(k - 4) = 0$$
$$k = 1 \quad \text{or} \quad k = 4$$

(b) k = 4, $f(x) = x^2 + 8x + 20$

$$= x^2 + 8x + \left(\frac{8}{2}\right)^2 - \left(\frac{8}{2}\right)^2 + 20$$

$$= (x + 4)^2 - 16 + 20$$

$$= (x + 4)^2 + 4$$

  (ii)

Axis of symmetry : x = - 4.

QUESTION 01

Given $f(x) = x^2 + kx + 3$ (k constant) has a minimum value k.

    (a) By completing the square, determine the possible values of k

    (b) Sketch the graph of y = f(x) for the value of k which id negative and state the equation of the axis of symmetry.

Checked by:	**Note:**