MODUL KECEMERLANGAN AKADEMIK TERENGGANU TERBILANG 2007

PROGRAM PRAPEPERIKSAAN SPM

ADDITIONAL MATHEMATICS FORM 4

MODULE 1

FUNCTIONS
SIMULTANEOUS EQUATIONS

PANEL

EN. KAMARUL ZAMAN BIN LONG – *SMK SULTAN SULAIMAN, K. TRG.*
EN. MOHD. ZULKIFLI BIN IBRAHIM – *SMK KOMPLEKS MENGABANG TELIPOT, K. TRG*
EN. OBAIDILLAH BIN ABDULLAH – *SM TEKNIK TERENGGANU, K. TRG*
PUAN NORUL HUDA BT. SULAIMAN – *SM SAINS KUALA TERENGGANU, K. TRG.*
PUAN CHE ZAINON BT. CHE AWANG – *SBP INTEGRASI BATU RAKIT, K. TRG.*

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1 FUNCTIONS

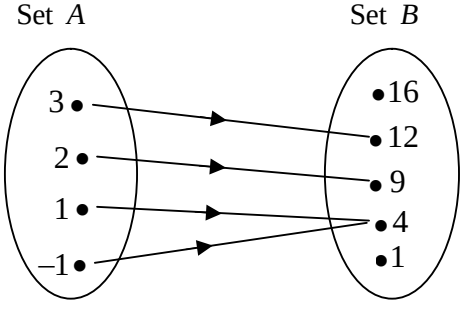
PAPER 1

1 A relation from set $P = \{6, 7, 8, 9\}$ to set $Q = \{0, 1, 2, 3, 4\}$ is defined by '*subtract by 5 from*'. State
(*a*) the object of 1 and 4,
(*b*) the range of the relation.

Answer : (*a*).....

(*b*).....

2 The arrow diagram below shows the relation between Set *A* and Set *B*.



State
(*a*) the range of the relation,
(*b*) the type of the relation.

Answer : (*a*).....

(*b*).....

3 The function f is defined by $f : x \to 2 - mx$ and $f^{-1}(8) = -2$, find the value of *m*.

Answer : *m* = ...

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4 Given the function $f : x \to 3x - 4$, find the value of m if $f^{-1}(2m - 1) = m$.

Answer : m = ...

5 Given the functions $f : x \to 2x + 4$ and $fg : x \to \frac{10}{x-2}, x \neq 2,$ find

(*a*) the function g,
(*b*) the values of x when the function g mapped onto itself.

Answer : (*a*).....

(*b*).....

6 The function f is defined by $f : x \to \frac{x+a}{x-3}, x \neq h$. Given that $f^{-1}(2) = 8$,

Find
(*a*) the value of h,
(*b*) the value of a.

Answer : (*a*) h = ...

(*b*) a = ...

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7 Given the functions $f : x \to 2 + x$ and $g : x \to mx^2 + n$. If the composite function fg is given by $gf : x \to 3x^2 + 12x + 8$, find

(*a*) the values of *m* and *n*,

(*b*) $g^2(-1)$.

Answer : (*a*) *m* = ...

n = ...

(*b*).....

8 Given the functions $f : x \to px + q$ where p > 0 and $f^2 : x \to 4x + 9$, find

(*a*) the values of p and q,

(*b*) $f^{-1}(5)$.

Answer : (*a*) *p* = ...

q = ...

(*b*).....

9 If $f : x \to \frac{4}{3-x}$, $x \neq 3$, $gf : x \to 3 - x$ and $fh : x \to \frac{4}{3-5x}$, $x \neq \frac{3}{5}$, find

(*a*) the function *g*,

(*b*) the function *h*.

Answer : (*a*).....

(*b*).....

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10 Given the function $f : x \to 7 - 2x$. Find
(*a*) the range of f corresponds to the domain $1 \le x \le 3$,
(*b*) the value of x that maps onto itself.

Answer : (*a*).....

(*b*) x = ...

11 Given the function $f : x \to 3x + p$ and $f^{-1} : x \to 2qx + \frac{5}{3}$, where p and q are constants. Find the values of p and q.

Answer : (*a*) p = ...

(*b*) q = ...

12 Given $f : x \to -4x + 3$, find
(*a*) the image of -3,
(*b*) the object which has the image of 5.

Answer : (*a*).....

(*b*).....

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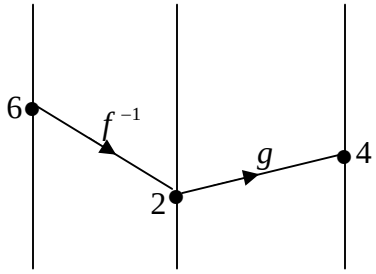
13 The diagram below shows the mapping for the function f^{-1} and *g*.



Given that $f(x) = ax + b$ and $g(x) = \frac{b}{a}x$, calculate the value of a and b.

Answer : $a =$ .....

$b =$ .....

14 Given that $h : x \to |5x - 2|$, find

(*a*) the object of 6,

(*b*) the image which has the object -2.

Answer : (*a*).....

(*b*).....

15 Given that $f : x \to 3 - 2x$ and $g(x) = x^2 - 1$, find

(*a*) $fg(x)$,

(*b*) $gf(-1)$.

Answer : (*a*).....

(*b*).....

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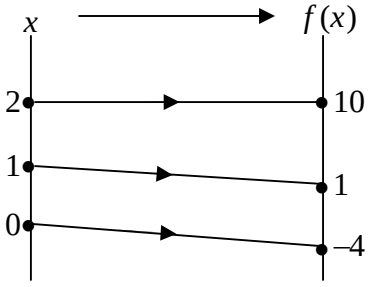
PAPER 2



16 The above diagram shows part of the function $f(x) = px^2 + qx + r$.
Find
(*a*) the values of p, q and r,
(*b*) the values of x which map onto itself under the function f.

17 Given that functions f and g are defined as $f : x \to x^2$ and $g : x \to ax + b$ where a and b are constants.
(*a*) Given that $f(1) = g(1)$ and $f(3) = g(5)$, find the values of a and b.
(*b*) With the values a and b obtained from (*a*), find $gg(x)$ and g^{-1}.
.

18 Given $v(x) = 3x - 6$ and $w(x) = 6x - 1$, find
(*a*) $vw^{-1}(x)$,
(*b*) values of x so that $vw(-2x) = x$.

19 Given that the function $f : x \to \frac{x+1}{2}$, and the composite function $f^{-1}g : x \to 2x^2 + 6x + 1$, find
(*a*) the function of $g(x)$,
(*b*) $gf(3)$,
(*c*) $f^2(x)$.

20 Given that $f : x \to 3x - 2$ and $g : x \to \frac{x}{5} + 1$, find
(*a*) $f^{-1}(x)$,
(*b*) $f^{-1}g(x)$,
(*c*) $h(x)$ such that $hg(x) = 2x + 6$.

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4 SIMULTANEOUS EQUATIONS

PAPER 2

1 Solve the equation $4x + y + 8 = x^2 + x - y = 2$.

2 Solve the simultaneous equations

$\frac{2}{3p} + \frac{1}{q} = 2$ and $3p + q = 3$.

3 Solve the equation $x^2 - y + y^2 = 2x + 2y = 10$.

4 Solve the simultaneous equations and give your answers correct to three decimal places,

$2m + 3n + 1 = 0$,

$m^2 + 6mn + 6 = 0$.

5 Solve the simultaneous equations

$x + \frac{1}{3}y = 3$ and $y^2 - 1 = 2x$.

6 Given $(-1, 2k)$ is the solution of the simultaneous equation

$x^2 + py - 29 = 4 = px - xy$, where k and p are constants. Find the values of k and p.

7 Solve the simultaneous equations

$\frac{x}{3} - \frac{y}{2} + 3 = 0$ and $\frac{3}{x} + \frac{2}{y} - \frac{1}{2} = 0$

8 Given $(2k, -4p)$ is the solution of the simultaneous equations $x - 3y = 4$ and $\frac{9}{x} + \frac{7}{4y} = 1$.

Find the values of k and p.

9 Given the following equations :

$A = -x + y$

$B = 2x - 14$

$C = xy - 9$

Find the values of x and y such that $3A = B = C$

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10 Solve the simultaneous equations and give your answers correct to four significant figures,

$x + 2y = 2$

$2y^2 - xy - 7 = 0$

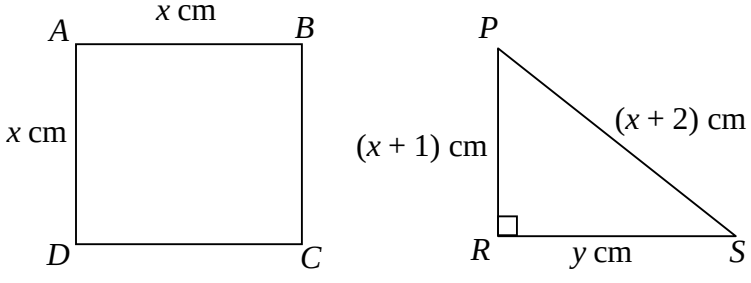
11 The straight line $3y = 1 - 2x$ intersects the curve $y^2 - 3x^2 = 4xy - 6$ at two points. Find the coordinates of the points.

12 If $x = 2$ and $y = -1$ are the solutions to the simultaneous equations $ax + b^2y = 2$ and $\frac{b}{2}x^2 - ay^2 = 1$, find the values of a and b.

13 The perimeter of a rectangle is 34 cm and the length of its diagonal is 13 cm. Find the length and width of the rectangle.

14 The difference between two numbers is 8. The sum of the squares and the product of the numbers is 19. Find the two numbers.

15 A piece of wire of length 24 cm is cut into two pieces, with one piece bent to form a square *ABCD* and the other bent to form a right-angled triangle *PQR*. The diagram below shows the dimensions of the two geometrical shapes formed.



The total area of two shapes is 15 cm^2,

(*a*) show that $6x + y = 21$ and $2x^2 + y(x + 1) = 30$.

(*b*) Find the value of x and y.

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