**RELATION AND MAPPINGS**

***Summary:***

*A relation between members of the given set can be illustrated using a papygram*

*EXAMPLES:*

***1.*** *Draw a papygram illustrating the relation* ***“****is a prime factor of****”*** *in the set* ***{1, 2, 3, 4, 5, 6, 8, 12, 30}***

***2.*** *Draw a papygram showing the relation* ***“****is a multiple of****”*** *in the set* ***{42, 28, 21, 14, 7}***

***3.*** *Given that* ***T =******{2, 5, 6, 8, 9, 10, 12, 13} ,*** *illustrate on papygrams the relations****:******(i)******“****Greater than by* ***3”*** ***(ii)******“****Factor of****”***

**FUNCTIONS**

***Summary:***

***1.*** *A function* ***f(x)*** *is a formula in terms of* ***x.***

***2.*** *A function* ***f*** *that maps* ***x*** *on to* ***3x + 1*** *can either be written as follows****:***

***(i) f(x) = 3x + 1 (ii) f : x → 3x + 1 (iii) x → 3x + 1***

***3. (i)*** *A mapping diagram is an arrow diagram with a set of values of* ***x*** *and that*

*of* ***f(x).***

***(ii)*** *A set of values of* ***x*** *is called The Domain*

***(iii)*** *A set of values of* ***f(x)*** *is called The Range*

***4.*** *The inverse of a function* ***f(x)*** *is denoted by*  *This function maps the*



*range back on to the domain****.***

***5.*** *A function is undefined or meaningless if its denominator part is equal to zero.*

***6. (i)*** *A composite function* ***fg(x)*** *is a combination of two functions* ***f(x)*** *and* ***g(x).***

***(ii)****A composite function* *is the same as* ***ff(x).***



***EXAMPLES:***

***1. (i)*** *Determine the range corresponding to the domain* ***{0, 1, 2, 3}*** *for the*

*mapping* ***f(x) = 3x + 1.***

***(ii)*** *Represent the mapping in* ***(i)*** *above on an arrow diagram****.***

***2. (i)*** *Determine the range corresponding to the domain* ***{−3, −2, 0, 1, 2, 3}*** *for the*

*mapping* ***x → x2 + 1.***

***(ii)*** *Represent the mapping in* ***(i)*** *above on an arrow diagram****.***

***3.*** *Find the unknown values in the arrow diagram for the mapping* ***x → 2x − 3.***

***4***

***a***

***b***

***12***

***5***

***9***

***17***

***c***

***x → 2x − 3***

***4.*** *Given the function find****:***



***(i)******f(3)***

***(ii)******f(6)***

***(iii)*** *the values of* ***x*** *for which* ***f(x)*** *is undefined*

***(iv)*** *the values of* ***x*** *for which* ***f(x) = 6***

***5.*** *Given the function find****:***



***(i)******f(2)***

***(ii)******f(−1)***

***(iii)*** *the values of* ***x*** *for which* ***f(x)*** *is undefined*

***6.*** *Given that* ***f(x) = 3x +5,***  *and* *find****:***



***(i)****and**hence*



***(ii)****and**hence*



***(iii)****and**hence*



***7.*** *Given that* ***f(x) = ax − 7*** *and* ***f(8) = 17,*** *find****:***

***(i)*** *the value of* ***a***

***(ii) f(4)***

***(ii)****hence obtain*



***8.*** *Given that* ***f(x) = a + bx, f(1) = 8*** *and* ***f(−1) = 2,*** *find****:***

***(i)*** *the values of* ***a*** *and* ***b***

***(ii) f(−2)***

***(iii) f(5)***

***(iv)*** *the value of* ***c*** *for which* ***f(c) = −7***

***(v)***



***(vi)***



***10.*** *Given that* ***f(x) = ax + 9*** *and* *find****:***



***(i)*** *the value of* ***a***

***(ii)***



***11.*** *Given that* ***f(x) = px + 7*** *and* *find****:***



***(i)***



***(ii)*** *the value of* ***p*** *for which* ***g(2x − 3) = f(x)***

***12.*** *Given that* *find*



***13.*** *Given that express* ***f(x)*** *in the form*



*Hence find****:***

***(i)******f(3)***

***(ii)*** *the values of* ***x*** *for which* ***f(x)*** *is undefined*

***14.*** *Given that express* ***f(x)*** *in the form*



*Hence find****:***

***(i)******f(2)***

***(ii)*** *the values of* ***x*** *for which* ***f(x)*** *is undefined*

***15.*** *Given that*  *and find****:***



***(i)*** *an expression for* ***gf(x)*** *and hence evaluate* ***gf(4)***

***(ii)*** *an expression for* ***fg(x)*** *and hence evaluate* ***fg(2)***

***(iii)*** *the values of* ***x*** *for which* ***gf(x) = fg(x)***

***(iv)*** *an expression for* ***gg(x)*** *and hence evaluate* ***gg(2)***

***(v)*** *an expression for* ***ff(x)*** *and hence evaluate* ***ff(−3)***

***16.*** *Given that* ***f(x) = 5x − 7,*** *find* ***g(x)*** *for which****:***

***(i)******fg(x) = 10x + 8,*** *hence evaluate* ***g(4)***

***(ii)********* *hence evaluate* ***g(2)***

***17.*** *Given that*  *and find the values of* ***x*** *for which*



***fg(x) + gf(x) = 0.***

***18.*** *Given that and find the values of* ***x*** *for*



*which*



***19.*** *Given that and find the values of* ***x*** *for*



*which* ***fg(x)*** *is undefined*

**EER:**

***1.*** *Given that find****:***



***(i)******f(4)***

***(ii)*** *the values of* ***x*** *for which* ***f(x)*** *is undefined****.***

***2. (i)*** *Determine the range corresponding to the domain* ***{4, 9, 16}*** *for the mapping*



***(ii)*** *Represent the mapping in* ***(i)*** *above on an arrow diagram****.***

***3.*** *Express in the form Hence solve the equation*



***4.*** *Given that* ***f(x) = 2x + 4*** *and* ***g(x) = x + 5,*** *find* ***fg(x)*** *and hence evaluate* ***fg(4)***

***5.*** *Given that find****:***



***(i)******f(5)***

***(ii)*** *the values of* ***x*** *for which* ***f(x) = 16.***

***6.*** *Given that* ***f(x) = ax + 3*** *and* *find****:***



***(i)*** *the value of* ***a***

***(ii)***



***7.*** *Given that*  ***f(−2) = 3*** *and* ***f(1) = −2,*** *find****:***



***(i)*** *the values of* ***a*** *and* ***b***

***(ii) f(4)***

***8.*** *Given that* ***f(x) = 2x − 5,*** *find****:***

***(i)***



***(ii)***



***9.*** *Given that* ***f(x) = 3x − 4,*** *find*



***10.*** *Given that and find the values of* ***x*** *for which*



*which*



***11.*** *Given that express* ***f(x)*** *in the*



*form Hence evaluate* ***f(−3)***



***12.*** *Given that express* ***f(x)*** *in the form*



*Hence find****:***

***(i)******f(4)***

***(ii)*** *the values of* ***x*** *for which* ***f(x)*** *is undefined*

***13.*** *Given that*  ***f(1) = 5*** *and* ***f(2) = 14,*** *find****:***



***(i)*** *the values of* ***a*** *and* ***b***

***(ii) f(3)***

***14.*** *Express in the form Hence solve the equation*



***15.*** *Express in the form Hence solve the equation*



***16.*** *Given that find the values of* ***x*** *for which* ***f(x) = 4.***



***17.*** *Given the function find****:***



***(i)******f(−1)***

***(ii)*** *the values of* ***x*** *for which* ***f(x) = 1***

***(iii)*** *the values of* ***x*** *for which* ***f(x)*** *is undefined*

***18.*** *Given that* * and* ***f(2) = −4,*** *find the value of* *Hence find*

*the value of* ***x*** *for which* ***f(x)*** *is undefined****.***