***EVALUATION AND SUBSTITUTION***

***Summary***

*When letters in a formula are replaced by numbers, it’s called substitution.*

***EXAMPLES:***

***1.*** *Find the value of when* ***x = 8*** *and* ***y = −6***

***2.*** *Find the value of* *when* ***x = −3***

***3.*** *Find the value of* ***2(4 + 3y) + y(3 − 2t)*** *when* ***y = 2*** *and* ***t = 3***

***4.*** *Given that* ***P = 200, r = 50*** *and* ***n = 2,*** *find the value of* 

***5.*** *If* ***a = 6, b = 8, c = 10*** *and* ***s = 12,*** *find the value of *

***6.*** *Given that* *find the values of* ***v*** *when* ***u = 6, a = 3.5*** *and* ***s = 4.***

***7.*** *Given that* ***a = 2, b = −4*** *and* ***c = −6,*** *find the values of *

***8.*** *Given that  find the value of* ***y*** *when* ***p = r.***

***9.*** *Given that* ***a = 3, b = 4*** *and* ***c = 5,*** *find the value of  where* 

***OPERATIONS***

***Summary:***

*An operation is a rule connecting two terms using sign language****.***

***EXAMPLES:***

***1.*** *Given that* ***a\* b*** ***=***  *find the value of****:***



***(i) 1\* 3***

***(ii)*** ***(1\* 3)\* 2***

***(iii) a*** *if* ***a\* 3 = 63***

***2.*** *Given that* ***m↑ n*** ***=*** ** *find the value of****:***

***(i) 5↑ 3***

***(ii)*** ***8↑ (5↑ 3)***

***(iii) 9↑ (6 ↑ 2)***

***(iv) (12↑ 4) ↑ (7↑ 2)***

***3.*** *Given that* ***p\* q*** ***=***  *find the value of****:***



***(i) 3\* (10\* 15)***

***(ii)*** ***6\* (20\* 30)***

***(iii) 15\* (30\* 15)***

***(iv) p*** *if* ***p\* 3 = 2***

***4.*** *Given that* ***a ∧ b*** ***=***  *find the value of*  ***y*** *if* ***3 ∧ y = 6 ∧ 4***



***EER:***

***1.*** *Given that* ***x ∧ y******=***  *find the value of****:***



***(i) 3∧ 2***

***(ii)*** ***(3∧ 2) ∧ 2***

***2.*** *Given that* ***a \* b*** ***=***  *find the value of****:***



***(i) 4\* 3***

***(ii)*** ***8\* (4\* 3)***

***3.*** *Given that* ***a \* b*** ***=***  *find the value of*  ***(5\* 3) \* −2***



***4.*** *Given that* ***m \* n*** ***=***  *find the value of****:***



***(i) 4\* −8***

***(ii)*** ***7\* (4\* −8)***

***5.*** *Given that* ***a \* b*** ***=***  *find the value of*  ***(1\* 4) \* 3***



***6.*** *Given that* ***a \* b*** ***=***  *find the value of*  ***\****



***7.*** *Given that* ***a \* b*** ***=***  *find the value of****:***



***(i) 3\* 4***

***(ii)*** ***5\* (3\* 4)***

***8.*** *Given that* ***a \* b*** ***=***  *find the value of****:***



***(i) −3\* −4***

***(ii)*** ***y*** *if* ***y\* 2 = 21***

***9.*** *Given that* ***a \* b*** ***=***  *find the value of****:***



***(i) 1\* (2\* 5)***

***(ii)*** ***y*** *if* ***4\* y = 16***

***COLLECTING LIKE TERMS***

***Summary***

***1.*** *In collecting like terms, the expression is re−arranged so that like terms are next to each other.*

***2.*** *The products*  *and*  *are the same. Thus*  *and* *are like terms.*

***3.*** *Like terms with powers can be added or subtracted if the powers are the same. Thus* *cannot be simplified because* ***4p*** *and* *are not like terms.*

***EXAMPLES:***

*Simplify the following expressions:*

***(i)***  ***(ii)***

***(iii)*** ***(iv)******4p + 6pq − 2q + 8p − 11qp + 10q***

***REMOVING BRACKETS***

***Summary***

***1.*** *When removing brackets****,*** *each term inside the brackets is multiplied by the quantity outside the brackets.*

***2.*** *If the sign in front of the bracket is negative****,*** *the signs inside the bracket are changed.*

***EXAMPLES:***

***1.*** *Remove the brackets and simplify the following expressions****:***

***(i) 3(x + 2) + 2(x − 4) (ii) 2(4x − 2) − (5x − 3) (iii) 4(1 − 2x) − 3(6x − 5)***

***(iv)******5(3x + 2) − 2(4p + 3) (v) 4x(x + 2) + x(x − 4) (vi) 3x(5 + 2x) − 2x(3x −7)***

***(vii) a(b + c) − 2b(c + a) + c(a + b) (viii)*** 

***EER:***

***1.*** *Remove the brackets and simplify the following expressions****:***

***(i) 2(5a + 3b)+3(a − 2b) (ii) 4(1 − 2x) − 3(3x − 4) (iii) 4(1 − 2x) − 3(3x − 4) (iv)******3(x + 1) + 2(x + 4) (v) 5((4y − 9) − (10y −5)) (vi) 9(2x + 3) − 3(5x+1) (vii) −4(a − 3b) −3(−3a − b) (viii) 2p(q + r) − p(3q − 2r) (ix) 2x(x + 3) + x(x − 2) (x) 5[4(y − 4) + 15] − [2(5y − 3)+1]***

***SOLVING LINEAR EQUATION***

***Summary:***

***1.*** *An equation consists of two expressions separated by an equal sign*

***2.*** *In solving linear equations the following apply****:***

***(i)*** *When moving any term from one side of the equation to the other****,*** *its sign changes*

***(ii)*** *If the equation contains brackets****,*** *first remove the brackets and then workout*

***(iii)*** *If the equation contains fractions****,*** *multiply each term by the* ***LCM*** *of the denominators to remove the fractions*

***EXAMPLES:***

***1.*** *Solve for* ***x*** *in the following equations****:***

***(i) 6x − 22 = 3x − 10 (ii) 2(3x − 6) = 3(5 + x) (iii) 5 − 2(x − 1) = 4(3 − x) − 2x (iv) (5x − 4) − (3x − 1) = 3***

***(v) (8x + 3) − 3(x − 1) = x − 2***

***2.*** *Solve for* ***x*** *in the following equations****:***

***(i) (ii)***



***3.*** *Given that* ***(7x − 5) : (2 + 4x) = 8:7,*** *find the value of* ***x***

***4.*** *Solve for* ***x*** *in the following equations****:***

***(i) (ii)***



***(iii) (iv)***



***(v) (vi)***



***(v) (vi)***



***EER:***

***1.*** *Solve for* ***x*** *in the following equations****:***

***(i) 4(2x + 3) = 31 − 3(x − 1) (ii) 15(x − 7) − 3(x − 9) + 5(x + 6) = 0 (iii) 10 − 2(x − 4) = 2(x − 1) − 6x (iv) 5(x − 1) = 3(2x − 5) − (1 − 3x)***

***(v) 9 − 2(x − 5) = x + 10***

***2.*** *Solve for* ***x*** *in the following equations****:***

***(i) (ii)***



***3.*** *Given that* ***(x + 3) : x = 8:5,*** *find the value of* ***x***

***4.*** *Given that* ***(x + 5) : 2 = 18:3,*** *find the value of* ***x***

***5.*** *Solve for* ***x*** *in the following equations****:***

***(i) (ii)***



***(iii) (iv)***



***(v) (vi)***



***(vii) (viii)***



***WORD PROBLEMS ON LINEAR EQUATION***

***Summary:***

*In solving word problems on linear equation, read the problem carefully and form an equation using the conditions given in the problem*

***EXAMPLES:***

***1.*** *Find two numbers such that one exceeds the other by* ***9*** *and their sum is* ***25***

***Soln:***

*If the numbers are* ***x*** *and* ***(x + 9),***

***⇒ x + (x + 9) = 25***

***x = 8***

***⇒ (x + 9) = 8 + 9 = 17***

***∴*** *The numbers**are* ***8*** *and* ***17***

***2.*** *The length of a rectangle is twice its width. If the perimeter of the rectangle is* ***72m,*** *find the length and width of the rectangle*

***Soln:***

*If the width =*  ***x***

***⇒*** *length =* ***2x***

*If**2(l + w) = 72*

***⇒*** *2(2x + x) = 72*

***x = 12m***

***∴*** *Width* ***= 12m,*** *length* ***=*** *2(12)* ***= 24m***

***3.*** *The sum of three consecutive multiples of* ***5*** *is* ***90.*** *Find these multiples*

***Soln:***

*If the multiples are* ***x, (x + 5)*** *and* ***(x + 10),***

***⇒ x + (x + 5) + (x + 10) = 90***

***x = 25***

***⇒ (x + 5) = 25 + 5 = 30, (x + 10) = 25 + 10 = 35***

***∴*** *The multiples are* ***25, 30*** *and* ***35***

***4.*** *Three−fifth of a number is* ***4*** *more than one−half of the number. Find the number*

***Soln:***

*If the required number =* ***N***

***⇒***



***∴ N = 40***

***5.*** *The denominator of a fraction is greater than its numerator by* ***3.*** *If the numerator is increased by* ***7*** *and the denominator is decreased by* ***1,*** *the fraction becomes*  *Find the original fraction*



***Soln:***

*If the original fraction =*



***⇒***



***⇒ x = 8***

***∴*** *Original fraction =* *=*



***6.*** *In a multiple choice test of* ***90*** *questions****,*** *each correct answer carries* ***5*** *marks and each wrong answer leads to a loss of* ***2*** *marks****.*** *If a student scored a total of* ***387*** *marks from the test****,*** *find how many questions were answered correctly*

***Soln:***

*If the correct answers* ***= x,*** *then wrong answers* ***= (90 − x)***

***⇒ correct score − incorrect score = total score***

***⇒ 5 x − 2(90 − x) = 387***

***x = 81***

***7.*** *The length of a rectangle is* ***4m*** *less than* ***3*** *times its width. If the perimeter of the rectangle is* ***32m,*** *find the length and width of the rectangle*

***Soln:***

*If the width =*  ***x***

***⇒*** *length =* ***3x − 4***

*If**2(l + w) = 32*

***⇒*** *2(3x − 4 + x) = 32*

***x = 5m***

***∴*** *Width* ***= 5,*** *length* ***=*** *3(5) − 4* ***= 11m***

***8.*** *A man is* ***24*** *years older than his son****.*** *In two years time****,*** *his age will be twice the age of his son****.*** *Find the present age of the son*

***Soln:***

*Son’s**present age =* ***x,*** *Father’s present age =* ***x + 24***

***⇒*** *After two years****,*** *Son’s**age =* ***x + 2,*** *Father’s age =* ***x + 26***

***⇒*** *x + 26 = 2(x + 2)*

***∴ x = 22 years***

***9.*** *Tom’s present age is two−fifth of his father’s age****.*** *After* ***8*** *years he will be one−half of his father’s age then. Find how old is his father*

***Soln:***

*Father’s**present age =* ***x,*** *Tom’s present age =*



***⇒*** *After* ***8*** *years****,*** *Father’s age =* ***x + 8*** *Tom’s**age =*



***⇒*** *=*



***∴ x = 40 years***

***10.*** *The sum of the present ages of a man and his son is* ***60*** *years. Six years ago, the man’s age was* ***5*** *times the son’s age. Find the son’s present age*

***Soln:***

*Son’s**present age =* ***x,*** *Father’s present age =* ***60 − x***

***⇒*** *Six years ago****,*** *Son’s**age =* ***x − 6,*** *Father’s age =* ***(60 − x) − 6 = 54 − x***

***⇒*** *54 − x = 5(x − 6)*

***∴ x = 14 years***

***11.*** *The sum of the present ages of a man and his son is* ***45*** *years****.*** *Five years ago****,*** *the product of their ages was* ***4*** *times the man’s age at that time****.*** *Find their present ages*

***Soln:***

*Son’s**present age =* ***x,*** *Father’s present age =* ***45 − x***

***⇒*** *Five years ago****,*** *Son’s**age =* ***x − 5,*** *Father’s age =* ***(45 − x) − 5 = 40 − x***

***⇒*** *(x − 5)(40 − x) = 4(40 − x)*

***⇒*** *(x − 5) = 4*

***⇒ x = 9 years***

***∴*** *Son’s age*  ***= 9 years,*** *Father’s age =* ***45 − 9 = 36 years***

***12.*** *Ten years ago****,*** *a man’s age was thrice as old as his son****.*** *In ten years time****,*** *the man’s age will be twice as old as his son****.*** *Find their present ages*

***Soln:***

*Ten years ago****,*** *Son’s age =* ***x,*** *Father’s age =* ***3x***

***⇒*** *Son’s present age =* ***x + 10,*** *Father’s present age =* ***3x + 10***

*After* ***10*** *years****,*** *Son’s age =* ***x + 20,*** *Father’s age =* ***3x + 20***

***⇒*** *3x + 20 = 2(x + 20)*

***⇒ x = 20 years***

***∴*** *Son’s present age = 20**+ 10* ***= 30 years,*** *Father’s age =**3(20) + 10* ***= 70 years***

***13.*** *Tom is* ***9*** *years older than Bob. In ten years time Tom will be twice as old as Bob was* ***10*** *years ago****.*** *Find Bob’s present age*

***Soln:***

*Bob’s**present age =* ***x,*** *Tom’s present age =* ***x + 9***

***⇒*** *In ten years****,*** *Tom’s**age = (x + 9) + 10* ***= x + 19,***

*Ten years ago****,*** *Bob’s age =* ***(x − 10)***

***⇒*** *x + 19* *= 2(x − 10)*

***∴ x = 39 years***

***14.*** *A man said to his son****, “****I was as old as you are at present at the time of your birth****”.*** *If the man’s age is* ***38*** *years now****,*** *find the son’s age* ***5*** *years ago*

***Soln:***

*Son’s present age =* ***x,***

***x*** *years ago****,*** *father’s age =* ***38 − x***

***⇒ 38*** *−* ***x*** *=* ***x***

***⇒ x = 19 years***

***∴ 5*** *years ago****,*** *son’s age = 19 − 5* ***= 14 years***

***15.*** *The ratio between two numbers is* ***7:5.*** *If the difference between them is* ***48,*** *find the numbers*

***Soln:***

*If the common ratio is* ***x,***

***⇒*** *The ratio* ***7 : 3 = 7x:3x (****The ratio* ***7x:3x*** *simplifies to* ***7:3)***

***⇒*** *The numbers are* ***7x*** *and* ***3x***

***⇒*** *7x − 3x = 48*

***x = 12***

***∴ 7x =*** *7(12)* ***= 84, 3x =*** *3(12)* ***= 36***

*Thus the numbers are* ***84*** *and* ***36***

***16.*** *Tom is* ***6*** *years older than Bob. The ratio between the present ages of Tom and Bob is* ***7:5.*** *Find their present ages*

***Soln:***

*The ratio* ***7 : 5 = 7x:5x***

***⇒*** *Tom’s**present age =* ***7x,*** *Bob’s present age =* ***5x***

***⇒*** *7x − 5x = 6*

***x = 3***

***∴*** *Tom’s age =**7(3)* ***= 21 years,*** *Bob’s age =**5(3)* ***= 15 years***

***METHOD II***

*Bob’s age =* ***x***

*Tom’s age =* ***x + 6***

***⇒***



***⇒ x = 15***

***∴*** *Bob’s age =* ***15 years,***  *Tom’s age =**15 + 6* ***= 21 years***

***17.*** *The present ages of Tom and Bob are in the ratio of* ***5:4.*** *In three years time, the ratio of their ages will become* ***11:9****respectively. Find Bob’s present age*

***Soln:***

*The ratio* ***5 : 4 = 5x:4x***

***⇒*** *Tom’s**present age =* ***5x,*** *Bob’s present age =* ***4x***

***⇒*** *After* ***3*** *years, Tom’s age =* ***5x + 3,*** *Bob’s age =* ***4x + 3***

***⇒***



***⇒ x = 6***

***∴*** *Bob’s present age =**4(6)* ***= 24 years***

***18.*** *Four years ago****,*** *the ratio of the ages of Tom and Bob was* ***3:2.*** *In six years time, the ratio of their ages will become* ***14:11*** *respectively. Find Bob’s present age*

***Soln:***

*Four years ago****,*** *Tom’s age =* ***3x,*** *Bob’s age =* ***2x***

***⇒*** *Tom’s present age =* ***3x + 4,*** *Bob’s present age =* ***2x + 4***

*After* ***6*** *years****,*** *Tom’s age =* ***(3x + 4) + 6 = 3x + 10,***

*Bob’s age =* ***(2x + 4) + 6 = 2x + 10***

***⇒***



***⇒ x = 6***

***∴*** *Bob’s present age =**2(6)* ***+*** *4* ***= 16 years***

***19.*** *The present ages of Tom, Bob and Ben are in the ratio* ***4:7:9.***  *Eight years ago****,*** *the sum of their ages was* ***76.*** *Find their present ages*

***Soln:***

*Tom’s present age =* ***4x,*** *Bob’s age =* ***7x,*** *Ben’s age =* ***9x***

***⇒ 8*** *years ago****,*** *Tom’s age =* ***4x − 8,*** *Bob’s age =* ***7x − 8,*** *Ben’s age =* ***9x − 8***

***⇒*** *(4x − 8) + (7x − 8) + (9x − 8) = 76*

***⇒ x = 5***

***∴*** *Tom’s present age =**4(5)* ***= 20 years,*** *Bob’s age =**7(5)* ***= 35 years***

*Ben’s age =**9(5)* ***= 45 years***

***20.*** *Ten years ago, the ratio of the ages of Tom, Bob and Ben was* ***2:3:7.***  *The sum of their present ages is* ***90.*** *Find Bob’s present age*

***Soln:***

*Ten years ago****,*** *Tom’s age =* ***2x,*** *Bob’s age =* ***3x,*** *Ben’s age =* ***7x***

***⇒*** *Tom’s present age =* ***2x + 10,*** *Bob’s age =* ***3x + 10,*** *Ben’s age =* ***7x + 10***

***⇒*** *(2x + 10) + (3x +10) + (7x + 10) = 90*

***⇒ x = 5***

***∴*** *Bob’s present age =**3(5) + 10* ***= 25 years***

***EER:***

***1.*** *Find two numbers such that one exceeds the other by* ***11*** *and their sum is* ***73***

***2.*** *The sum of three consecutive multiples of* ***4*** *is* ***444.*** *Find these multiples*

***3.*** *The cost of two tables and three chairs is* ***Shs 705,000.*** *If the table costs* ***Shs 40,000*** *more than the chair, find the cost of each table and a chair*

***4.*** *The length of a rectangle is* ***4*** *times its width****.*** *If the perimeter of the rectangle is* ***80m,*** *find the length and width of the rectangle*

***5.*** *Three−fourth of a number is more than one−fourth of a number by* ***2.*** *Find the number*

***6.****The numerator of a fraction is* ***5*** *less than its denominator. If* ***2*** *is added to both the numerator and denominator****,*** *the fraction becomes Find the original fraction*



***7.*** *In a multiple choice test of* ***30*** *questions****,*** *each correct answer carries* ***5*** *marks and each wrong answer leads to a loss of* ***2*** *marks****.*** *If a student scored a total of* ***80*** *marks from the test****,*** *find how many questions were answered correctly*

***8.****The numerator of a fraction is* ***1*** *less than its denominator. If the numerator is decreased by* ***2*** *and the denominator is increased by* ***3,*** *the fraction becomes Find the original fraction*



***9.****The numerator of a fraction is* ***3*** *less than its denominator. If the numerator is tripled and the denominator is increased by* ***7,*** *the resulting fraction is Find the original fraction*



***10.*** *The sum of the ages of* ***5*** *children born at intervals of* ***3*** *years each is* ***50*** *years****.*** *Find the age of the youngest child*

***11.*** *The present ages of* ***P, Q*** *and* ***R*** *are in the ratio* ***4:7:9.***  *Eight years ago****,*** *the sum of their ages was* ***56.*** *Find their present ages*

***12.*** *A man is* ***4*** *times as old as his son. Five years ago****,*** *the man was* ***9*** *times as old as his son. Find the man’s present age*

***13.*** *Tom is* ***4*** *times as old as Bob. In* ***4*** *years time, the sum of their ages will be* ***43*** *years. Find Tom’s present age*

***14.*** *Five years ago****,*** *a man’s age was seven times as old as his son****.*** *In five years time****,*** *the man’s age will be thrice as old as his son****.*** *Find their present ages*

***15.*** *In* ***15*** *years time****,*** *Tom’s age will be* ***6*** *times his age* ***5*** *years back. Find his present age*

***16.*** *Tom is* ***12*** *years younger than Bob. The ratio between the present ages of Tom and Bob is* ***2:5.*** *Find their present ages*

***17.*** *Ten years ago****, P*** *was twice as old as* ***Q.*** *The ratio between the present ages of* ***P*** *and* ***Q*** *is* ***4:3.*** *Find their present age*

***18.*** *Six years ago****,*** *Tom was thrice as old as Bob****.*** *In six years time****,*** *Tom will be one and a third times as old as Bob****.*** *Find Bob’s present age*

***19.*** *The present ages of Tom and Bob are in the ratio* ***4:3.***  *In six years time, Tom’s age will be* ***26*** *years****.*** *Find Bob’s present age*

***20.*** *The present ages of Tom and Bob are in the ratio* ***11:5.***  *If the difference between their ages is* ***24*** *years****,*** *find their present ages*

***21.*** *The present ages of a man and his son are in the ratio* ***4:1.***  *If the product of their ages is* ***196*** *years****,*** *find the ratio of their ages in* ***5*** *years time*

***22.*** *The ratio between the present ages of* ***P*** *and* ***Q*** *is* ***2:5.*** *In eight years time, their ages will be in the ratio* ***1:2.*** *Find their present ages*

***23.*** *Six years ago****,*** *the ratio of the ages of Tom and Bob was* ***6:5.*** *In four years time, the ratio of their ages will become* ***11:10*** *respectively. Find Bob’s present age*

***24.*** *The ages of two people differ by* ***16*** *years. Six years ago, the elder one was* ***3*** *times as old as the younger one. Find the elder’s present age*

***ALGEBRAIC FRACTIONS***

***Summary:***

***(i)*** *A fraction with any letter in its numerator or denominator is called an algebraic fraction*

***(ii)*** *A fraction is undefined* ***(meaningless)*** *when its denominator is equal to zero.*

***(iii)*** *To reduce an algebraic fraction in its simplest form****,*** *factorization is sometimes necessary*

***EXAMPLES:***

***1.*** *Find the value of* ***x*** *that makes the fraction*  *undefined*



***2.*** *Find the values of* ***x*** *for which the fraction*  *is undefined*



***3.*** *Find the values of* ***x*** *for which the fraction*  *is undefined*



***4.*** *Express the following as a single fraction****:***

***(i)*** ***(ii)***



***(iii)***  ***(iv)***



***(v)*** ***(vi)***



***5.*** *Reduce the following fractions to their lowest form****:***

***(i)***  ***(ii)*** ***(iii)***  ***(iv)***



***(v) (vi) (vii) (viii)***



***(ix) (x) (xi) (xii)***



***(xiii) (xiv)***



***(i) Soln:***



***6.*** *Simplify the following fractions as far as possible****:***

***(i)***  ***(ii)***



***(iii) (iv)***



***LCM OF ALGEBRAIC EXPRESSIONS***

***Summary:***

*The* ***LCM*** *of given expressions is obtained as follows****:***

***(i)*** *Determine the prime factor form of each expression*

***(ii)****The product of each factor with the highest power is the required* ***LCM***

***EXAMPLES:***

***1.*** *Find the* ***LCM*** *of and*



***Soln:***



***2.*** *Find the* ***LCM*** *of and*



***Soln:***



***3.*** *Find the* ***LCM*** *of and*



***Soln:***



***4.*** *Find the* ***LCM*** *of*  *and*



***Soln:***



***5.*** *Find the* ***LCM*** *of*  *and*



***Soln:***



***6.*** *Find the* ***LCM*** *of*  *and*



***Soln:***



***7.*** *Simplify the following fractions as far as possible****:***

***(i)*** ***(ii) (iii)***   ***(iv)*** ***(v)*** ***(vi) (vii) (viii) (ix)***   ***(x)***  ***(xi) (xii) (xiii)***



***EER:***

***1.*** *Find the values of* ***x*** *that make the fraction*  *undefined*



***2.*** *Find the values of* ***x*** *for which the fraction*  *is undefined*



***3.*** *Find the values of* ***x*** *for which the fraction*  *is undefined*



***4.*** *Find the* ***LCM*** *of and*



***5.*** *Find the* ***LCM*** *of*  *and*



***6.*** *Simplify as far as possible****:***



***7.*** *Express*  *as a single fraction*



***8.*** *Express*   *as a single fraction*



***9.*** *Express*   *as a single fraction*



***10.*** *Express*   *as a single fraction*



***11.*** *Given that express* ***y*** *in the form*



*Hence find the value of* ***x*** *for which* ***y*** *is undefined*

***12.*** *Express*   *as a single fraction*



***13.*** *Express*   *as a single fraction*



***14.*** *Reduce the following fractions to their lowest form****:***

***(i)***  ***(ii)*** ***(iii)***  ***(iv)***



***(v) (vi) (vii) (viii)***



***(ix) (xi)***



***15.*** *Simplify the following fractions as far as possible****:***

***(i)***  ***(ii)***



***(iii) (iv)***



***16.*** *Simplify the following fractions as far as possible****:***

***(i)*** ***(ii)***   ***(iii)*** ***(iv)*** ***(v)***   ***(vi) (vii) (viii)***   ***(ix)***

