***INDICES***

***Summary:***

***1.*** *The expression**is read as* ***3*** *to power* ***5*** *and is defined as follows****:***

***(“3”*** *is called the base and* ***“5”*** *is the index or power****)***

***2.*** *The following rules apply to indices****:***

***(i)***

*To multiply expressions with the same base, copy the base and add the powers.*

***(ii)***

*To divide expressions with the same base, copy the base and subtract the*

*powers.*

***(iii)***

*To raise an expression with the* ***nth*** *power, copy the base and multiply the*

*powers.*

***(iv)***

*Any number to power zero is* ***1*** *except zero.*

***(v)***

*Any number raised with a negative power, is the reciprocal of the number with*

*a positive power.*

***∴*** 

***(vi)*** 

*The square root of any number is that number raised to power* *a half.*

***(vii)*** 

*The* ***nth*** *root of any number is that number raised to power* 

***∴*** 

***(viii)***  *implies that* 

***(ix)*** 

***EXAMPLES:***

***1.*** *Write the following expanded forms in index form****:***

**(i)** 

**(ii)** 

**(iii)** 

**(iv)** 

***2.*** *Write each of the following index forms in expanded form****:***

**(i)** 

**(ii)** 

**(iii)** 

**3*.*** *Write the following numbers in index form using base* ***2:***

**(i) 8**

**(ii) 32**

**(iii) 16**

**(iv) 64**

**4*.*** *Find the value of the following index forms****:***

**(i)** 

**(ii)** 

**(iii)** 

**(iv)** 

**(v)** 

**(vi)** 

**(vii)** 

**(viii)** 

**(ix)** 

**5.** Simplify the following**:**

**(i)** 

**(ii)** 

**(iii)** 

**(iv)** 

**(v)** 

**(vi)** 

**6.** Without using a calculator**,** simplify the following:

**(i)** 

**(ii)** 

**(iii)** 

**(iv)** 

**(v)** 

**(vi)** 

**(vii)** 

**(viii)** 

**(ix)** 

**(x)** 

**(xi)** 

**7.** Solve for ***x*** and ***y*** in the following equations**:**

**(i)** 

**(ii)** 

**8.** Solve for ***y*** in the following equations**:**

**(i)**  

**(ii)**  

**(iii)**  

**(iv)** 

**(v)** 

**(vi)** 

**(vii)** 

**(viii)** 

**(ix)** 

**(x)** 

**(vi)** 

**(vii)** 

***EER***

***1.*** *Simplify the following****:***

***(i)*** **

***(ii)*** **

***(iii)*** **

***(iv)*** **

***2.*** *Without using a calculator, evaluate****:*****

***3.*** *Without using a calculator****,*** *simplify* 

***4.*** *Solve for* ***x*** *and* ***y*** *in the equation****:*** **

***5.*** *Without using a calculator****,*** *simplify *

***6.*** *If*  *find the value of* 

***7.*** *If*  *find the value of* 

***8.*** *Without using a calculator****,*** *simplify *

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

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

***(iii)***  ** ***(vi)***  **

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

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

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

***11.*** *Solve for* ***x*** *and* ***y*** *in the equations****:***

**

***12.*** *If* ***x = 32,***  *find the value of *

***13.*** *Given that  express* ***p*** *in terms of* ***x*** *and* ***y***

***14.*** *Given that*  *and*  *solve for* ***x*** *and* ***y***

***15.*** *Given that* ***a = −2*** *and* ***b = 2,*** *find the value of* 

***16.*** *Without using a calculator or tables****,*** *evaluate****:*** **

***17.*** *Without using a calculator or tables****,*** *evaluate****:*** **

***STANDARD FORM***

***Summary:***

***1.*** *Standard form is a way of expressing a number in the form*  *where*  *and* ***n*** *is an integer*

***2. (i)*** *To express a number in standard form, we shift the decimal point until the digit part* ***A*** *is between* ***1*** *and* ***10.*** *This digit* ***A*** *has a decimal point placed after the first digit.*

***(ii)*** *The power part*  *shows how many places to move the decimal point*

***3.*** *The rules of indices apply to calculations in**standard form*

***EXAMPLES:***

***1.*** *Express the following numbers in standard form****:***

***(i) 25000 (ii) 3860 (iii) 568⋅3 (iv) 74⋅8 (v) 3⋅584 (vi) 4000***

***(vii) 0⋅435 (viii) 0⋅000263 (ix) 0⋅007 (x) 0⋅00356 (xi)*** 

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

***(xv)***  ***(xvi)*** 

***2.*** *By**expressing each of the numbers in standard form, evaluate the following****:***

***(i) 0⋅0004 × 0⋅002 (ii) 0⋅005 × 0⋅00004 (iii) 800000 × 0⋅0005***

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

***3.*** *By**expressing each of the numbers in the form*  *where* ***n*** *is even****,*** *evaluate the following****:***

***(i)*** ** ***(ii) 0⋅02 × 0⋅0015 (iii) 1500 × 40000***

***4.*** *By**expressing each of the numbers in the form*  *where* ***n*** *is even****,*** *find**the square root of****:***

***(i) 0⋅25 × 0⋅64 (ii) 0⋅16 × 0⋅09 (iii) 0⋅0036 × 0⋅25 (iv) 0⋅0081 × 0⋅0004***

***5.*** *Without using a calculator, evaluate the following give your answer in standard form****:***

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

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

***6.*** *Without using a calculator or tables, evaluate****:*** **

***7.*** *Without using a calculator or tables, evaluate****:*** **

***EER:***

***1.*** *Without using a calculator, evaluate****:*** **

***2.*** *Without using a calculator, evaluate****:*** **

***2.*** *Without using a calculator, evaluate****:*****

***3.*** *Without using a calculator, evaluate****:*** **

***4.*** *Without using a calculator, evaluate****:*** ***give your answer in the form* *where*  *and* ***n*** *is an integer*

***4.***

*mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm*