Lesson 7

7.1 REVISION

PART ONE

Question 1
Find the value of the following sums

$(-3) + 7 =$

$(-6) - (-5) =$

$(-3) \times (-6) =$

$(-12) \div 4 =$

$(-9) \div (-3) =$

$(-16) \div 8 + (-3) =$

Question 2
Find the value of the following without using a calculator;

$2^5 \quad =$ $8^{\frac{1}{3}} \quad =$

$4^3 \quad =$ $131^1 \quad =$

$7^{-1} \quad =$ $1^{57} \quad =$

$9^{-2} \quad =$ $67^0 \quad =$

$16^{\frac{1}{2}} \quad =$ $25^{\frac{3}{2}} \quad =$

Question 3

Simplify the following, giving your answer in index form;

$2^7 \times 2^8 =$ $\qquad$ $11^{13} \div 11^{-5} =$

$5^8 \div 5^2 =$ $\qquad$ $(3^7)^{10} =$

$13^4 \times 13^5 =$ $\qquad$ $(7^5)^{-3} =$

Question 4

Given $a = 3$, $b = 10$ and $c = -2$, evaluate the following;

$b + 2a$ $\qquad$ a^2b

$5b - 3c$ $\qquad$ $\dfrac{b}{a - c}$

Question 5

Simplify the following algebraic expressions

$7x + 3x - 4x =$ $\qquad$ $5(h - 4) + 12 =$

$7x - 4y - 3x - 8y =$ $\qquad$ $2x^5 \times 5x^3 =$

$4(u + 6) + 9 =$ $\qquad$ $10m^9 \div 5m^{-2} =$

PART TWO

Question 1
Write in prime index form, p^m, for some prime p.

(i)

$7 \times 7 \times 7 \times 7 \times 7$

(ii)

$$\frac{5 \times 5 \times 5 \times 5 \times 5 \times 5}{5 \times 5}$$

(iii)

$\sqrt{3 \times 3 \times 3 \times 3 \times 3 \times 3}$

(iv)

$$\frac{13 \times 13 \times 13}{13 \times 13 \times 13 \times 13}$$

Question 2
Write in prime index form, p^m, for some prime p.

(i)

$7^6 \times 7^8$

(ii)

$5^7 \times 5^3 \times 5^6$

(iii)

$13^8 \times 13$

(iv)

$\sqrt{17^8}$

(v)

$$\frac{11^9}{11^4}$$

(vi)

$\left(19^4\right)^6$

(vii)

9

(viii)

9^5

Question 3

Write in index form;

(i)

$7 \times 5 \times 5 \times 7 \times 7$

(ii)

$$\frac{5 \times 2 \times 2 \times 2 \times 5 \times 5}{5 \times 5}$$

(iii)

$\sqrt{3 \times 3 \times 3 \times 3 \times 23 \times 23}$

(iv)

$$\frac{17 \times 13 \times 13 \times 13 \times 13 \times 13}{17 \times 13 \times 13 \times 13}$$

Question 4

Write in prime index form, $p^{\,m}$, for some prime p.

(i)

$3^5 \times 3^4 \times 3^2 \times 3^6$

(ii)

$13^7 \times 13^3 \times 13^0$

(iii)

$17^8 \times \left(17^5 \right)^5$

(iv)

$\sqrt{11^8 \times 11^{10}}$

(v)

$$\frac{\left(5^6 \right)^3}{\left(5^2 \right)^4}$$

(vi)

$\left(29^8 \right)^{\frac{1}{2}}$

(vii)

$\sqrt{\sqrt{7^{20}}}$

(viii)

$\left(\left(5^3 \right)^4 \right)^3$

Question 5
Simplify;

(i)

$$p^{15} \times p^5 \times p^2 \times p^8$$

(ii)

$$\frac{p^{17}}{p^5}$$

(iii)

$$\left(p^4\right)^5 \times p^3$$

(iv)

$$\sqrt{p^6}$$

(v)

$$\frac{\left(p^{16}\right)^2}{p}$$

(vi)

$$p^0$$

(vii)

$$\left(\frac{p^{19}}{p^{11}}\right)^2$$

(viii)

$$p^8 \div p^2$$

Question 6
Write in prime index form, p^m, for some prime, p.

(i)

$$8$$

(ii)

$$8 \times 4$$

(iii)

$$9^5$$

(iv)

$$9^3 \times 3^3$$

Question 7

Write in prime index form, $p^m q^n$, for some primes, p and q.

(i)

    12

(ii)

    $12^7 \times 2^3$

(iii)

    $12^8 \times 4^4$

(iv)

    $12^5 \times 6^3$

Question 8

(a)   Write 40 as a product of primes.

(b)   Hence, or otherwise, write in prime index form, $p^m q^n$, where p and q are prime numbers, the value of;

$$40^6 \times 6^5$$

Question 9

Write in prime index form, p^m, for some prime, p.

(i)

$$\frac{1}{5 \times 5 \times 5}$$

(ii)

$$\frac{7 \times 7}{7 \times 7 \times 7 \times 7}$$

(iii)

$$\frac{1}{13}$$

(iv)

$$\frac{2}{8}$$

Question 10
Write in prime index form, p^m, for some prime p.

(i)

$$11^7 \times 11^{-3}$$

(ii)

$$5^{-7} \times 5^3$$

(iii)

$$19^{-8} \times \left(19^4\right)^5$$

(iv)

$$\sqrt{11^{-26}}$$

(v)

$$\frac{5^7}{5^9}$$

(vi)

$$\frac{11^{-23}}{11^5}$$

(vii)

$$\frac{\left(7^5\right)^3}{\left(7^6\right)^4}$$

(viii)

$$23^{-8} \times 23^{-7}$$

Question 11
Write in prime index form, p^m, for some prime p.

(i)

$$\frac{2^8 \times 2^7}{2^6 \times 2^3}$$

(ii)

$$\frac{2^{14} \times 2^{-5}}{2^4 \times 2^2}$$

(iii)

$$\frac{2^3 \times 2^6}{2^{-4}}$$

(iv)

$$\sqrt{\frac{2^{-23}}{2^{-5}}}$$

Question 12

Simplify;

(i)

$$p^{13} \times p^{-3} \times p^{7} \times p^{-2}$$

(ii)

$$\frac{p^{-14}}{p^{4}}$$

(iii)

$$\left(p^{-4}\right)^{5} \times p^{13}$$

(iv)

$$\sqrt{p^{-56}}$$

(v)

$$\frac{\left(p^{16}\right)^{-2}}{p^{40}}$$

(vi)

$$\sqrt{p^{2}}$$

(vii)

$$\left(\frac{p^{19}}{p^{-11}}\right)^{2}$$

(viii)

$$\left(p^{-5}\right)^{-8}$$

Question 13

Write in prime index form, $p^{m} q^{n}$, for some primes, p and q.

(i)

$$\left(2^{5} \times 3^{2}\right)^{4}$$

(ii)

$$\left(2^{7} \times 5^{-3}\right)^{6}$$

(iii)

$$\left(\sqrt{5^{8}} \times \sqrt{7^{6}}\right)^{4}$$

(iv)

$$\left(6^{3} \times 4^{2}\right)^{3}$$