

Lesson 7

GCSE (Year 9) Mathematics Index Form

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;

$$2^5 =$$

$$8^{\frac{1}{3}} =$$

$$4^3 =$$

$$131^1 =$$

$$7^{-1} =$$

$$1^{57} =$$

$$9^{-2} =$$

$$67^0 =$$

$$16^{\frac{1}{2}} =$$

$$25^{\frac{3}{2}} =$$

Question 3

Simplify the following, giving your answer in index form;

$$2^7 \times 2^8 =$$

$$11^{13} \div 11^{-5} =$$

$$5^8 \div 5^2 =$$

$$(3^7)^{10} =$$

$$13^4 \times 13^5 =$$

$$(7^5)^{-3} =$$

Question 4

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

$$b + 2a$$

$$a^2b$$

$$5b - 3c$$

$$\frac{b}{a - c}$$

Question 5

Simplify the following algebraic expressions

$$7x + 3x - 4x =$$

$$5(h - 4) + 12 =$$

$$7x - 4y - 3x - 8y =$$

$$2x^5 \times 5x^3 =$$

$$4(u + 6) + 9 =$$

$$10m^9 \div 5m^{-2} =$$

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)

$$(19^4)^6$$

(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 4Write 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)

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

(iv)

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

(v)

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

(vi)

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

(vii)

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

(viii)

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

Question 5

Simplify;

(i)

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

(ii)

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

(iii)

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

(iv)

$$\sqrt{p^6}$$

(v)

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

(vi)

$$p^0$$

(vii)

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

(viii)

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

Question 6Write 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 10Write in prime index form, p^m , for some prime p .**(i)**

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

(ii)

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

(iii)

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

(iv)

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

(v)

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

(vi)

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

(vii)

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

(viii)

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

Question 11Write 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)

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

(iv)

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

(v)

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

(vi)

$$\sqrt{p^2}$$

(vii)

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

(viii)

$$(p^{-5})^{-8}$$

Question 13

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

(i)

$$(2^5 \times 3^2)^4$$

(ii)

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

(iii)

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

(iv)

$$(6^3 \times 4^2)^3$$

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