Answer ALL TWENTY TWO questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write down the value of m, given that $3^4 \times 3^5 = 3^m$

$m =$ .....

(1)

(b) Write down the value of n, given that $(5^3)^7 = 5^n$

$n =$ .....

(1)

(c) Find the value of p, given that $\dfrac{7^8 \times 7^2}{7^p} = 7^6$

$p =$ .....

(2)

(Total for Question 1 is 4 marks)

2

(a) Expand and simplify $(y + 4)(2 - y)$

.....

(2)

(b) Factorise fully $15b^5c - 35b^3c^9$

.....

(2)

(Total for Question 2 is 4 marks)

3 (a) Expand and simplify $3(c - 7) + 2(3c + 4)$

.....

(2)

(b) Expand and simplify $(x + 7)(x - 2)$

.....

(2)

(c) Factorise fully $28y^2 - 21y$

.....

(2)

(d) Solve $\frac{7x - 2}{4} = 3x + 1$

Show clear algebraic working.

$x =$.....

(3)

(Total for Question 3 is 9 marks)

4 (a) Factorise fully $15y^4 + 20uy^3$

.....

(2)

(b) Solve $4 - 3x = \dfrac{5 - 8x}{4}$

Show clear algebraic working.

$x =$ .....

(3)

(Total for Question 4 is 5 marks)

5 (a) Write down the value of x^0

.....

(1)

Given that $2^{-3} \times 2^9 = 2^n$

(b) find the value of n

$n =$ .....

(1)

Given that $\dfrac{7^{206} \times 7^m}{7^{214}} = 7^{-3}$

(c) find the value of m

$m =$ .....

(2)

(Total for Question 5 is 4 marks)

6 (a) Make c the subject of $A = \frac{c}{y} - 5z$

.....

(2)

(b) Write down the value of g^0

.....

(1)

(c) Factorise $x^2 - 11x + 24$

.....

(2)

(Total for Question 6 is 5 marks)

7 (a) Solve $5(4 - x) = 7 - 3x$
Show clear algebraic working.

$x =$ .....

(3)

(b) Factorise fully $16m^3g^3 + 24m^2g^5$

.....

(2)

(c) (i) Factorise $y^2 - 2y - 48$

.....

(2)

(ii) Hence, solve $y^2 - 2y - 48 = 0$

.....

(1)

(Total for Question 7 is 8 marks)

8 $-4 \leqslant 2y < 6$

y is an integer.

(a) Write down all the possible values of y.

.....

(2)

(b) Solve the inequality $7t - 3 \leqslant 2t + 31$

Show your working clearly.

.....

(2)

(Total for Question 8 is 4 marks)

9 (a) Simplify $(3x^2y)^0$

.....

(1)

(b) (i) Factorise $x^2 - 5x - 36$

.....

(2)

(ii) Hence solve $x^2 - 5x - 36 = 0$

.....

(1)

(Total for Question 9 is 4 marks)

10 (a) Simplify $(2x^3y^5)^4$

.....

(2)

(b) (i) Factorise $x^2 + 5x - 36$

.....

(2)

(ii) Hence, solve $x^2 + 5x - 36 = 0$

.....

(1)

(Total for Question 10 is 5 marks)

11 (a) Factorise fully $25a^4c^7d + 45a^9c^3h$

.....

(2)

(b) Solve $(2x + 5)^2 = (2x + 3)(2x - 1)$

$x =$ .....

(3)

(Total for Question 11 is 5 marks)

12 $\sqrt{2} \times 16 = 2^x$

(a) Find the value of x.
Show your working clearly.

$x =$ .....

(2)

$$\frac{(11^{-6})^5}{11^4} = 11^n$$

(b) Find the value of n.
Show your working clearly.

$n =$ .....

(2)

(Total for Question 12 is 4 marks)

13 (a) Simplify $(64p^9q^{12})^{\frac{2}{3}}$

.....

(2)

(b) Write as a single fraction $\frac{2}{3x} + \frac{4}{5x} - \frac{9}{10x}$

Give your answer in its simplest form.

.....

(2)

(c) Expand and simplify $4x(x - 5)(2x + 3)$
Show your working clearly.

.....

(3)

(Total for Question 13 is 7 marks)

14 Expand and simplify $4x(3x + 1)(2x - 3)$
Show your working clearly.

.....

(Total for Question 14 is 3 marks)

15 (a) Simplify fully $\left(16x^8y^6\right)^{\frac{1}{2}}$

(2)

(b) Solve $\frac{8-2x}{3}-\frac{2x-3}{2}=4$

Show clear algebraic working.

$x =$

(3)

(c) Make f the subject of $m=\sqrt{\frac{1}{3}ef}$

(2)

(Total for Question 15 is 7 marks)

16 Given that $n > 0$

make n the subject of the formula $y = \dfrac{n^2 + d}{n^2}$

.....

(Total for Question 16 is 4 marks)

§7 Make t the subject of $n^2 = \dfrac{4d + t^3}{t^3}$

.....

(Total for Question 17 is 4 marks)

18 $\frac{8}{2^7} = 2^n$

(a) Find the value of n.

$n =$ .....

(2)

$(13^{-6})^4 \times 13^5 = 13^k$

(b) Find the value of k.

$k =$ .....

(2)

(Total for Question 18 is 4 marks)

19 (a) Simplify n^0

(1)

(b) Simplify $(3x^2y^5)^3$

(2)

(c) Factorise fully $2e^2 - 18$

(2)

(d) Make r the subject of $m = \sqrt{\dfrac{6a + r}{5r}}$

(4)

(Total for Question 19 is 9 marks)

20 Simplify fully $\left(\frac{9t^4w^9}{18t^6w^{10}}\right)^{-2}$

.....

(Total for Question 20 is 3 marks)

21 Simplify fully $\left(\frac{9x^4}{16y^{10}}\right)^{-\frac{1}{2}}$

.....

(Total for Question 21 is 3 marks)

22

Express $\frac{5}{3} - \frac{x+2}{2x}$ as a single fraction in its simplest terms.

(Total for Question 22 is 3 marks)