LAWS OF INDICES

Answer all of these questions. Remember to show your working out in all questions.

MAIN QUESTIONS

1.

Simplify $2^3 \times 2^4$

> 2^7

2.

Simplify $5^6 \div 5^2$

> 5^4

3.

Simplify $(3^2)^3$

> 3^6

4.

Simplify 4^0

> 1

5.

Simplify 7^{-2}

> 1/49

6.

Simplify 8^(1/3)

> 2

7.

Simplify 16^(3/4)

> 8

8.

Simplify 9^(-1/2)

> 1/3

9.

Simplify $(2x^3)^4$

> $16x^{12}$

10.

Simplify $(3a^2b)^3$

> $27a^6b^3$

11.

Simplify $(5x^{-2})^2$

> $25/x^4$

12.

Simplify $(2y^3)/(4y^5)$

> $1/(2y^2)$

13.

Simplify $(8x^6)$^(2/3)

> $4x^4$

14.

Simplify $(27a^9)$^(1/3)

> $3a^3$

15.

Simplify $(16x^8)^{(3/4)}$

> $8x^6$

16.

Simplify $(x^2y^4)^{(1/2)}$

> xy^2

17.

Simplify $(a^{-3}b^2)/(a^2b^{-1})$

> b^3/a^5

18.

Simplify $(4x^{-2}y^3)^2$

> $16y^6/x^4$

19.

Simplify $(9a^4b^{-2})^{(1/2)}$

> $3a^2/b$

20.

Simplify $(8x^{-3})^{(2/3)}$

> $4/x^2$

21.

Simplify $(25a^6b^{-4})^{(1/2)}$

> $5a^3/b^2$

22.

Simplify $(x^4y^{-2})^{(3/2)}$

> x^6/y^3

23.

Simplify $(16a^{-8})^{(3/4)}$

> $8/a^6$

24.

Simplify $(27x^{-9})^{(2/3)}$

> $9/x^6$

25.

Simplify $(a^2b^{-3}c^4)/(a^{-1}b^2c^{-3})$

> a^3c^7/b^5

26.

Simplify $(8x^{-6}y^9)^{(2/3)}$

> $4y^6/x^4$

27.

Simplify $(32a^{10}b^{-5})^{(2/5)}$

> $4a^4/b^2$

28.

Simplify $(64x^{-12})^{(1/3)}$

> $4/x^4$

29.

Simplify $(81a^{-8}b^{12})^{(3/4)}$

> $27b^9/a^6$

30.

Simplify $(125x^{-9}y^6)^{(2/3)}$

> $25y^4/x^6$

MASTER QUESTIONS

M1.

A bacteria culture doubles every hour. If there are 1000 bacteria initially, how many will there be after 6 hours?

64000

M2.

The area of a square is $64cm^2$. What is the length of one side?

8cm

M3.

A radioactive substance halves every 3 hours. If you start with 800g, how much remains after 12 hours?

50g

M4.

The volume of a cube is $125cm^3$. What is the length of one edge?

5cm

M5.

A population of rabbits triples every month. If there are 4 rabbits initially, how many will there be after 5 months?

972

M6.

The surface area of a sphere is proportional to the square of its radius. If a sphere has surface area $144\pi\ cm^2$, what is its radius?

6cm

M7.

An investment grows by 10% each year. If you invest £1000, what will it be worth after 4 years?

£1464.10

M8.

The intensity of light decreases with the square of the distance from the source. If the intensity is 100 units at 2m, what is it at 5m?

16 units

M9.

A car depreciates by 15% each year. If a car is worth £20000 new, what will it be worth after 3 years?

£12282.50

M10.

The period of a pendulum is proportional to the square root of its length. If a 1m pendulum has a period of 2 seconds, what length gives a period of 3 seconds?

2.25m