



## YouTube Live Lessons

Getting ready for A-Level Maths...

*"We are what we repeatedly do.  
Excellence is not an act, but a habit."*



## Laws of indices (2)

Getting ready for A-Level Maths...

What you need...

- Your brain and attention
- A device to watch connected to internet
- A pen and paper
- Can do attitude

# Laws of indices (2)

## Important rules

$$a^1 = a$$

$$a^0 = 1$$

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = \frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$(ka^m)^n = k^n a^{mn}$$

$$a^{-m} = \frac{1}{a^m}$$

$$a^{\frac{1}{m}} = \sqrt[m]{a}$$

$$a^{\frac{n}{m}} = \sqrt[m]{a^n}$$

# Laws of indices (2)

## My turn

Evaluate:

$$64^{\frac{1}{3}}$$

## Your turn

Evaluate:

$$169^{\frac{1}{2}}$$

# Laws of indices (2)

## My turn

Evaluate:

$$16^{\frac{5}{4}}$$

## Your turn

Evaluate:

$$27^{\frac{2}{3}}$$

# Laws of indices (2)

## My turn

Evaluate:

$$81^{-\frac{3}{4}}$$

## Your turn

Evaluate:

$$36^{-\frac{3}{2}}$$

# Laws of indices (2)

## My turn

Evaluate:

$$\left(\frac{64}{125}\right)^{-\frac{2}{3}}$$

## Your turn

Evaluate:

$$\left(\frac{32}{243}\right)^{-\frac{3}{5}}$$

# Laws of indices (2)

## My turn

Express the following in the form  $x^n$ .

$$\sqrt[3]{x^5}$$

## Your turn

Express the following in the form  $x^n$ .

$$\sqrt[6]{x^7}$$



# Laws of indices (2)

## My turn

Express the following in the form  $x^n$ .

$$\frac{\sqrt[5]{x}}{x}$$

## Your turn

Express the following in the form  $x^n$ .

$$\frac{\sqrt[3]{x}}{x^2}$$

# Laws of indices (2)

## My turn

Express the following in the form  $ax^n$ , where  $a$  is an integer.

$$\left(\frac{2}{\sqrt[7]{x}}\right)^5$$

Exam Q

## Your turn

Express the following in the form  $ax^n$ , where  $a$  is an integer.

$$\left(\frac{3}{\sqrt[9]{x}}\right)^4$$

Exam Q

# Laws of indices (2)

## My turn

Express  $7^{\frac{5}{2}}$  in the form  $a\sqrt{b}$ , where  $a$  is an integer and  $b$  is a prime number.

Exam Q

## Your turn

Express  $5^{\frac{9}{2}}$  in the form  $a\sqrt{b}$ , where  $a$  is an integer and  $b$  is a prime number.

Exam Q

# Laws of indices (2)

## My turn

Simplify fully.

$$(8y^9)^{\frac{5}{3}}$$

Exam Q

## Your turn

Simplify fully.

$$(81y^8)^{\frac{3}{4}}$$

Exam Q

# Laws of indices (2)

## Review Exercise

1. Evaluate:

$$81^{\frac{1}{4}}$$

2. Evaluate:

$$36^{\frac{3}{2}}$$

3. Evaluate:

$$64^{-\frac{2}{3}}$$

4. Evaluate:

$$\left(\frac{81}{256}\right)^{-\frac{3}{4}}$$

5. Express the following in the form  $x^n$ .

$$\sqrt[7]{x^3}$$

6. Express the following in the form  $x^n$ .

$$\frac{\sqrt[4]{x}}{x}$$

7. Express the following in the form  $ax^n$ , where  $a$  is an integer.

$$\left(\frac{4}{\sqrt[5]{x}}\right)^3$$

8. Express  $5^{\frac{7}{2}}$  in the form  $a\sqrt{b}$ , where  $a$  is an integer and  $b$  is a prime number.

9. Simplify fully.

$$(32y^{10})^{\frac{6}{5}}$$

# Laws of indices (2)

## Review Exercise (Answers)

1. Evaluate:

$$81^{\frac{1}{4}} \quad 3$$

2. Evaluate:

$$36^{\frac{3}{2}} \quad 216$$

3. Evaluate:

$$64^{-\frac{2}{3}} \quad \frac{1}{16}$$

4. Evaluate:

$$\left(\frac{81}{256}\right)^{-\frac{3}{4}} \quad \frac{64}{27} \text{ or } 2\frac{10}{27}$$

5. Express the following in the form  $x^n$ .

$$\sqrt[7]{x^3} \quad x^{\frac{3}{7}}$$

6. Express the following in the form  $x^n$ .

$$\frac{\sqrt[4]{x}}{x} \quad x^{-\frac{3}{4}}$$

7. Express the following in the form  $ax^n$ , where  $a$  is an integer.

$$\left(\frac{4}{\sqrt[5]{x}}\right)^3 \quad 64x^{-\frac{3}{5}}$$

8. Express  $5^{\frac{7}{2}}$  in the form  $a\sqrt{b}$ , where  $a$  is an integer and  $b$  is a prime number.

$$125\sqrt{5}$$

9. Simplify fully.

$$(32y^{10})^{\frac{6}{5}} \quad 64y^{12}$$