hegartymaths

YouTube Live Lessons

Getting ready for A-Level Maths...

"We are what we repeatedly do.

Excellence is not an act, but a habit."

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Laws of indices (1)

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 (1)

Important rules

$$a^1 = a$$

$$a^0 = 1$$

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

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

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

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

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

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

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

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

$$a^{-\frac{n}{m}} = \frac{1}{\sqrt[m]{a^n}} = \frac{1}{(\sqrt[m]{a})^n}$$

Laws of indices (1)

My turn

Evaluate:

3^{-4}

Your turn

Evaluate:

2^{-4}

Laws of indices (1)

My turn

Write as a fraction.

t^{-9}

Your turn

Write as a fraction.

t^{-12}

Laws of indices (1)

My turn

Write as a fraction.

$7r^{-4}$

Your turn

Write as a fraction.

$10r^{-9}$

Laws of indices (1)

My turn

Simplify the following, leaving your answer in index form:

$(r^{-6})^4$

Your turn

Simplify the following, leaving your answer in index form:

$(r^8)^{-4}$

Laws of indices (1)

My turn

Simplify the following, writing your answer as a fraction:

$(3r^{-6})^4$

Your turn

Simplify the following, writing your answer as a fraction:

$(4r^{-8})^3$

Laws of indices (1)

My turn

Simplify the following, writing your answer as a fraction:

$$(3r^{-6})^{-4}$$

Your turn

Simplify the following, writing your answer as a fraction:

$$(4r^{-8})^{-3}$$

Laws of indices (1)

My turn

Simplify the following, writing your answer as a fraction:

$$(2r^4t^{-5})^7$$

Your turn

Simplify the following, writing your answer as a fraction:

$$(3rt^{-8})^4$$

Laws of indices (1)

My turn

Simplify the following:

$5t^2 \times 7t^{-3} \times t$

Your turn

Simplify the following:

$4t^6 \times 9t^{-5} \times t$

Laws of indices (1)

My turn

Simplify the following, leaving your answer in index form:

$$\frac{18r^{-8}}{6r^{-2}}$$

Your turn

Simplify the following, leaving your answer in index form:

$$\frac{36r^{-12}}{9r^{-16}}$$

Laws of indices (1)

My turn

Simplify.

$$\left(\frac{a^{-2}b^{3}}{c^{4}}\right)^{3}$$

Your turn

Simplify.

$$\left(\frac{a^{-5}b^{2}}{c^{6}}\right)^{4}$$

Laws of indices (1)

Review Exercise

1. Evaluate 4^{-3}.

2. Write as a fraction: t^{-7}

3. Write as a fraction: $6r^{-5}$

4. Simplify the following, leaving your answer in index form:
$(r^{-7})^{6}$

5. Simplify the following, writing your answer as a fraction:
$(5r^{-9})^{3}$

6. Simplify the following, writing your answer as a fraction:
$(6r^{-8})^{-3}$

7. Simplify the following, writing your answer as a fraction:
$(2r^{5}t^{-7})^{6}$

8. Simplify the following, leaving your answer in index form:
$3t^{6} \times 8t^{-4} \times t$

9. Simplify the following, leaving your answer in index form:

$$\frac{24r^{-14}}{4r^{-5}}$$

10. Simplify.

$$\left(\frac{a^{-3}b^{4}}{c^{6}}\right)^{5}$$

Laws of indices (1)

Review Exercise (Answers)

1. Evaluate 4^{-3}.

$\frac{1}{64}$

2. Write as a fraction: t^{-7}

$\frac{1}{t^7}$

3. Write as a fraction: $6r^{-5}$

$\frac{6}{r^5}$

4. Simplify the following, leaving your answer in index form:
$(r^{-7})^6$

r^{-42}

5. Simplify the following, writing your answer as a fraction:
$(5r^{-9})^3$

$\frac{125}{r^{27}}$

6. Simplify the following, writing your answer as a fraction:
$(6r^{-8})^{-3}$

$\frac{r^{24}}{216}$

7. Simplify the following, writing your answer as a fraction:
$(2r^5t^{-7})^6$

$\frac{64r^{30}}{t^{42}}$

8. Simplify the following, leaving your answer in index form:
$3t^6 \times 8t^{-4} \times t$

$24t^3$

9. Simplify the following, leaving your answer in index form:

$$\frac{24r^{-14}}{4r^{-5}}$$

$6r^{-9}$

10. Simplify.

$$\left(\frac{a^{-3}b^4}{c^6}\right)^5$$

$\frac{b^{20}}{a^{15}c^{30}}$