Outcome 2 – More Laws of Indices

Bronze examples...

Examples...

When removing a bracket with indices...you MULTIPLY the powers.

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

Write each of the following in their simplest index form...

$(x^4)^3 = x^4 \times x^4 \times x^4 = x^{12}$

$(x^7)^8 = x^{56}$

$(4x^5)^2 = 16x^{10}$

$(7x^2)^9 = 40\,353\,607\,x^{18}$

Silver examples

Examples...

ANYTHING to the power of zero is 1!

$a^0 = 1$

Write down the value of...

$b^0 = 1$ $\quad 4^0 = 1$

Rewrite the following with negative indices...

$\frac{1}{x} = x^{-1}$

$\frac{1}{x^4} = x^{-4}$ $\quad \frac{1}{2^4} = 2^{-4}$

Rewrite the following with positive indices...

$x^{-2} = \frac{1}{x^2}$ $\quad 3^{-5} = \frac{1}{3^5}$

Gold examples

Examples...

$a^{\frac{1}{2}} = \sqrt{a}$

$a^{\frac{1}{3}} = \sqrt[3]{a}$

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

Write down the value of...

$36^{\frac{1}{2}} = \sqrt{36} = 6$

$100^{\frac{1}{2}} = \sqrt{100} = 10$

$8^{\frac{1}{3}} = \sqrt[3]{8} = 2$

$16^{\frac{3}{2}} = \sqrt{16^3} = 4^3 = 64$

$1^{\frac{4}{5}} = \sqrt[5]{1^4} = 1^4 = 1$

Bronze Questions

Write each of the following in their simplest index form...

1. $(x^6)^5$
2. $(u^4)^9$
3. $(q^7)^{11}$
4. $(k^3)^{10}$
5. $(6e^4)^2$
6. $(2g^8)^3$
7. $(2y^7)^5$
8. $(4w^{10})^3$
9. $(4h^4)^4$
10. $(5b^5)^8$

Silver Questions

Write down the value of...

1. s^0
2. 9^0

Rewrite the following with negative indices...

3. $\frac{1}{g^6}$
4. $\frac{1}{8^2}$

Rewrite the following with positive indices...

5. t^{-8}
6. 4^{-2}

Gold Questions

Write down the value of...

1. $25^{\frac{1}{2}}$
2. $144^{\frac{1}{2}}$
3. $1^{\frac{1}{3}}$
4. $1000^{\frac{1}{3}}$
5. $81^{\frac{3}{4}}$
6. $125^{\frac{2}{3}}$

Bronze Answers

1. x^{30}
2. u^{36}
3. q^{77}
4. k^{30}
5. $36e^{8}$
6. $8g^{24}$
7. $32y^{35}$
8. $64w^{30}$
9. $256h^{16}$
10. $390\,625b^{40}$

Silver Answers

1. 1
2. 1
3. g^{-6}
4. 8^{-2}
5. $\frac{1}{t^8}$
6. $\frac{1}{4^2}$

Gold Answers

1. 5
2. 12
3. 1
4. 10
5. 27
6. 25