Year 8 Integers, Powers and Roots – Challenge

ANSWER KEY HappyKids.fit

Answers and worked solutions · 8 questions

A. Think like a mathematician

1. No. Counter-example: $0^2 = 0$, which is not positive (the square is never negative, though).

Test some examples
Counter-example: $0^2 = 0$, which is not positive (the square is never negative, though).
Decide whether it is always true

2. Yes. Three negatives multiply to a negative, e.g. $(-2)^3 = -8$.

Test some examples
Three negatives multiply to a negative, e.g. $(-2)^3 = -8$.
Decide whether it is always true

3. Yes. Any integer n can be written as the fraction n/1, e.g. −4 = −4/1.

Test some examples
Any integer n can be written as the fraction n/1, e.g. −4 = −4/1.
Decide whether it is always true

4. $10^0 = 1$: for example $10^2 \div 10^2 = 10^0$ and it also equals 1.

Error: a power of 0 is not 0
$10^2 \div 10^2 = 10^0$ by the index law
Any number divided by itself is 1, so the answer is 1

5. $(-9)^2 = (-9) \times (-9) = 81$; a negative times a negative is positive.

Error: the sign was kept negative
$(-9) \times (-9)$
$= 81$

6. 4, −8, 16, −32; positive when n is even

$(-2)^2 = 4$, $(-2)^3 = -8$
$(-2)^4 = 16$, $(-2)^5 = -32$
The sign alternates: positive for even powers

7. −39 °C; 26 degrees colder

$-13 \times 3 = -39$ °C
$-13 - (-39) = 26$ degrees

8. 12, −10, 25/5

Natural numbers: 1, 2, 3, … (positive whole numbers). Integers: whole numbers, including 0 and negatives
Rational numbers: any number that can be written as a fraction, so every integer is rational