Year 9 Indices and Surds – Developing

ANSWER KEY HappyKids.fit

Answers and worked solutions · 10 questions

A. Use indices and surds

1. 5.6

$5.5^2 = 30.25$ and $5.6^2 = 31.36$, so $\sqrt{31}$ is between 5.5 and 5.6

$5.55^2 = 30.8025$, which is less than 31, so $\sqrt{31} \approx 5.6$

2. 5.3

$5.2^2 = 27.04$ and $5.3^2 = 28.09$, so $\sqrt{28}$ is between 5.2 and 5.3

$5.25^2 = 27.5625$, which is less than 28, so $\sqrt{28} \approx 5.3$

3. $n = -8$

Add the indices: $3 + n = -5$

$n = -5 - 3 = -8$

4. $n = -2$

$100 = 10^2$, so $1/100 = 10^{-2}$

$n = -2$

5. $\sqrt[3]{70}$, $\sqrt{19}$, 4.6, 14/3

Estimate each value as a decimal

$\sqrt{19} \approx 4.36$; $4.6 \approx 4.60$; $\sqrt[3]{70} \approx 4.12$; $14/3 \approx 4.67$

Then put them in order

6. between 7 and 8 m

Edge = $\sqrt[3]{370}$; $7^3 = 343$ and $8^3 = 512$

So the edge is between 7 and 8 m

7. 18.8 m

$18.7^2 = 349.69$ and $18.8^2 = 353.44$

$18.75^2 = 351.5625$, so the side $\approx$ 18.8 m

8. 1/3

A negative index means the reciprocal: $3^{-1} = 1/3^1$

$= 1/3$

9. $3 + \sqrt{5}$, $\sqrt{11}$

Irrational numbers cannot be written as a fraction of two integers

Square roots of non-square numbers, cube roots of non-cubes and π are irrational

10. Add the indices: $3^4 \times 3^{-3} = 3^1$.

Error: the indices were multiplied

Add them: $4 + (-3) = 1$

$= 3^1$