

Boost Free Lessons - Year 10 Maths

Lesson 10: Fractional Indices

Name: _____ Grade: _____ Date: _____

Worked Example 1

Evaluate $25^{1/2}$

1. An index of $\frac{1}{2}$ means take the square root: $a^{1/2} = \sqrt{a}$.
2. So $25^{1/2} = \sqrt{25}$.
3. $\sqrt{25} = 5$, because $5 \times 5 = 25$.

= 5

Worked Example 2

Evaluate $8^{2/3}$

1. The rule is $a^{m/n} = (\text{the } n\text{-th root of } a), \text{ all raised to the power } m$.
2. The **bottom** of the fraction is the root and the **top** is the power.
3. Take the root first to keep the numbers small: the cube root of 8 is 2.
4. Now raise that to the power 2: $2^2 = 4$.

= 4

Remember: $a^{1/n}$ means the n -th root of a . In $a^{m/n}$ the bottom is the root and the top is the power. Take the root first, because it keeps the numbers much smaller.



Question 1: Evaluate the following.

1. $9^{1/2}$

2. $16^{1/2}$

3. $64^{1/2}$

4. $27^{1/3}$

5. $8^{1/3}$

6. $125^{1/3}$

7. $100^{1/2}$

8. $81^{1/2}$

9. $1000^{1/3}$

10. $49^{1/2}$



Question 2: Evaluate the following.

1. $4^{3/2}$

2. $9^{3/2}$

3. $8^{2/3}$

4. $16^{3/4}$

5. $27^{2/3}$

6. $25^{3/2}$

7. $32^{2/5}$

8. $64^{2/3}$



Question 3: Answer the following questions.

1. Evaluate $36^{1/2} + 8^{1/3}$.
2. Write $\sqrt{x}$ as a power of x .
3. Write the cube root of x^2 using a fractional index.
4. Evaluate $16^{1/2} \times 16^{1/2}$.
5. Evaluate $4^{-1/2}$.





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Answers: Fractional Indices**Question 1**

- | | |
|------|-------|
| 1. 3 | 6. 5 |
| 2. 4 | 7. 10 |
| 3. 8 | 8. 9 |
| 4. 3 | 9. 10 |
| 5. 2 | 10. 7 |

Question 2

- | | |
|-------|--------|
| 1. 8 | 5. 9 |
| 2. 27 | 6. 125 |
| 3. 4 | 7. 4 |
| 4. 8 | 8. 16 |

Question 3

1. 8
2. $x^{1/2}$
3. $x^{2/3}$
4. 16
5. $\frac{1}{2}$

