# Year 8 Integers, Powers and Roots – Mixed Practice

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Answers and worked solutions · 30 questions

## A. Mixed practice (mixed order)

**1.** $5^8$

Same base, so add the indices: 4 + 4 = 8

$= 5^8$

**2.** −6

Brackets first (including the part under a root sign), then indices and roots

Then × and ÷, then + and −

= −6

**3.** n = 9

Indices add when multiplying: 5 + n = 14

n = 9

**4.** −532

Ignore the signs: 38 × 14 = 532

Different signs give a negative: −532

**5.** $3^6$

Same base, so add the indices: 4 + 2 = 6

$= 3^6$

**6.** 169

(−13) × (−13)

Negative × negative is positive: 169

**7.** −3

$(-3)^3 = -27$

So $\sqrt[3]{(-27)} = -3$

**8.** $(-6)^2 = (-6) \times (-6) = 36$; a negative times a negative is positive.

Error: the sign was kept negative

(−6) × (−6)

= 36

**9.** 116

$4^2 = 16$, $13^0 = 1$, $10^2 = 100$

= 116

**10.** No. Counter-example: 3/4 is rational but not an integer.

Test some examples

Counter-example: 3/4 is rational but not an integer.

Decide whether it is always true

**11. –25 and 25**

$-5^2$ means $-(5 \times 5) = -25$
$(-5)^2 = (-5) \times (-5) = 25$

**12. –559**

Ignore the signs: $43 \times 13 = 559$
Different signs give a negative: –559

**13. 12, 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

**14. n = 14**

Indices add when multiplying: $2 + n = 16$
$n = 14$

**15. 70**

Brackets first (including the part under a root sign), then indices and roots
Then × and ÷, then + and –
= 70

**16. 24 m: a length cannot be negative, so we take the positive square root**

$\text{Side}^2 = 576$
$\sqrt{576} = 24$ (the other square root, –24, is not a length)

**17. –8**

$(-2) \times (-2) \times (-2)$
Three negatives multiply to a negative: –8

**18. $7^1$**

Same base, so subtract the indices: $10 - 9 = 1$
$= 7^1$

**19. 29**

Brackets first (including the part under a root sign), then indices and roots
Then × and ÷, then + and –
= 29

**20. 0**

$\sqrt[3]{512} = 8$ and $\sqrt[3]{(-512)} = -8$
$8 + (-8) = 0$

**21. 5**

$2^3 = 8$, $7^0 = 1$, $2^2 = 4$
= 5

**22. 1, −1, 1, −1; $(-1)^n = 1$ when n is even and −1 when n is odd**

Each extra factor of −1 changes the sign
Even numbers of negatives give a positive
Odd numbers of negatives give a negative

**23. −988**

Ignore the signs: 26 × 38 = 988
Different signs give a negative: −988

**24. 8 and −8**

8 × 8 = 64
(−8) × (−8) = 64 too

**25. No. The base stays 2: $2^3 \times 2^4 = 2^7 = 128$, but $4^7 = 16\,384$.**

Test some examples
The base stays 2: $2^3 \times 2^4 = 2^7 = 128$, but $4^7 = 16\,384$.
Decide whether it is always true

**26. n = 7**

Indices subtract when dividing: 16 − n = 9
n = 7

**27. $10^4$**

Add, then subtract the indices: 2 + 3 − 1 = 4
$= 10^4$

**28. 12, 5, 7**

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

**29. $(-7)^2 = (-7) \times (-7) = 49$; a negative times a negative is positive.**

Error: the sign was kept negative
(−7) × (−7)
= 49

**30. −30 °C; 15 degrees colder**

−15 × 2 = −30 °C
−15 − (−30) = 15 degrees