

Indices

Part A Practice with Integers

Work out the value of the following indices.

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

Part B Tricky base numbers

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|----------------------|-------------|-----------------------|----------------------|-------------|
| 1. $(\frac{1}{2})^3$ | 2. $(-4)^2$ | 3. $(0.5)^3$ | 4. $(\frac{3}{4})^2$ | 5. $(-2)^6$ |
| 6. $(0.2)^4$ | 7. $(-3)^3$ | 8. $(-\frac{1}{4})^2$ | 9. $(-0.1)^2$ | 10. 0^3 |

Part C Negative indices

Remember, you should expect most of your answers to be fractions.

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|--------------------------|-----------------|------------------|--------------------------|-----------------|
| 1. 4^{-2} | 2. 9^{-2} | 3. 4^{-3} | 4. 5^{-1} | 5. 2^{-7} |
| 6. 10^{-1} | 7. 4^{-1} | 8. 8^{-3} | 9. 1^{-11} | 10. 0^5 |
| 11. $(\frac{1}{2})^{-2}$ | 12. $(-4)^{-1}$ | 13. $(0.5)^{-4}$ | 14. $(\frac{3}{4})^{-3}$ | 15. $(-2)^{-3}$ |

Part D Equations

Work out the value of x in the equations below.

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|----------------------------------|--------------------------|----------------------------|---------------------------------------|
| 1. $49 = 7^x$ | 2. $25 = x^2$ | 3. $121 = 11^x$ | 4. $400 = x^2$ |
| 5. $\frac{1}{4} = \frac{1}{2}^x$ | 6. $\frac{1}{4} = 2^x$ | 7. $\frac{1}{8} = x^{-3}$ | 8. $1/49 = x^{-2}$ |
| 9. $36 = 2^2 \times 3^x$ | 10. $250 = 2 \times 5^x$ | 11. $88 = 11^1 \times 2^x$ | 12. $200 = 2^x \times 5^2$ |
| 13. $999 = 37^1 \times 3^x$ | 14. $1024 = 2^x$ | 15. $343 = 7^x$ | 16. $480 = 2^x \times 3^1 \times 5^1$ |

Part E Square roots and other fractional indices

Calculate the following:

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|-------------------|--------------------|--------------------|--------------------|------------------|
| 1. $4^{1/2}$ | 2. $27^{1/3}$ | 3. $64^{1/2}$ | 4. $64^{1/3}$ | 5. $1000^{1/3}$ |
| 6. $125^{1/3}$ | 7. $81^{1/2}$ | 8. $81^{1/4}$ | 9. $900^{1/2}$ | 10. $8000^{1/3}$ |
| 11. $8^{2/3}$ | 12. $16^{3/4}$ | 13. $100^{3/2}$ | 14. $49^{3/2}$ | 15. $9^{5/2}$ |
| 16. $(1/4)^{1/2}$ | 17. $(0.01)^{1/2}$ | 18. $(0.36)^{1/2}$ | 19. $(9/16)^{1/2}$ | 20. $(-8)^{1/3}$ |

Indices Answers

Part A Practice with Integers

Work out the value of the following indices.

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|----------|--------|--------|--------|----------|
| 1. 8 | 2. 81 | 3. 27 | 4. 125 | 5. 64 |
| 6. 10000 | 7. 256 | 8. 343 | 9. 256 | 10. 3125 |

Part B Tricky base numbers

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|------------------|--------|-------------------|-------------------|-------|
| 1. $\frac{1}{8}$ | 2. 16 | 3. 0.125 | 4. $\frac{9}{16}$ | 5. 64 |
| 6. 0.0016 | 7. -27 | 8. $\frac{1}{16}$ | 9. 0.01 | 10. 0 |

Part C Negative indices

Remember, you should expect most of your answers to be fractions.

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|-------------------|--------------------|--------------------|---------------------|--------------------|
| 1. $\frac{1}{16}$ | 2. $\frac{1}{81}$ | 3. $\frac{1}{64}$ | 4. $\frac{1}{5}$ | 5. $\frac{1}{128}$ |
| 6. $\frac{1}{10}$ | 7. $\frac{1}{4}$ | 8. $\frac{1}{512}$ | 9. 1 | 10. 0 |
| 11. 4 | 12. $-\frac{1}{4}$ | 13. 16 | 14. $\frac{64}{27}$ | 15. $-\frac{1}{8}$ |

Part D Equations

Work out the value of x in the equations below.

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|-------|--------|-------|-------|
| 1. 2 | 2. 5 | 3. 2 | 4. 20 |
| 5. 2 | 6. -2 | 7. 2 | 8. 7 |
| 9. 2 | 10. 3 | 11. 3 | 12. 3 |
| 13. 3 | 14. 10 | 15. 3 | 16. 5 |

Part E Square roots and other fractional indices

Calculate the following:

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|-------------------|---------|----------|-------------------|---------|
| 1. 2 | 2. 3 | 3. 8 | 4. 4 | 5. 10 |
| 6. 5 | 7. 9 | 8. 3 | 9. 30 | 10. 20 |
| 11. 4 | 12. 8 | 13. 1000 | 14. 343 | 15. 243 |
| 16. $\frac{1}{2}$ | 17. 0.1 | 18. 0.6 | 19. $\frac{3}{4}$ | 20. -2 |