Introduction to Scientific Notation

Explore ideas and representations

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

Scientific notation has the form $a \times 10^n$ with $1 \le a < 10$ for positive values. $720 = 7.2 \times 10^2$ and $0.072 = 7.2 \times 10^{-2}$. A negative exponent means a small positive number, not a negative measurement.

Worked example

Write 0.0635 in scientific notation.

1. Shift the decimal two places right to get 6.35, a coefficient between 1 and 10.
2. Compensate with two factors of $1/10$: $10^{-2} = 0.01$.
3. Check $6.35(0.01) = 0.0635$.
Answer: 6.35×10^{-2}.

Practice Problems

Show your thinking.

1. Write 42000 in scientific notation. Show the first value as a sum of place values.

2. Write $\frac{13}{2} \times 10^{-3}$ as an ordinary decimal. If this value is in meters, convert it to millimeters.

3. Write 800000 in scientific notation. Find the ratio of the first value to 10^5 in the same units.

4. Write $\frac{5}{4} \times 10^{-4}$ as an ordinary decimal. Recover the exponent from the ordinary value when the coefficient is fixed at 1.25.

5. Write 3100 in scientific notation. Give the ordinary values when the first value is divided and multiplied by 10.

6. Write 9×10^{-2} as an ordinary decimal. Compare the ordinary numerical value with 0.1 and find the difference.

7. Signal record: write 2700000 in scientific notation.

8. Distance marker: write 4.8×10^{-5} as an ordinary decimal.

9. Balance check: find integer q in $6.25 \times 10^q = 625$.

10. Reference scale: write 0.012 in scientific notation.

Answer Key

1. $4.2 \times 10^4 = 42000$.
$4.2(10000) = 4(10000) + 2(1000) = 42000$.
2. $6.5 \times 10^{-3} = 0.0065$. $0.0065(1000) = 6.5$ mm.
3. $8 \times 10^5 = 800000$. Ratio $(8 \times 10^5)/10^5 = 8$.
4. $1.25 \times 10^{-4} = 0.000125$. $0.000125/1.25 = 0.0001 = 10^{-4}$, so exponent -4.
5. $3.1 \times 10^3 = 3100$. $3100/10 = 310$ and $3100(10) = 31000$.
6. $9 \times 10^{-2} = 0.09$. $0.1 - 0.09 = 0.01$; the value is smaller by 0.01.
7. $2.7 \times 10^6 = 2700000$.
8. $4.8 \times 10^{-5} = 0.000048$.
9. $q = 2$.
10. $1.2 \times 10^{-2} = 0.012$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. 42000 lies from 10^4 up to, but not including, 10^5.
2. Divide by the chosen power: $42000/10000 = 4.2$.
3. Thus the normalized form is 4.2×10^4.
4. $4.2(10000) = 4(10000) + 2(1000) = 42000$.

Problem 2

1. The coefficient 6.5 satisfies $1 \le 6.5 < 10$.
2. $10^{-3} = 0.001$; multiply by 6.5 to obtain 0.0065.
3. Check: $0.0065 \div (0.001) = 6.5$.
4. $0.0065(1000) = 6.5$ mm.

Problem 3

1. 800000 lies from 10^5 up to, but not including, 10^6.
2. Divide by the chosen power: $800000/100000 = 8$.
3. Thus the normalized form is 8×10^5.
4. Ratio $(8 \times 10^5)/10^5 = 8$.

Problem 4

1. The coefficient 1.25 satisfies $1 \le 1.25 < 10$.
2. $10^{-4} = 0.0001$; multiply by 1.25 to obtain 0.000125.
3. Check: $0.000125 \div (0.0001) = 1.25$.
4. $0.000125/1.25 = 0.0001 = 10^{-4}$, so exponent -4.

Problem 5

1. 3100 lies from 10^3 up to, but not including, 10^4.
2. Divide by the chosen power: $3100/1000 = 3.1$.
3. Thus the normalized form is 3.1×10^3.
4. $3100/10 = 310$ and $3100(10) = 31000$.

Problem 6

1. The coefficient 9 satisfies $1 \le 9 < 10$.
2. $10^{-2} = 0.01$; multiply by 9 to obtain 0.09.
3. Check: $0.09 \div (0.01) = 9$.
4. $0.1 - 0.09 = 0.01$; the value is smaller by 0.01.

Problem 7

1. Start with 2700000. Shift the decimal left until the coefficient is at least 1 and less than 10.
2. That takes 6 places and leaves 2.7. Compensate with 10^6 to restore the original value.
3. Check: $2.7 \times 10^6 = 2.7(1000000) = 2700000$.

Problem 8

1. $10^{-5} = 0.00001$.
2. $4.8(0.00001) = 0.000048$.
3. The coefficient 4.8 is at least 1 and less than 10, so 4.8×10^{-5} is normalized.

Problem 9

1. Divide the given value by its coefficient:
$10^q = 625 \div 6.25 = 100$.
2. $100 = 10^2$, so the required exponent is $q = 2$.
3. Check: $6.25 \times 10^2 = 625$.

Problem 10

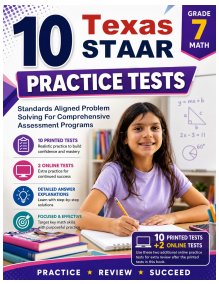
1. Start with 0.012. Shift the decimal right until the coefficient is at least 1 and less than 10.
2. That takes 2 places and leaves 1.2. Compensate with 10^{-2} to restore the original value.
3. Check: $1.2 \times 10^{-2} = 1.2(0.01) = 0.012$.

TESTINAR

Keep Building Grade 7 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 7 books



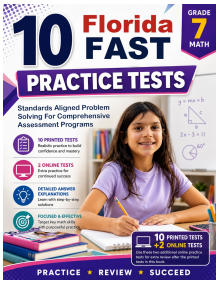
TEXAS STAAR

10 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook



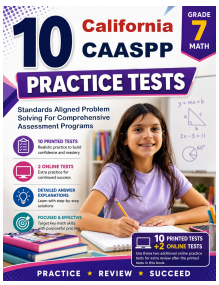
FLORIDA FAST

10 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook



CALIFORNIA CAASPP

10 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 7 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/7