

Grade 8 · Scientific Notation · Worksheet

Answer Key

Common Core 8.EE.A.3, 8.EE.A.4 · mathovore.fr

This answer key gives every step for the 25 problems on the scientific notation worksheet (8.EE.A.3 and 8.EE.A.4). Use it to check the exponent, the coefficient and the units in each answer, and to see how a coefficient of 10 or more is fixed.

Grade 8 Common Core: 8.EE.A.3 · 8.EE.A.4

Problem 1: Thousands

Move the decimal point 3 places left to get 5. So 5,000 is 5 times 10^3 .

$$5 \times 10^3$$

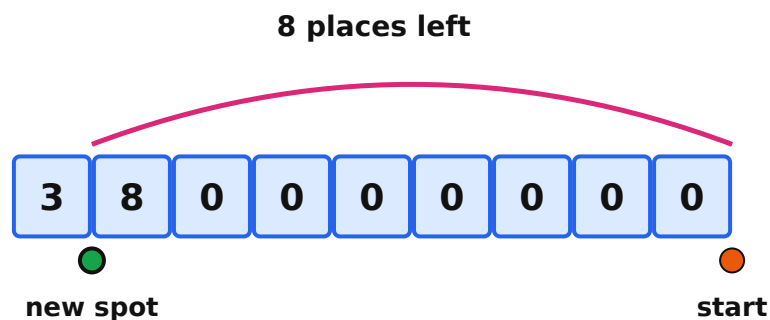
Problem 2: Ten thousands

Move the point 4 places left to get 7.2. Check: 7.2 times 10,000 is 72,000.

$$7.2 \times 10^4$$

Problem 3: A very large number

Place the point after the 3: 3.8. Count the places from the end of the number: 8.



$$3.8 \times 10^8$$

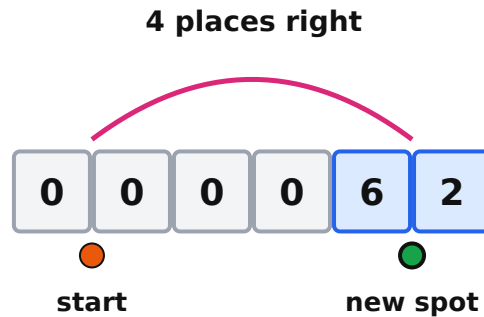
Problem 4: A small number

Move the point 4 places right to get 4. The number is less than 1, so the exponent is negative.

$$4 \times 10^{-4}$$

Problem 5: Small number with two digits

The point moves 4 places right to sit after the 6, giving 6.2. The number is less than 1, so the exponent is -4 .



The point moves 4 places right.

$$6.2 \times 10^{-4}$$

Problem 6: Standard form

The exponent 5 moves the point 5 places right: 3.5 becomes 350000 after filling with zeros.

350,000

Problem 7: Negative exponent to decimal

The exponent -3 moves the point 3 places left: 0.0081.

0.0081

Problem 8: Millions

Move the point 6 places right: 2.04 becomes 2,040,000.

2,040,000

Problem 9: Tiny decimal

The first nonzero digit, 7, is in the seventh decimal place. Move the point 7 places right to get 7.05.

$$7.05 \times 10^{-7}$$

Problem 10: Compare two numbers

The exponents are 5 and 6. The larger exponent gives the larger number. Check: 420,000 is less than 3,900,000.

$$4.2 \times 10^5 < 3.9 \times 10^6$$

Problem 11: Order small numbers

Compare exponents: $-4 < -3 < -2$. The values are 0.00099, 0.0061 and 0.025.

$$9.9 \times 10^{-4}, 6.1 \times 10^{-3}, 2.5 \times 10^{-2}$$

Problem 12: How many times as much?

Divide: $\frac{6 \times 10^8}{3 \times 10^5} = \frac{6}{3} \times 10^{8-5} = 2 \times 10^3$.

2,000 times as large (2×10^3)

Problem 13: Small numbers: how many times

$\frac{9 \times 10^{-2}}{3 \times 10^{-5}} = 3 \times 10^{-2-(-5)} = 3 \times 10^3$. Check: 0.09 divided by 0.00003 is 3,000.

3,000 times as large

Problem 14: Multiply

Multiply the coefficients: $3 \cdot 2 = 6$. Add the exponents: $4 + 3 = 7$.

$$6 \times 10^7$$

Problem 15: Multiply and fix

$4 \cdot 5 = 20$ and $5 + (-2) = 3$, so the product is 20×10^3 . The coefficient must be less than 10: $20 \times 10^3 = 2 \times 10^4$. Check: 400,000 times 0.05 is 20,000.

$$2 \times 10^4$$

Problem 16: Divide

$8.4 \div 2.1 = 4$ and $7 - 3 = 4$.

$$4 \times 10^4$$

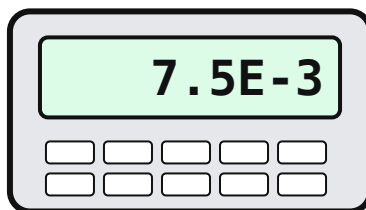
Problem 17: Add

Rewrite 4.8×10^5 as 0.48×10^6 . Then $0.48 + 3.7 = 4.18$.

$$4.18 \times 10^6$$

Problem 18: Calculator notation

$3.2\text{E}5$ means 3.2×10^5 : move the point 5 places right to get 320,000. $7.5\text{E}-3$ means 7.5×10^{-3} : move the point 3 places left to get 0.0075.



Second display.

$$320,000 = 3.2 \times 10^5; 0.0075 = 7.5 \times 10^{-3}$$

Problem 19: Miles to feet

Multiply: $2450 \cdot 5280 = 12936000$ ft, or 12,936,000 ft. Move the point 7 places left: 1.2936.

$$1.2936 \times 10^7 \text{ feet}$$

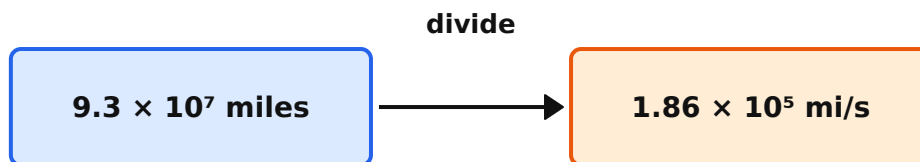
Problem 20: Population comparison

Divide: $\frac{3 \times 10^8}{2.5 \times 10^5} = 1.2 \times 10^3$ because $3 \div 2.5 = 1.2$ and $8 - 5 = 3$.

1,200 times as large

Problem 21: Sunlight to Earth

Time = distance $\div$ speed: $\frac{9.3 \times 10^7}{1.86 \times 10^5} = 5 \times 10^2$ seconds, since $9.3 \div 1.86 = 5$.



Divide distance by speed.

500 seconds is 8 minutes and 20 seconds.

$$5 \times 10^2 \text{ seconds, or 8 min 20 s}$$

Problem 22: Stack of paper

Multiply: $(4 \times 10^{-3})(5 \times 10^3) = 20 \times 10^0 = 2 \times 10^1$. Check: 5,000 sheets at 0.004 inch each is 20 inches.

2×10^1 inches

Problem 23: Photos on a tablet

Divide: $\frac{6.4 \times 10^{10}}{4 \times 10^6} = 1.6 \times 10^4$, because $6.4 \div 4 = 1.6$ and $10 - 6 = 4$.

1.6×10^4 photos (16,000)

Problem 24: Snail on a trail

Distance = rate $\times$ time: $(2 \times 10^{-3})(4 \times 10^2) = 8 \times 10^{-1}$.

8×10^{-1} mile, which is 0.8 mile

Problem 25: Earth and Moon

$\frac{1.3 \times 10^{25}}{1.6 \times 10^{23}} = 0.8125 \times 10^2 = 81.25$. Rounded, that is 81.

About 81 times as heavy