

New

PIONEERS
GRADED

MATHS



Book 6

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Place Value and Powers of Ten

You can use exponents to write very large and very small numbers as power of 10.

$$10^5 = 10 \times 10 \times 10 \times 10 \times 10 = 100,000$$

$$10^{-4} = \frac{1}{10 \times 10 \times 10 \times 10} = \frac{1}{10,000} = 0,00001$$

You can use power of 10 to write numbers in expanded form.

$$48,369 = (4 \times 10^4) + (8 \times 10^3) + (3 \times 10^2) + (6 \times 10^1) + (9 \times 10^0)$$

$$0.018 = (1 \times 10^{-2}) + (8 \times 10^{-3})$$

Write each number in expanded form, using powers of 10.

7,000

43,000,000

0.00028

48,002

Write each number in standard form.

$$(6 \times 10^2) + (7 \times 10^0)$$

$$(2 \times 10^{-4}) + (2 \times 10^{-3})$$

$$(7 \times 10^5) + (9 \times 10^2) + (4 \times 10^{-2})$$

$$(5 \times 10^{-3}) + (7 \times 10^{-4}) + (1 \times 10^{-2})$$

Patterns: Find a pattern in each sequence of numbers. Use your pattern to find the missing terms.

$$10^1, 10^3, 10^5, \underline{\quad}, \underline{\quad}, \underline{\quad},$$

$$2^{-1}, 4^{-3}, 6^{-5}, \underline{\quad}, \underline{\quad}, \underline{\quad},$$

Compare and Order Numbers

Different Ways to Compare Numbers

You can use a number line.



Since 0.35 is to the right of 0.345,

$$0.35 > 0.345.$$

You can compare digits.

Align the decimal points. Compare digits from left to right until they are different.

$$\begin{array}{r} 0.35 \\ 0.345 \end{array} \quad \begin{array}{l} 5 > 4 \\ 0.35 > 0.345 \end{array}$$

Compare. Write $>$, $<$, or $=$ for each

$0.09 \quad \text{○} \quad 0.090$

$30.583 \quad \text{○} \quad 3.0583$

$45,298,402 \quad \text{○} \quad 45,299,204$

Order from least to greatest.

$1,245,735 \quad 12,245,735 \quad 124,735 \quad 0.0037 \quad 0.307 \quad 0.037$

Round and Estimate Numbers

Different Ways to Estimate Sums and Differences

Use front-end estimation.

Add (or subtract) the digits in the greatest place.

$$\begin{array}{r} 8.59 \\ + \underline{6.25} \\ \hline 14 \end{array}$$

Adjust.

Look at the digits in the next greatest place.

$$\begin{array}{r} 8.59 \\ + \underline{6.25} \\ \hline 14.7 \end{array}$$

Use rounding rules.

Round to the nearest whole number. Then add (or subtract).

$$\begin{array}{r} 8.59 \longrightarrow 9 \\ + \underline{6.25} \longrightarrow + \underline{6} \\ \hline 15 \end{array}$$

Round each number to the underlined place.

$245,\underline{9}58,873$

$197.47\underline{3}2$

$22.0\underline{8}96$

Estimate each sum or , difference. Identify the method you used.

$8.21 - 5.33$

$7.09 + 3.54 + 4.21$



Add and Subtract Whole Numbers and Decimals

Find $54.2 + 315.6$.

$$\begin{array}{r} 54.2 \\ + 315.6 \\ \hline 369.8 \end{array}$$

Align the decimal points.

Find $15.72 - 6.4$.

$$\begin{array}{r} 15.72 \\ - 6.40 \\ \hline 9.32 \end{array}$$

Find $3,851 + 38$.

$$\begin{array}{r} 3,851 \\ + 38 \\ \hline 3,889 \end{array}$$

Align the digits by place value.

Find each sum or difference. Show your work.

$1.4572 - 0.731$

$4.697 + 8.29$

$14,659 + 925$

$4,157 + 1,790$

$2.067 - 1.15$

$179.2 + 14.85$

$51.64 - 7.9$

Variables and Expressions

Phrase	6 less than 19 increased by 3.6
Numerical Expression	$19 - 6 + 3.6$
Phrase	The sum of 13 and 8 decreased by 9
Algebraic Expression	$13 + 8 - 9$

Write a numerical expression to represent each phrase.

11 more than 6.2 plus 5

9 less than 14.6 increased by 8

7 less than 55 increased by 23

3.5 more than 42 decreased by 15

6.4 less than 12 plus 17

7.6 more than 9 increased by 2.3

Choose the expression that correctly represents each situation.

The total number of points scored by Team **A** was 96. Team **B** scored **W** points. How many more points did Team **A** score?

(Team **A** was the winner)

a $96 + w$

b $96 - w$

c $w - 96$

Sara invited 14 friends to her party. She also invited **S** people from her family. How many people did she invite in all?

a $14 - S$

b $S - 14$

c $S + 14$

Use Addition Properties

Commutative Property $8 + 3 = 3 + 8$

$$a + b = b + a$$

Associative Property $(6 + 7) + 2 = 6 + (7 + 2)$ $(a + b) + c = a + (b + c)$

Identity Property $5 + 0 = 5$

$$a + 0 = a$$

Estimate. Identify the property or properties you used.

$$5.63 + 0 + 11$$

$$45 + 9.4 + 55$$

$$72 + (a + 19),$$

given $a = 28$

$$28 + 59 + c$$

given $c = 12$

$$31 + b + 44,$$

given $b = 0$

$$26 + s + 64,$$

given $s = 5$

$$78.1 + m + 1.9$$

given $m = 3$

Use $>$, $<$, or $=$ to make each statement true.

$$9.3 + (14 + 3.6) \bigcirc (9.3 + 14) + 3.6$$

$$(16.8 + 23) + 4 \bigcirc 18.6 + (23 + 4)$$

$$87 + b + 42 \bigcirc 87 + b + 24$$

Estimate Products and Quotients

Ways to Estimate 39×53

Round to Greatest Place

$$\begin{array}{r} 39 \\ \times 53 \\ \hline \end{array} \qquad \begin{array}{r} 40 \\ \times 50 \\ \hline 2,000 \end{array}$$

Round Up to Overestimate

$$\begin{array}{r} 39 \\ \times 53 \\ \hline \end{array} \qquad \begin{array}{r} 40 \\ \times 60 \\ \hline 2,400 \end{array}$$

Use Front-end Estimation to Underestimate

$$\begin{array}{r} 39 \\ \times 53 \\ \hline \end{array} \qquad \begin{array}{r} 30 \\ \times 50 \\ \hline 1,500 \end{array}$$

Estimate $5,237 \div 64$ using compatible numbers.

Underestimate

$$\begin{array}{r} 80 \\ 60 \overline{)5000} \end{array}$$

$$\begin{array}{r} ? \\ 64 \overline{)5,237} \end{array}$$

Overestimate 70

$$\begin{array}{r} 70 \overline{)5,000} \end{array}$$

Estimate each product or quotient. Identify the method you used.

56×82

$19 \overline{)785}$

58×657

$32 \overline{)1,566}$

512×87

$84 \overline{)5,585}$

616×279

$24 \overline{)4,850}$

691×525

$47 \overline{)2,754}$

$8,298 \times 53$

$53 \overline{)5,581}$

Multiply Whole Numbers

Find 56×36

Step 1

Multiply by the ones digit. Regroup if necessary.

$$\begin{array}{r} 3 \\ 56 \\ \times 36 \\ \hline 336 \end{array}$$

Step 2

Multiply by the tens digit. Regroup if necessary.

$$\begin{array}{r} 14 \\ 56 \\ \times 36 \\ \hline 336 \\ 1680 \end{array}$$

Step 3

Add the partial products.

$$\begin{array}{r} 1 \\ 56 \\ \times 36 \\ \hline 336 \\ 1680 \\ \hline 2016 \end{array}$$

Find each product. Estimate to see if your answer is reasonable. Show your work.

$$\begin{array}{r} 57 \\ \times 48 \\ \hline \end{array}$$

$$\begin{array}{r} 39 \\ \times 62 \\ \hline \end{array}$$

$$\begin{array}{r} 245 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 496 \\ \times 53 \\ \hline \end{array}$$

$$\begin{array}{r} 391 \\ \times 255 \\ \hline \end{array}$$

$$\begin{array}{r} 662 \\ \times 124 \\ \hline \end{array}$$

$$\begin{array}{r} 3,755 \\ \times 732 \\ \hline \end{array}$$

$$2,583 \times 39$$

$$838 \times 134$$

$$3,502 \times 85$$

Order of Operations

Order of Operations

1. Always do operations in the parentheses first.
2. Rewrite any exponents.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

Evaluate. Indicated the order of operations you performed.

$6 + 7 \times 9$ _____

$5^2 \times 4 \div 2 - (8 - 3)$ _____

Evaluate each expression, given $q = 3$, $r = 5$, and $s = 9$.

$s \div (q + 0)$

$q \times s \div q$

$r^2 - (s + q)$

$(q \times r) + s^2 \div q$

$r \times s - q \times r$

$q + (s - r)^2$

Insert parentheses to make each pair of expressions equal.

$4 + 3^2 = 49$

$6 \times 10 - 7 \times 5 = 90$

$100 \div 4 \times 8 - 3 = 125$

$4 \times 7 + 5 - 8 = 40$