

4th Grade Math Diagnostic — Units 4–5

Suggested time: 60 minutes. Answer every question on your own. No calculator, Khan Academy, hints, or answer checking. Show your work for multi-digit multiplication and division.

Unit 4 — Multiply by 2-Digit Numbers

1. Multiplying multiples of 10 and 100

Use basic facts and place-value patterns to multiply.

a. $30 \times 40 =$

1200

b. $70 \times 80 =$

5600

c. $50 \times 600 =$

30000

d. Fill in the missing number: $90 \times \boxed{60} = 5,400$

e. Explain why $50 \times 60 = 3,000$ ends in three zeros instead of two zeros.

because 5×6 is thirty plus the two zero that will be three zero because 30 has one more 0 add all together that will be 3000

2. Estimating products with 2-digit numbers

Estimate products by rounding numbers to the nearest ten.

a. Estimate 48×32 by rounding each number to the nearest ten.

48 rounds to:

50

32 rounds to:

30

Estimated product:

1500

b. A farmer packs 68 apples in each crate. She has 21 crates. Estimate the total number of apples by rounding both numbers to the nearest ten.

$70 \times 20 = 1400$

c. Is your estimate of $70 \times 20 = 1,400$ an overestimate or an underestimate of the exact number of apples ($68 \times 21 = 1,428$)? Explain why.

68 rounds up to 70 that's greater than 68

3. Area models for 2-digit multiplication

The area model represents $34 \times 27 = (30 + 4) \times (20 + 7)$.

$\times$	30	4
20	Box A (20 $\times$ 30)	Box B (20 $\times$ 4)
7	Box C (7 $\times$ 30)	Box D (7 $\times$ 4)

a. Find each partial area.

Box A:

600

Box B:

80

Box C:

210

Box D:

28

b. Add all 4 partial areas to find the total product of 34×27 .

918

4. Partial products & the break-apart rule

Multiply 53×46 by breaking apart both numbers: $(50 + 3) \times (40 + 6)$.

Find the 4 partial products:

$$\text{Ones} \times \text{Ones}: 3 \times 6 =$$

18

$$\text{Tens} \times \text{Ones}: 50 \times 6 =$$

300

$$\text{Ones} \times \text{Tens}: 3 \times 40 =$$

120

$$\text{Tens} \times \text{Tens}: 50 \times 40 =$$

2000

e. Add all 4 partial products to find the final product.

2438

5. Standard multiplication algorithm

Multiply vertically using the standard algorithm:
 64×38 .

$$\begin{array}{r} 64 \\ \times 38 \\ \hline \end{array}$$

a. Row 1: Multiply 64 by the ones digit (64×8):

512

b. Row 2: Multiply 64 by the tens digit (64×30 , with placeholder 0 in the ones place):

1800

c. Row 3: Add both rows together to find the final product:

2432

6. Multi-step multiplication word problems

The 4th-grade class is planning a field trip to the science museum. There are **4 classrooms**, and

each classroom has **24 students**. Each museum ticket costs **\$15**.

a. Step 1: How many students are going on the trip in total?

96

b. Step 2: What is the total cost for all students' museum tickets?

\$ 1440

c. Step 3: The school set aside a total trip budget of **\$1,600**. After paying for all tickets, how much money is left over for bus transportation?

\$ 160

Unit 5 — Division

7. Division with remainders and checking work

Find the quotient and remainder for each division problem.

a. $38 \div 5$

Quotient:

7

Remainder:

3

b. $53 \div 7$

Quotient:

7

Remainder:

4

c. Write the check equation (using multiplication and addition) that proves your answer to part b is correct.

$$7 \times 7 = 49 + 4 = 53$$

d. Explain why the remainder can NEVER be 7 or greater when dividing by 7.

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8. Dividing multiples of 10, 100, and 1,000

Use basic division facts and place value patterns to divide.

a. $280 \div 7 =$

40

b. $3,600 \div 4 =$

900

c. $42,000 \div 6 =$

7000

d. Fill in the missing dividend: $\boxed{16} \div 5 = 800$

e. An art supplier packs 4,800 colored markers

equally into 8 large storage crates. How many markers are in each crate?

600

9. Estimating quotients with compatible numbers

Find friendly compatible numbers that divide easily to estimate each quotient.

a. Estimate $347 \div 5$:

Friendly number close to

347:

350

Estimated quotient:

70

b. Estimate $2,745 \div 9$:

Friendly number close to
2,745:

27000

Estimated quotient:

3000

c. Is $438 \div 6$ between 60 and 70, or between 70 and 80? Explain using multiplication.

60 70

10. Division area models & friendly chunks

The rectangle represents $156 \div 6$. It has a total area of 156 and height 6, split into two friendly chunks: **120** and **36**.