



LIGHTNING ARITHMETIC TRICKS

Multiply by 10, 100, or 1000



THE TRICK

Count the zeros, then attach them to the end!

$\times 10 \rightarrow$ attach 1 zero $\times 100 \rightarrow$ attach 2 $\times 1000 \rightarrow$ attach 3

No multiplying at all — just zooming digits into bigger places!

EXAMPLE 1: What is 47×10 ?

10 has one zero. Attach it: $47 \rightarrow 470$

$$47 \times 10 = 470$$

EXAMPLE 2: What is 36×1000 ?

1000 has three zeros. Attach all three: $36 \rightarrow 36,000$

$$36 \times 1000 = 36,000$$

Watch out: $60 \times 10 = 600$. Keep the zero 60 already had, then attach one more!

SUPER SPEED TIP: Zeros on BOTH sides? Collect them all!

Multiply the front numbers, then attach every zero from both sides:

40×300 ? Fronts: $4 \times 3 = 12$. Zeros: one + two = three.

12 with three zeros attached $\rightarrow 12,000$

$$40 \times 300 = 12,000. \text{ Lightning fast!}$$

WHY DOES IT WORK?

Multiplying by 10 slides every digit one place bigger: in 47×10 , the 4 tens become 4 hundreds and the 7 ones become 7 tens $\rightarrow 470$.

And $\times 100$ is just $\times 10$ twice, $\times 1000$ is $\times 10$ three times!



LIGHTNING ARITHMETIC TRICKS

$\times 10, 100, 1000$ — Practice!



YOUR TURN! Attach those zeros!

$8 \times 10 =$

$23 \times 10 =$

$60 \times 10 =$

$5 \times 100 =$

$41 \times 100 =$

$90 \times 100 =$

$7 \times 1000 =$

$32 \times 1000 =$

$300 \times 10 =$

$15 \times 100 =$

$44 \times 1000 =$

$200 \times 100 =$

SPEED ROUND: Zeros on both sides — collect them all!

$20 \times 30 =$

$400 \times 2 =$

$50 \times 60 =$

$700 \times 30 =$

$80 \times 500 =$

$900 \times 40 =$



LIGHTNING CHALLENGE

1. What is $2,500 \times 400$? (Hint: the answer is a very famous number!)
2. Multiply $10 \times 100 \times 1000$.

How many zeros does the answer have? _____



LIGHTNING ARITHMETIC TRICKS

Decimals $\times 10$, 100 , or 1000



THE TRICK

Count the zeros, then hop the decimal point that many places to the RIGHT! $\times 10 = 1$ hop $\times 100 = 2$ $\times 1000 = 3$

Hopping right makes the number BIGGER — just like attaching zeros!

EXAMPLE 1: What is 3.47×10 ?

10 has one zero, so hop once: $3.47 \rightarrow 34.7$

$$3.47 \times 10 = 34.7$$

EXAMPLE 2: What is 2.6×1000 ?

1000 has three zeros, so hop three times:

$2.6 \rightarrow 26. \rightarrow 260. \rightarrow 2600.$ (Zeros fill the empty spots!)

$$2.6 \times 1000 = 2,600$$

SUPER SPEED TIP: Every number has a decimal point!

Whole numbers hide their decimal point at the end: 47 is really 47.

So $47 \times 100 \rightarrow$ hop twice: $47. \rightarrow 470. \rightarrow 4700.$

$47 \times 100 = 4,700$ — the "attach zeros" trick is the SAME trick!

Attaching zeros and hopping the point are two views of one idea.

WHY DOES IT WORK?

Multiplying by 10 makes every digit worth ten times more, so each digit slides one place bigger. The digits and the point pass each other — digits sliding left looks exactly like the point hopping right!



LIGHTNING ARITHMETIC TRICKS

Decimals $\times$ 10, 100, 1000 — Practice!



YOUR TURN! Hop that decimal point!

$2.5 \times 10 =$

$6.14 \times 10 =$

$0.8 \times 10 =$

$3.9 \times 100 =$

$1.25 \times 100 =$

$0.07 \times 100 =$

$5.3 \times 1000 =$

$8.125 \times 1000 =$

$0.45 \times 1000 =$

$12.6 \times 10 =$

$0.309 \times 100 =$

$7.5 \times 1000 =$

SPEED ROUND: Watch out for sneaky zeros!

$0.001 \times 1000 =$

$4.05 \times 100 =$

$0.5 \times 10 =$

$9.99 \times 100 =$

$0.02 \times 1000 =$

$60.7 \times 10 =$



LIGHTNING CHALLENGE

1. A penny is \$0.01. How much money is 1,000 pennies?
2. MYSTERY NUMBER: My decimal point hopped 3 places and I became 4,250.

Who was I before the hops? _____



LIGHTNING ARITHMETIC TRICKS

Divide by 10, 100, or 1000



THE TRICK

Count the zeros, then hop the decimal point that many places to the LEFT! $\div 10 = 1$ hop $\div 100 = 2$ $\div 1000 = 3$

Hopping LEFT makes the number smaller — dividing is the undo button!

EXAMPLE 1: What is $470 \div 10$?

One zero, so hop once to the left: $470. \rightarrow 47.0$

$470 \div 10 = 47$ (it undoes $47 \times 10 = 470$!)

EXAMPLE 2: What is $26 \div 100$?

Two zeros, so hop twice. Remember 26 is really 26.

$26. \rightarrow 2.6 \rightarrow 0.26$ (A zero fills in at the front!)

$26 \div 100 = 0.26$

SUPER SPEED TIP: Run out of digits? Zeros to the rescue!

When the point hops past the front, zeros fill the empty spots:

$3.5 \div 100$? Hop twice: $3.5 \rightarrow 0.35 \rightarrow 0.035$

$3.5 \div 100 = 0.035$

Always write a zero before the point: 0.035, never just .035!

WHY DOES IT WORK?

Dividing by 10 makes every digit worth ten times LESS, so each digit slides one place smaller — which looks like the point hopping left.

Division undoes multiplication: $\times 10$ hops right, $\div 10$ hops back left!



LIGHTNING ARITHMETIC TRICKS

Divide by 10, 100, 1000 — Practice!



YOUR TURN! Hop left — and let zeros fill in!

$350 \div 10 =$

$4,700 \div 100 =$

$9,000 \div 1000 =$

$62 \div 10 =$

$5 \div 10 =$

$84 \div 100 =$

$7 \div 100 =$

$3.6 \div 10 =$

$45.9 \div 100 =$

$6,250 \div 1000 =$

$12.5 \div 10 =$

$500 \div 1000 =$

SPEED ROUND: Zeros fill in at the front!

$1,000 \div 1000 =$

$0.4 \div 10 =$

$75 \div 1000 =$

$30.3 \div 10 =$

$908 \div 100 =$

$2.5 \div 100 =$



LIGHTNING CHALLENGE

1. You split \$50.00 equally among 100 people. How much does each get?
2. MYSTERY NUMBER: My point hopped 2 places LEFT and I became 0.067.

Who was I before the hops? _____



LIGHTNING ARITHMETIC TRICKS

Divisibility Rule: 3



THE TRICK

Add up the digits. If the sum is divisible by 3, the whole number is divisible by 3!

No long division needed. Just add!

EXAMPLE 1: Is 852 divisible by 3?

Step 1: Add the digits: $8 + 5 + 2 = 15$

Step 2: Is 15 divisible by 3? Yes! ($3 \times 5 = 15$)

So 852 IS divisible by 3. ($852 \div 3 = 284$)

EXAMPLE 2: Is 1,000 divisible by 3?

Add the digits: $1 + 0 + 0 + 0 = 1$

1 is NOT divisible by 3, so 1,000 is NOT divisible by 3.

SUPER SPEED TIP: Keep adding!

If the digit sum is still big, add its digits again!

Is 78,996 divisible by 3? $7 + 8 + 9 + 9 + 6 = 39$

Add again: $3 + 9 = 12$...and $12 = 3 \times 4$

Yes! 78,996 is divisible by 3.

WHY DOES IT WORK?

Every 10 is a 9 plus 1, and every 100 is a 99 plus 1. The 9s and 99s are always divisible by 3 — so all that's left to check is the leftover digits.

Example: $852 = (8 \times 99 + 8) + (5 \times 9 + 5) + 2 \rightarrow$ just check $8 + 5 + 2$!



LIGHTNING ARITHMETIC TRICKS

Divisibility Rule: 3 — Practice!



YOUR TURN! Circle every number divisible by 3.

(Hint: add the digits! There are 14 to find.)

45

73

126

205

88

411

57

302

963

1,000

2,673

514

738

92

6,241

8,052

345

76

56,832

1,111

111

314

84

640

5,004

2,222

219

98



LIGHTNING CHALLENGE

1. Is 123,456,789 divisible by 3? Prove it with the trick!

2. Fill in the blank to make a number divisible by 3:

7 _ 4

(How many different answers can you find?)



LIGHTNING ARITHMETIC TRICKS

Divisibility Rule: 9



THE TRICK

Add up the digits. If the sum is divisible by 9, the whole number is divisible by 9!

Sound familiar? It's the same move as the Rule of 3 — just check for 9 instead!

EXAMPLE 1: Is 738 divisible by 9?

Step 1: Add the digits: $7 + 3 + 8 = 18$

Step 2: Is 18 divisible by 9? Yes! ($9 \times 2 = 18$)

So 738 IS divisible by 9. ($738 \div 9 = 82$)

EXAMPLE 2: Is 561 divisible by 9?

Add the digits: $5 + 6 + 1 = 12$

12 is NOT divisible by 9, so 561 is NOT divisible by 9.

But wait — 12 IS divisible by 3, so 561 is divisible by 3. Two tricks in one!

SUPER SPEED TIP: Keep adding!

If the digit sum is still big, add its digits again!

Is 89,991 divisible by 9? $8 + 9 + 9 + 9 + 1 = 36$

Add again: $3 + 6 = 9$...and that's 9 itself!

Yes! 89,991 is divisible by 9.

WHY DOES IT WORK?

Same secret as the Rule of 3! Every 10 is a 9 plus 1, and every 100 is a 99 plus 1. The 9s and 99s are divisible by 9 — so just check the leftovers.

Example: $738 = (7 \times 99 + 7) + (3 \times 9 + 3) + 8 \rightarrow$ just check $7 + 3 + 8$!



LIGHTNING ARITHMETIC TRICKS



Divisibility Rule: 9 — Practice!

YOUR TURN! Circle every number divisible by 9.

(Careful! Some are divisible by 3 but NOT by 9. There are 14 to find.)

81

75

234

512

99

120

648

333

745

3,213

907

486

7,777

5,554

6,300

246

8,910

1,006

46,818

57

63

87

909

444

4,500

1,234

17,982

650



LIGHTNING CHALLENGE

1. Is 987,654,321 divisible by 9? Prove it with the trick!

2. Fill in the blank to make a number divisible by 9:

5 _ 2

(Hint: this time there's only ONE answer!)



LIGHTNING ARITHMETIC TRICKS

Divisibility Rule: 6



THE TRICK

A number is divisible by 6 if it passes TWO checks:

Check 1: It's EVEN **Check 2: Digits add to a multiple of 3**

You already know both tricks — now use them together!

EXAMPLE 1: Is 234 divisible by 6?

Check 1: Ends in 4, so it's even. Passed!

Check 2: $2 + 3 + 4 = 9$, a multiple of 3. Passed!

So 234 IS divisible by 6. ($234 \div 6 = 39$)

EXAMPLE 2: Is 261 divisible by 6?

Check 2: $2 + 6 + 1 = 9$, a multiple of 3. Passed...

Check 1: It ends in 1 — that's ODD! FAILED.

So 261 is NOT divisible by 6. You need BOTH checks!

SUPER SPEED TIP: Do the easy check first!

Glancing at the last digit is instant — do it before any adding!

Is 1,357,911 divisible by 6? It ends in 1 → odd.

NO — done in one second! No adding needed.

Only if it's even do you bother adding the digits.

WHY DOES IT WORK?

Because $6 = 2 \times 3$! To be divisible by 6, a number needs a 2 AND a 3 hiding inside it. Being even proves the 2 is there; the digit-sum trick proves the 3 is there. Both hiding inside? Then 6 is hiding inside too!



LIGHTNING ARITHMETIC TRICKS

Divisibility Rule: 6 — Practice!



YOUR TURN! Circle every number divisible by 6.

(Two checks: Is it even? Do the digits add to a multiple of 3? Find 14.)

42

58

81

96

114

77

300

123

522

92

648

344

405

1,236

700

2,514

810

1,000

66

205

4,608

2,673

7,002

913

3,330

5,554

45,678

6,241



LIGHTNING CHALLENGE

1. Is 111,111,111,110 divisible by 6? Careful — it's sneaky!

2. Fill in the blank to make a number divisible by 6:

4 _ 2

(How many different answers can you find?)



LIGHTNING ARITHMETIC TRICKS

Divisibility Rule: 4



THE TRICK

Look at **ONLY** the last two digits. If they make a number divisible by 4, the whole number is divisible by 4!

You can ignore everything else — even in a giant number!

EXAMPLE 1: Is 316 divisible by 4?

Step 1: Look at the last two digits: $3 \mid 16 \rightarrow 16$

Step 2: Is 16 divisible by 4? Yes! ($4 \times 4 = 16$)

So 316 IS divisible by 4. ($316 \div 4 = 79$)

EXAMPLE 2: Is 1,254 divisible by 4?

Last two digits: $12 \mid 54 \rightarrow 54$

54 is NOT divisible by 4 (52 works, 56 works, but not 54).

So 1,254 is NOT divisible by 4 — even though it's even!

SUPER SPEED TIP: Don't even divide!

Just peek at the tens digit, then the ones digit:

Tens digit ODD $\rightarrow$ ones digit must be 2 or 6

Tens digit EVEN (or 0) $\rightarrow$ ones digit must be 0, 4, or 8

76 works (7 odd, ends in 6) 92 works (9 odd, ends in 2)

58 does NOT (5 is odd, but 8 isn't 2 or 6)

Even for 987,654,332 $\rightarrow$ check 32: 3 is odd, ends in 2. Yes!

WHY DOES IT WORK?

Because $100 = 4 \times 25$, every hundred is divisible by 4. So all the hundreds, thousands, and millions take care of themselves!

Example: $316 = 300 + 16$. The 300 is 3 hundreds (all fine!) $\rightarrow$ just check 16.



LIGHTNING ARITHMETIC TRICKS



Divisibility Rule: 4 — Practice!

YOUR TURN! Circle every number divisible by 4.

(Only look at the last two digits! Careful — even numbers aren't always divisible by 4. Find 14.)

32

58

116

214

700

341

924

1,338

512

246

2,816

930

5,472

1,111

63,048

7,777

10,000

98,762

444

350

68

94

172

522

3,336

6,118

85,204

45,678



LIGHTNING CHALLENGE

1. Is 123,456,789,012 divisible by 4? Prove it with the trick!

2. Fill in the blank to make a number divisible by 4:

7 3 ____ (How many different answers can you find?)



LIGHTNING ARITHMETIC TRICKS



Squaring Numbers That End in 5

THE TRICK

**Multiply the tens digit by the NEXT number up.
Then write 25 at the end. That's the answer!**

You'll be faster than a calculator — really!

EXAMPLE 1: What is 45×45 ?

Step 1: The tens digit is 4. The next number up is 5.

Step 2: $4 \times 5 = 20$. Now write 25 after it: $20 \rightarrow 2025$

$45 \times 45 = 2,025$. Done!

EXAMPLE 2: What is 85×85 ?

Tens digit is 8. Next number up is 9.

$8 \times 9 = 72$. Write 25 after it: $72 \rightarrow 7225$

$85 \times 85 = 7,225$. Faster than typing it into a phone!

SUPER SPEED TIP: It works for BIG numbers too!

Use everything in front of the 5 as your "tens digit":

105×105 ? The front part is 10. $10 \times 11 = 110$.

Write 25 after it: $110 \rightarrow 11025$

$105 \times 105 = 11,025$. Your teachers will be amazed!

WHY DOES IT WORK?

Slide a 5 from one 45 to the other: $45 \times 45 = (40 \times 50) + (5 \times 5)$.

$40 \times 50 = 2,000$ — that's just 4×5 with two zeros stuck on!

Then 5×5 adds the 25 at the end: $2,000 + 25 = 2,025$.



LIGHTNING ARITHMETIC TRICKS



Squaring 5s — Practice!

YOUR TURN! Use the trick — no calculators allowed!

(Tens digit $\times$ next number up, then write 25 at the end.)

$$25 \times 25 =$$

$$65 \times 65 =$$

$$15 \times 15 =$$

$$85 \times 85 =$$

$$35 \times 35 =$$

$$95 \times 95 =$$

$$55 \times 55 =$$

$$45 \times 45 =$$

$$75 \times 75 =$$

SPEED ROUND: Time yourself! Can you beat 60 seconds?

$$35 \times 35 =$$

$$75 \times 75 =$$

$$25 \times 25 =$$

$$95 \times 95 =$$

$$55 \times 55 =$$

$$65 \times 65 =$$



LIGHTNING CHALLENGE

1. What is 115×115 ? (Use the big-number version of the trick!)
2. MYSTERY NUMBER: When I multiply myself by myself, I get 3,025.

Who am I? _____ (Hint: run the trick backwards!)



LIGHTNING WORKSHEET

Multiplication Magic — Part 1



REMEMBER YOUR TRICKS!

$\times 10, 100, 1000$: attach the zeros! Zeros on both sides: multiply the fronts, collect ALL the zeros!

A. ATTACH THE ZEROS!

$34 \times 10 =$

$71 \times 100 =$

$6 \times 1000 =$

$80 \times 10 =$

$250 \times 100 =$

$49 \times 1000 =$

B. COLLECT ZEROS FROM BOTH SIDES!

$30 \times 40 =$

$200 \times 5 =$

$60 \times 600 =$

$500 \times 80 =$

$90 \times 700 =$

$4,000 \times 20 =$

C. DECIMALS — HOP THE POINT RIGHT!

$4.6 \times 10 =$

$0.72 \times 100 =$

$3.15 \times 100 =$

$8.4 \times 1000 =$

$0.09 \times 10 =$

$27.5 \times 100 =$



LIGHTNING WORKSHEET

Multiplication Magic — Part 2



REMEMBER YOUR TRICKS!

$\div 10, 100, 1000$: hop the point LEFT (zeros fill in!) Squaring 5s: tens $\times$ next number up, then write 25!

D. DIVIDE — HOP THE POINT LEFT!

$630 \div 10 =$

$5,400 \div 100 =$

$7,000 \div 1000 =$

$92 \div 100 =$

$8.1 \div 10 =$

$460 \div 1000 =$

E. SQUARING NUMBERS THAT END IN 5!

$35 \times 35 =$

$65 \times 65 =$

$15 \times 15 =$

$85 \times 85 =$

$55 \times 55 =$

$95 \times 95 =$



LIGHTNING CHALLENGE

- Combine two tricks: $55 \times 55 \div 100 =$ _____
- Collect ALL the zeros:
 $20 \times 30 \times 50 =$ _____



LIGHTNING WORKSHEET

Divisibility Detective — Part 1



REMEMBER YOUR TRICKS!

Divisible by 3: digits add to a multiple of 3.

Divisible by 9: digits add to a multiple of 9!

F. CIRCLE EVERY NUMBER DIVISIBLE BY 3

(There are 6 to find.)

54

71

138

260

87

913

402

1,004

615

2,048

7,209

5,551

G. CIRCLE EVERY NUMBER DIVISIBLE BY 9

(Watch for numbers divisible by 3 but NOT 9! There are 6 to find.)

72

84

117

214

594

303

801

745

1,062

5,000

6,993

1,235

THINK ABOUT IT...

Did any number get circled in BOTH sections F and G?

Could a number ever be divisible by 9 but NOT by 3? Why or why not?



LIGHTNING WORKSHEET

Divisibility Detective — Part 2



REMEMBER YOUR TRICKS!

Divisible by 4: check the last TWO digits. (Odd tens → ends in 2/6. Even tens → ends in 0/4/8.)

Divisible by 6: it must be EVEN and pass the 3 rule!

H. CIRCLE EVERY NUMBER DIVISIBLE BY 4

(There are 6 to find.)

76

54

128

310

532

218

1,916

774

2,340

466

35,672

1,230

I. CIRCLE EVERY NUMBER DIVISIBLE BY 6

(Two checks: even, AND digits add to a multiple of 3! There are 6 to find.)

48

93

162

250

306

415

522

741

1,014

2,222

5,556

800



LIGHTNING CHALLENGE

1. SUPER SORTER: Which of 3, 4, 6, and 9 divide the number 3,336?
2. What is the SMALLEST number divisible by 3, 4, 6, AND 9?
_____ (Hint: it's smaller than 50!)



LIGHTNING ARITHMETIC TRICKS

Multiply an Even Number by 5



THE TRICK

Cut the number in HALF, then attach a zero!

Half it $\rightarrow \times 10$. That's the whole trick.

Halving is way easier than multiplying by 5 the long way!

EXAMPLE 1: What is 48×5 ?

Step 1: Half of 48 is 24.

Step 2: Attach a zero: $24 \rightarrow 240$

$48 \times 5 = 240$. No carrying, no columns!

EXAMPLE 2: What is 86×5 ?

Half of 86 is 43.

Attach a zero: $43 \rightarrow 430$

$86 \times 5 = 430$. Try beating that with pencil and paper!

SUPER SPEED TIP: Halve big numbers piece by piece!

For a long number, halve it chunk by chunk from the left:

246×5 ? Half of 246: half of 200 is 100, half of 46 is 23 $\rightarrow 123$

Attach a zero: $123 \rightarrow 1,230$

$246 \times 5 = 1,230$. Lightning strikes again!

WHY DOES IT WORK?

Because 5 is exactly HALF of 10! So multiplying by 5 is the same as multiplying by 10 and cutting in half — in whichever order you like.

$48 \times 5 = 48 \times 10 \div 2 = 480 \div 2 = 240$. Halving first is easier!



LIGHTNING ARITHMETIC TRICKS

Multiply by 5 — Practice!



YOUR TURN! Half it, then attach a zero!

$12 \times 5 =$

$26 \times 5 =$

$48 \times 5 =$

$64 \times 5 =$

$82 \times 5 =$

$36 \times 5 =$

$124 \times 5 =$

$208 \times 5 =$

$462 \times 5 =$

$680 \times 5 =$

$1,246 \times 5 =$

$2,480 \times 5 =$

SPEED ROUND: Can you beat 45 seconds?

$14 \times 5 =$

$66 \times 5 =$

$92 \times 5 =$

$340 \times 5 =$

$128 \times 5 =$

$786 \times 5 =$



LIGHTNING CHALLENGE

1. What is $4,682 \times 5$? (Halve it chunk by chunk!)
2. DARE: The trick works for ODD numbers if you know your decimals!

$37 \times 5 =$ _____ (Hint: half of 37 is 18.5 ...)



LIGHTNING ARITHMETIC TRICKS

Same Tens + Ones That Add to 10



THE TRICK (a secret upgrade of the 5s trick!)

Works when: SAME tens digit, and the ones digits ADD TO 10.

Front of answer: tens $\times$ next number up.

Back of answer: ones $\times$ ones, written as TWO digits.

45 $\times$ 45 was this trick all along — same tens (4 and 4), and 5 + 5 = 10!

EXAMPLE 1: What is 43×47 ? (same tens: 4. ones: $3 + 7 = 10$.)

Front: $4 \times 5 = 20$

Back: $3 \times 7 = 21$ Put them together: 20 | 21

$43 \times 47 = 2,021$

EXAMPLE 2: What is 62×68 ? (same tens: 6. ones: $2 + 8 = 10$.)

Front: $6 \times 7 = 42$

Back: $2 \times 8 = 16$ Put them together: 42 | 16

$62 \times 68 = 4,216$

SUPER IMPORTANT: The back must be TWO digits!

91×99 ? Front: $9 \times 10 = 90$. Back: $1 \times 9 = 9 \dots$

Write the back as 09, not 9! 90 | 09

$91 \times 99 = 9,009$ (NOT 909!)

Whenever ones $\times$ ones is less than 10, sneak a zero in front of it.

WHY DOES IT WORK?

Same slide as the 5s trick! Because $3 + 7 = 10$, you can trade the ones for one extra ten: $43 \times 47 = (40 \times 50) + (3 \times 7) = 2,000 + 21 = 2,021$.

The trade only balances out when the ones digits add to exactly 10!



LIGHTNING ARITHMETIC TRICKS

Same Tens, Ones Add to 10 — Practice!



YOUR TURN! Front: tens $\times$ next up. Back: ones $\times$ ones (two digits!)

$21 \times 29 =$

$34 \times 36 =$

$42 \times 48 =$

$53 \times 57 =$

$61 \times 69 =$

$72 \times 78 =$

$84 \times 86 =$

$93 \times 97 =$

$25 \times 25 =$

$31 \times 39 =$

$55 \times 55 =$

$64 \times 66 =$

SPEED ROUND: Watch for sneaky zeros!

$22 \times 28 =$

$45 \times 45 =$

$73 \times 77 =$

$81 \times 89 =$

$52 \times 58 =$

$94 \times 96 =$



LIGHTNING CHALLENGE

- Go big: $101 \times 109 =$ _____ (The front part is 10!)
- MYSTERY PAIR: Two numbers multiply to 3,024. They have the same tens digit, and their ones digits add to 10.
Who are they? _____ $\times$ _____



LIGHTNING ARITHMETIC TRICKS



Chunk Division — Divide Piece by Piece!

THE TRICK

Split the number into chunks that each divide evenly.

Divide each chunk, then put the answers back together!

Golden rule: after the first chunk, each answer must be as WIDE as its chunk.

Long division without the long part!

EXAMPLE 1: What is $648 \div 2$?

Every digit divides by 2! Chunk it: 6 | 4 | 8

Divide each chunk: $6 \div 2 = 3$, $4 \div 2 = 2$, $8 \div 2 = 4 \rightarrow 3 | 2 | 4$

$648 \div 2 = 324$. No long division needed!

EXAMPLE 2: What is $2,412 \div 4$?

Single digits don't all work — use bigger chunks: 24 | 12

$24 \div 4 = 6$, $12 \div 4 = 3$. But 12 was TWO digits wide $\rightarrow$ write 03!

6 | 03 $\rightarrow 2,412 \div 4 = 603$ (not 63!)

SUPER SPEED TIP: Mix and match your chunks!

$270,315 \div 3$? Chunk it: 27 | 0 | 3 | 15

$27 \div 3 = 9$, $0 \div 3 = 0$, $3 \div 3 = 1$, $15 \div 3 = 5 \rightarrow$ written as 05

9 | 0 | 1 | 05 $\rightarrow 270,315 \div 3 = 90,105$. Six digits, zero sweat!

If a chunk doesn't divide evenly, try different chunk sizes!

WHY DOES IT WORK?

Each chunk lives in its own place-value "room": $2,412 = 2,400 + 12$.

Dividing the whole number just divides each room: $600 \div 3 = 200$.

The zero-padding keeps every answer in its correct room!



LIGHTNING ARITHMETIC TRICKS



Chunk Division — Practice!

YOUR TURN! Find friendly chunks — write your answer on top!

$$3\overline{)396}$$

$$4\overline{)848}$$

$$3\overline{)693}$$

$$2\overline{)2,486}$$

$$5\overline{)1,530}$$

$$3\overline{)2,712}$$

$$6\overline{)3,618}$$

$$7\overline{)5,635}$$

$$2\overline{)1,864}$$

$$4\overline{)12,048}$$

$$4\overline{)8,124}$$

$$7\overline{)21,714}$$

SPEED ROUND: Chunk fast!

$$4\overline{)484}$$

$$3\overline{)963}$$

$$5\overline{)1,025}$$

$$3\overline{)2,469}$$

$$6\overline{)6,048}$$

$$8\overline{)3,216}$$



LIGHTNING CHALLENGE

1. MONSTER DIVISION: $12\overline{)12,036,024}$

2. BUILD-A-PROBLEM: Write your own 6-digit number that a friend could divide by 3 in their head using chunks.

My number: _____, _____ Trade with a neighbor and race!



LIGHTNING ARITHMETIC TRICKS



Multiply a Two-Digit Number by 11

THE TRICK

Pull the two digits apart, then drop their SUM into the middle!

This one looks like pure magic to anyone who doesn't know it.

EXAMPLE 1: What is 43×11 ?

Step 1: Pull the digits apart: 4 _ 3

Step 2: Add them: $4 + 3 = 7$. Drop it in the middle: 4 7 3

$43 \times 11 = 473$. **Magic!**

EXAMPLE 2: What is 68×11 ? (The sum is too big to fit!)

Pull apart: 6 _ 8. Add: $6 + 8 = 14$ — two digits!

Drop in the 4, and **CARRY** the 1 onto the 6: $(6+1) 4 8 \rightarrow 7 4 8$

$68 \times 11 = 748$

SUPER SPEED TIP: Three digits? Add NEIGHBORS!

Keep the outside digits, and fill the middle with neighbor sums:

132×11 ? 1 | 1+3 | 3+2 | 2 $\rightarrow$ 1 | 4 | 5 | 2

$132 \times 11 = 1,452$

Carries work the same way — pass the extra 1 to the left!

WHY DOES IT WORK?

Multiplying by 11 is $\times 10$ plus one more copy: $43 \times 11 = 430 + 43$.

Stack them up: the 4 keeps its spot, the last 3 keeps its spot, and the middle column adds $3 + 4$ — the digits meet in the middle!



LIGHTNING ARITHMETIC TRICKS

Multiply by 11 — Practice!



YOUR TURN! Pull apart, sum in the middle — carry if needed!

$24 \times 11 =$

$35 \times 11 =$

$61 \times 11 =$

$72 \times 11 =$

$53 \times 11 =$

$81 \times 11 =$

$48 \times 11 =$

$57 \times 11 =$

$75 \times 11 =$

$66 \times 11 =$

$89 \times 11 =$

$94 \times 11 =$

SPEED ROUND: The last one is legendary...

$18 \times 11 =$

$26 \times 11 =$

$45 \times 11 =$

$63 \times 11 =$

$77 \times 11 =$

$99 \times 11 =$



LIGHTNING CHALLENGE

1. Use the neighbor-sum trick: $234 \times 11 =$ _____

2. MYSTERY NUMBER: _____ $\times 11 = 616$

(Careful — there was a carry! The middle of 616 hides a secret...)