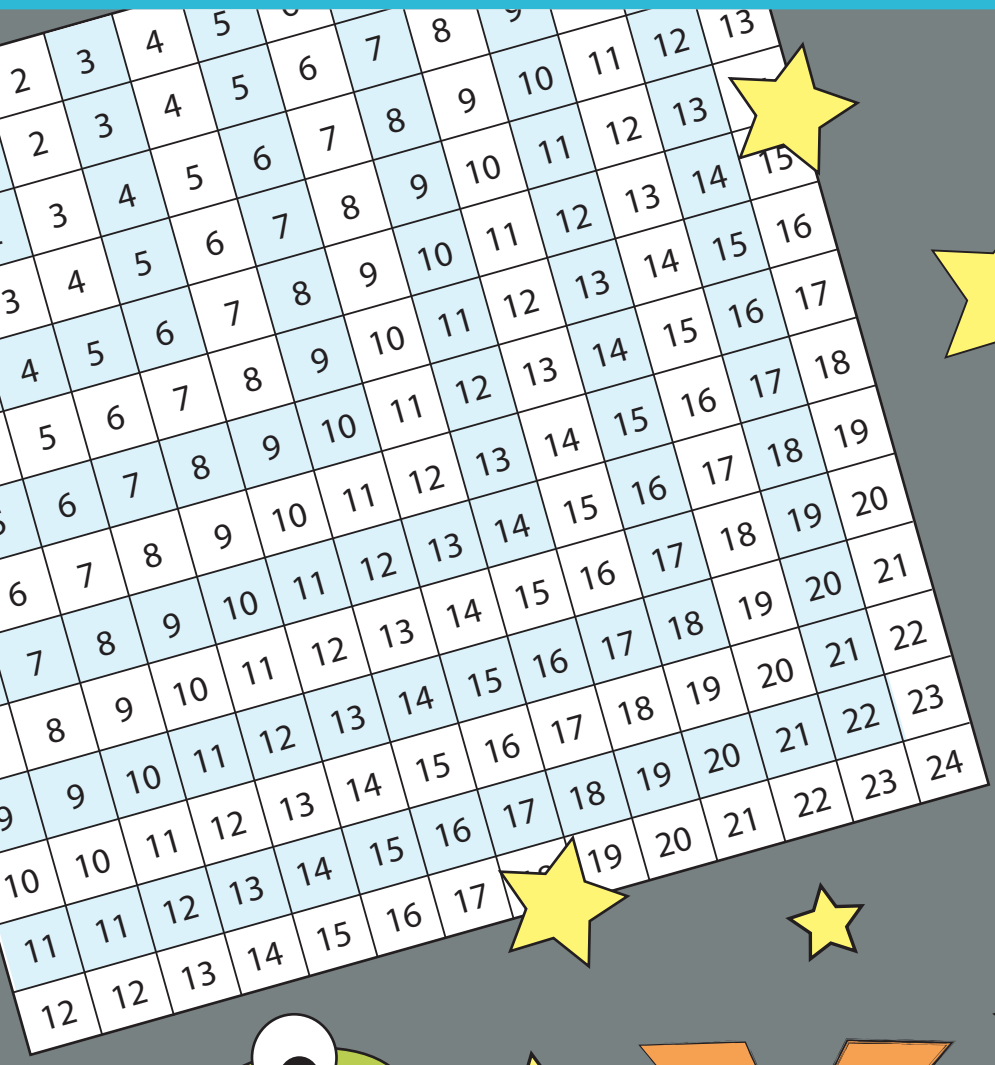
Computation Station

3rd Grade

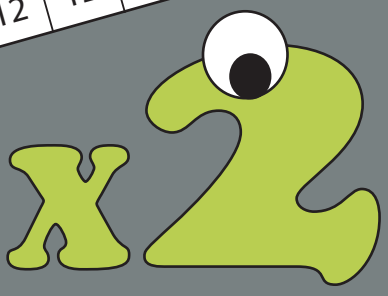


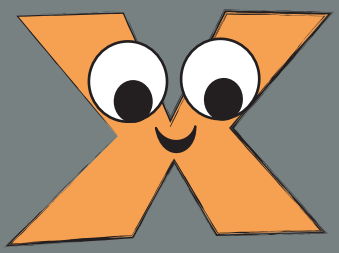
Tricks

1000

100

10





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** Includes Answer Sheet*

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Find the Patterns! Addition

Addition facts are easier when you know the patterns! Take a look at the addition table below: Do you notice any patterns?

+	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12	13
2	2	3	4	5	6	7	8	9	10	11	12	13	14
3	3	4	5	6	7	8	9	10	11	12	13	14	15
4	4	5	6	7	8	9	10	11	12	13	14	15	16
5	5	6	7	8	9	10	11	12	13	14	15	16	17
6	6	7	8	9	10	11	12	13	14	15	16	17	18
7	7	8	9	10	11	12	13	14	15	16	17	18	19
8	8	9	10	11	12	13	14	15	16	17	18	19	20
9	9	10	11	12	13	14	15	16	17	18	19	20	21
10	10	11	12	13	14	15	16	17	18	19	20	21	22
11	11	12	13	14	15	16	17	18	19	20	21	22	23
12	12	13	14	15	16	17	18	19	20	21	22	23	24

These patterns follow three main rules. Review the rules below and then complete the exercise below:

Rule One. The even numbers on the above table are 2, 4, 6, 8, 10, and 12. When you add any even number to another even number, your answer will be an even number.
EX:
2 + 2 = 4 4 is an even number.
6 + 12 = 18 18 is an even number.

Rule Two. The odd numbers on the above table are 1, 3, 5, 7, 9, and 11. When you add any even number to an odd number, your answer will be an odd number.
EX: 3 + 4 = 7 7 is an odd number.

Rule Three. When you add any number to itself, your answer will always be an even number.
EX:
4 + 4 = 8 8 is an even number.
5 + 5 = 10 10 is an even number (Even though 5 is an odd number!)

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Based on the three rules above, pay attention to whether the answer is even or odd. Put a check next to the answers that have to be wrong:

1. 4 + 8 = 12 _____
2. 6 + 8 = 17 _____
3. 42 + 24 = 65 _____
4. 16 + 18 = 23 _____
5. 102 + 86 = 188 _____
6. 1002 + 144 = 1,143 _____
7. 3 + 8 = 11 _____
8. 3 + 12 = 16 _____
9. 3 + 42 = 45 _____
10. 3 + 34 = 38 _____
11. 3 + 110 = 114 _____
12. 3 + 3,654 = 3,657 _____
13. 6 + 6 = 12 _____
14. 66 + 66 = 132 _____
15. 666 + 666 = 1,331 _____
16. 24 + 24 = 48 = _____
17. 22 + 22 = 43 = _____
18. 3,432 + 3,432 = 6,865 _____

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Find the Patterns! Multiplication

Similar to addition facts, multiplication facts follow patterns, too. Observe the multiplication table below.

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Review the three multiplication rules and complete the exercise.

Rule One.

When you multiply any number by an even number the product is always even.
3 × 4 = 12 3 is an odd number, but 4 is even. Notice that the product, 12, is even.

2 × 6 = 12 2, 6, and 12 are all even.

Rule Two.

When you multiply any number by 3, the digits of the product always add up to a multiple of 3.

The multiples of 3 up to 100 are as follows:

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51,
54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99.

EX:
3 × 4 = 12.
Add: 1 + 2 = 3.
3 is a multiple of 3 because 3 × 1 = 3

3 × 12 = 36.
Add: 3 + 6 = 9.
9 is a multiple of 3 because 3 × 3 = 9

Rule Three.

When you multiply any number by 5, the last digit of the answer has to be either 5 or 0.

EX:
5 × 3 = 15 The last digit of the product is 5.

5 × 12 = 60, and notice that the last digit of the answer is 0.

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Based on the three rules above, put a check next to the answers that have to be wrong:

1. $6 \times 8 = 48$ _____

2. $24 \times 14 = 336$ _____

3. $16 \times 28 = 447$ _____

4. $30 \times 32 = 960$ _____

5. $146 \times 86 = 12{,}556$ _____

6. $152 \times 92 = 13{,}985$ _____

7. $3 \times 11 = 33$ _____

8. $3 \times 12 = 35$ _____

9. $3 \times 21 = 63$ _____

10. $3 \times 13 = 38$ _____

11. $3 \times 25 = 75$ _____

12. $3 \times 30 = 91$ _____

13. $5 \times 4 = 20$ _____

14. $5 \times 12 = 72$ _____

15. $5 \times 17 = 85$ _____

16. $5 \times 18 = 88$ _____

17. $5 \times 20 = 100$ _____

18. $5 \times 22 = 106$ _____

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Multiplying by 10, 100, or 1,000!

Multiplying any number by 10, 100, or even 1,000 is easy if you know these tricks.

If you have to multiply any number by 10, just place a 0 at the end of the original number.

EX: 10 × 14 = 140

If you have to multiply a number by 100, just place two 0s at the end of the original number.

EX: 100 × 14 = 1400

And if you have to multiply a number by 1,000, just place three 0s at the end of the original number.

EX: 1000 × 14 = 14,000

Answer the following problems:

10 x 24 = 240

1. 10 x 12 = _____

2. 10 x 32 = _____

3. 10 x 87 = _____

4. 10 x 376 = _____

5. 10 x 6,395 = _____

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100 x 24 = 2,400

6. 100 x 16 = _____

7. 100 x 38 = _____

8. 100 x 94 = _____

9. 100 x 672 = _____

10. 100 x 4,936 = _____

1,000 x 24 = 24,000

11. 1,000 x 17 = _____

12. 1,000 x 39 = _____

13. 1,000 x 91 = _____

14. 1,000 x 289 = _____

15. 1,000 x 3,386 = _____

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Relating Single Digit Addition to a Double Digit.

If you know that 3 + 5 = 8 you can easily solve 30 + 50 because you don't have to worry about adding numbers in the ones column.

$$\begin{array}{r} 30 = 3 \text{ tens} \\ +\ 50 = 5 \text{ tens} \\ \hline 80 = 8 \text{ tens} \end{array}$$

You can use the same rule to add numbers with three digits, or even 4 digits. For example,

$$\begin{array}{r} 300 = 3 \text{ hundreds} \\ +\ 500 = 5 \text{ hundreds} \\ \hline 800 = 8 \text{ hundreds} \end{array}$$

Just take off the zeros and add the numbers. Then, make sure you put the zeros back!

Let's try it with different numbers:

6 + 5 = 11
60 + 50 + 110
600 + 500 = 1,100

Now, use this rule to add the following numbers. Write the correct answers on the following blanks:

1. 4 + 8 = 12

   40 + 80 = _____

   400 + 800 = 1,200

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2. 4 + 3 = 7

   40 + 30 = 70

   400 + 300 = _____

3. 4 + 1 = _____

   40 + 10 = _____

   400 + 100 = _____

4. 12 + 16 = 28

   120 + 160 = 280

   1,200 + 1,600 = _____

5. 15 + 18 = 33

   150 + 180 = 330

   1,500 + 1,800 = _____

6. 14 + 17 = _____

   140 + 170 = _____

   1,400 + 1,700 = _____

7. 18 + 36 = _____

   180 + 360 = _____

   1,800 + 3,600 = _____

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Using Estimation: Knowing What's Too Big and Too Small

Adding and subtracting large numbers can sometimes be difficult. Estimating is an easy way to figure out if your answer is close, or if you need to try again.

EX:
227 + 631 = _____
This looks hard. But there are some things you can know right away just by looking at it.

For example, what if you had an answer like 78?
You should know immediately that it must be wrong.
A 3-digit number + a 3-digit number can never equal a 2-digit number. It's too small!

OR, what if you had an answer like 12,428?
You should also know this is wrong.
A 3-digit number + a 3-digit number can never equal a 5-digit number. It's way too big!

If 227 + 631 is a difficult problem for you, you can still estimate an answer.
You should be able to determine that the answer probably has 3 digits or, at most, 4 digits.
(The actual answer is 858, a large three-digit number.)
Note: The same thing is true for subtraction.

Answer the following multiple choice problems. None of the possible answers are correct, but one is closer to the correct answer than any of the others. Pick the answer provided that is closest to the correct answer.

1. 428 + 298 =

a. 650
b. 65
c. 6,500

2. 82 + 45 =

a. 11
b. 1,100
c. 110

3. 634 + 56 =

a. 6,700
b. 67
c. 670

4. 856 – 32 =

a. 800
b. 8,000
c. 80

5. 7,324 – 119 =

a. 72
b. 720
c. 7,200

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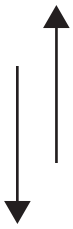
Using Rounding Up or Down to Estimate an Answer



What is easier to do in your in head?

800 + 100
OR
372 + 621 ?

You probably chose 800 + 100. All you have to do is add 8 + 1 and add two zeros. Sometimes when you need a quick answer that doesn't have to be exact, you can estimate by rounding.

Let's take 372 + 621 again. How can we turn this into an easy problem with lots of zeros? You can do this by rounding to the nearest hundred.

1. Look at the number in the tens place, the one immediately to the right of the hundreds place.

2. If it is 5 or over, round up to the next hundred by adding 1 to the hundreds place.

3. For 372, the tens digit is 7. It's 5 or greater, so we add 1 to 3 and get 4 in the hundreds place. 4_ _.

4. What do we put in the tens and ones place? We put zeros because we have rounded up. 400.

5. Let's do the same with 621. Because 2 is less than 5, we round down to the nearest hundred which is 6.

Now it's time to do the addition

400 + 600 = 1,000.

This is our estimated answer. What's the exact answer?
It's 993, which is pretty close in value.

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Answer the following multiple choice questions by rounding up or rounding down the numbers in the problem provided. None of the possible answers is correct, but one is closer to the correct answer than any of the others. Pick the approximate answer provided that is closest to the correct answer.

1. 328 + 598 =

a. 800
b. 80
c. 8,000

2. 52 + 49 =

a. 10
b. 1,000
c. 100

3. 784 + 81 =

a. 8,800
b. 88
c. 880

4. 756 - 39 =

a. 7,000
b. 700
c. 70

5. 4,124 - 139 =

a. 39
b. 390
c. 3,900

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Mixed Problems Requiring Estimation

Find the best estimate by rounding up or rounding down.

None of the possible answers are correct, but one is closer to the correct answer than any of the others. Pick the answer provided that is closest to the correct answer.

1. 327 + 516 = _____	a. 80	b. 800	c. 8,000
2. 689 + 173 = _____	a. 900	b. 9,000	c. 90
3. 542 + 198 = _____	a. 7,000	b. 70	c. 700
4. 263 + 77 = _____	a. 38	b. 380	c. 3,800
5. 482 + 237 = _____	a. 600	b. 700	c. 800
6. 617 – 426 = _____	a. 200	b. 2,000	c. 20
7. 387 + 187 = _____	a. 60	b. 6,000	c. 600
8. 871 – 329 = _____	a. 60	b. 600	c. 6,000
9. 352 – 51 = _____	a. 300	b. 30	c. 3,000
10. 78 + 491 = _____	a. 5,800	b. 580	c. 58
11. 789 + 821 = _____	a. 1,600	b. 1,500	c. 1,700
12. 835 – 263 = _____	a. 400	b. 500	c. 700

Challenge:

1. 4,279 + 2,912 = _____	a. 70,000	b. 7,000	c. 700
2. 3,897 + 5,267 = _____	a. 8,000	b. 80,000	c. 800
3. 5,933 – 3,361 = _____	a. 300	b. 3,000	c. 30,000

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Fast Addition Moving Left to Right: The Break Down

One way to add large numbers quickly is to break down the second number into smaller parts and then add all the parts from left to right. For example:

34 + 27 = _____ is hard to do in your head. So, let's *break it down*.

27 is the same as 20 + 7.
Once you know this, the original problem becomes: 34 + 20 + 7 = _____ .
Now add this in your head:
34 + 20 = 54.
Then, 54 + 7 = 61.
You have your answer: 34 + 27 = 61.

Here's another example in 4 steps:

48 + 87 = _____

1. Rewrite the second number: 87 = 80 + 7.

2. Write the new problem:
48 + 80 + 7 = _____

3. Add left to right
48 + 80 = 128. Now add the 7 128 + 7 = 135.

135 is the answer!

Write the number that should go where the blank spaces are in the following three-part solutions using the adding left to right method:

1. 31 + 23 =

a. 23 = 20 + _____
b. 31 + 20 + 3 =
c. 31 + 20 = 51. Then, 51 + _____ = 54. The answer is 54.

2. 44 + 67 =

a. 67 = _____ + 7
b. 44 + 60 + 7 =
c. 44 + 60 = 104. Then, 104 + _____ = 111. The answer is 111.

3. 27 + 52 =

a. 52 = _____ + _____
b. _____ + 50 + 2 =
c. _____ + 50 = 77. Then, 77 + _____ = 79. The answer is 79.

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Fast Addition Moving Left to Right

Fast addition moving left to right is done in three steps. The three steps are as follows:

The problem is 32 + 23 = _____

* Step One: Rewrite the second number: 23 = 20 + 3
* Step Two: Write the new problem: 32 + 20 + 3 = _____
* Step Three: Add left to right: 32 + 20 = 52. Then, 52 + 3 = 55. The answer is 55.

In answering the problems below, use the three-step format (show your work):

Here's one more example before you do the rest of the problems by yourself. Fill in the blank spaces:

37 + 55 =

a. 55 = 50 + 5

b. 37 + 50 + 5 =

c. 37 + 50 = 87. Then, 87 + 5 = 92. The answer is 92.

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1. 27 + 54 = _____

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2. 41 + 35 = _____

3. 18 + 77 = _____

4. 36 + 36 = _____

5. 62 + 26 = _____

6. 51 + 44 = _____

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x2 Multiplying by 2 and 5 Using Patterns x5

Everyone should memorize the multiplication tables. Sometimes, though, there are other ways to quickly multiply and divide numbers by recognizing patterns.

For example, to multiply by 2, you can memorize the multiplication table, or you can recognize that multiplying a number by 2 is just *doubling* that number. For example:

2 x 8 = 16. Another way to find out the answer to 2 x 8 is to recognize that doubling 8 (8 + 8) also equals 16.

This works for bigger numbers, too. 2 x 136 = 272. Another way to find out the answer to 2 x 136 is to recognize that *doubling* 136 (136 + 136) also equals 272.

Another example of how recognizing patterns can help you multiply numbers is multiplying by 5. Any time you multiply a number by 5, the last digit in the answer *must be either* 5 *or* 0. If the last digit is anything other than a 5 or 0, it is wrong. For example:

- 5 x 2 = 10: The first digit of this answer is 1, and the last digit is 0.
- 5 x 3 = 15: The last digit is 5
- 5 x 8 = 40: The last digit is 0
- 5 x 18 = 90: The last digit is 0
- 5 x 253 = 1,265: The last digit is 5
- 5 x 12 *can't be* 72 because the last digit is 2 (The answer is 70)

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Problems:

2 x 9 = _____ , 2 x 11 = _____ , 2 x 15 = _____ , 2 x 27 = _____ ,

2 x 32 = _____ , 2 x 77 = _____ , 2 x 112 = _____ , 2 x 164 = _____ ,

2 x 234 = _____ , 2 x 367 = _____ , 2 x 426 = _____ .

5 x 7 = _____ , 5 x 12 = _____ , 5 x 14 = _____ , 5 x 17 = _____ ,

5 x 20 = _____ , 5 x 25 = _____ .

Put a check by the problems that have to be wrong:

1. 5 x 16 = 80 _____

2. 5 x 19 = 93 _____

3. 5 x 78 = 391 _____

4. 5 x 92 = 460 _____

5. 5 x 156 = 784 _____

6. 5 x 333 = 1665 _____

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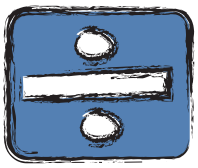
Dividing by 2 and 3 Using Patterns



Everyone should memorize the multiplication tables. Sometimes, though, there are other ways to quickly multiply and divide numbers by recognizing patterns.

To divide by 2 you can memorize the multiplication table, or you can recognize that dividing a number by 2 is just figuring out what *half* of the number is. For example:

6 divided by 2 = 3. *Half* of 6 is 3. You know this because 3 + 3 is 6. So, if you know *half* of 6 is 3, then you know how to divide by 2.

This works for bigger numbers too. 860 divided by 2 = 430. This means that 430 + 430 = 860 (which also means that 430 is *half* of 860). And 1,428 divided by 2 = 714. This means that 714 + 714 = 1,428 (which also means that 714 is *half* of 1,428).

To divide by 3 you can memorize the multiplication table, or you can recognize that dividing a number by 3 is just figuring out what *one-third* of the number is. For example:

6 divided by 3 = 2. *One-third* of 6 is 2. You know this because 2 + 2 + 2 is 6. So, if you know *one-third* of 6 is 2, then you know how to divide by 3.

This works for bigger numbers, too. 963 divided by 3 = 321. This means that 321 + 321 + 321 = 963 (which also means that 321 is *one-third* of 963). And 3,369 divided by 3 = 1,123 . This means that 1,123 + 1,123 + 1,123 = 3,369 (which also means that 1,123 is *one-third* of 3,369).

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Solve the division problems below using this method, and explain your answer.

Ex: 42 divided by 2 = _____ . 21 + 21 = 42. Therefore, half of 42 = 21.

1. 40 divided by 2 = _____ .

2. 44 divided by 2 = _____ .

3. 68 divided by 2 = _____ .

4. 100 divided by 2 = _____ .

5. 146 divided by 2 = _____ .

Ex: 42 divided by 3 = _____ . 14 + 14 + 14 = 42. Therefore, one-third of 42 is 14.

6. 9 divided by 3 = _____ .

7. 15 divided by 3 = _____ .

8. 21 divided by 3 = _____ .

9. 33 divided by 3 = _____ .

10. 51 divided by 3 = _____ .

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Multiplying by 3 Using Patterns

Multiplying by 3 is easier than multiplying by other numbers because of a certain pattern. When you multiply any number by 3, the digits of the answer must add up to a multiple of 3. Here are the multiples of 3 up to 100:

> 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99.

3 x 4 = 12. If you add together the two digits of the answer, you get 3. That is because 1 + 2 = 3. 3 is the first number on the list of multiples of 3 above. This is how you know the answer is right! If the answer is not on the list above, it is wrong.

3 x 16 = 48. Add up the two digits of the answer, 4 + 8 = 12. Since 12 is on the list of multiples of 3 above, the answer is probably right.

Solve the multiplication problems below and check your answer using this method. Show your work.

1. 3 x 8 = _____

2. 3 x 11 = _____

3. 3 x 14 = _____

4. 3 x 19 = _____

5. 3 x 20 = _____

6. 3 x 27 = _____

Answer the question. Then, put a check by the problems that have to be wrong:

Ex: 3 x 9 = 26. Does 2 + 6 = a multiple of 3? (In other words, is 8 on the list above?) No.

7. 3 x 13 = 39. Does 3 + 9 = a multiple of 3? ____

8. 3 x 15 = 45. Does 4 + 5 = a multiple of 3? ____

9. 3 x 21 = 62. Does 6 + 2 = a multiple of 3? ____

10. 3 x 26 = 78. Does 7 + 8 = a multiple of 3? ____

11. 3 x 33 = 97. Does 9 + 7 = a multiple of 3? ____

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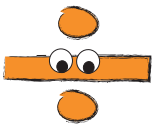

Mixed Problems

Review the multiplication and division patterns, then solve the problems below.

Multiplying by 2: Recognize that multiplying a number by 2 is just doubling that number. For example: 2 x 8 = 16. Another way to find out the answer to 2 x 8 is to recognize that doubling 8 (8 + 8) also equals 16.

Multiplying by 5: Any time you multiply a number by 5, the last digit in the answer must be either 5 or 0. If the last digit is anything other than a 5 or 0, it is wrong.

Dividing by 2: Recognize that dividing a number by 2 is just figuring out what half of the number is. For example: 6 divided by 2 = 3. Half of 6 is 3. You know this because 3 + 3 is 6. So, if you know half of 6 is 3, then you know how to divide by 2.

Multiplying by 3: Multiplying by 3 is easier than you think because of a certain pattern. When you multiply any number by 3, the digits of the answer must add up to a multiple of 3. For example, 3 x 4 = 12. If you add together the two digits of the answer, you get 3. That is because 1 + 2 = 3.

2 x 4 = _____ , 2 x 50 = _____ , 2 x 13 = _____ , 2 x 18 = _____ , 2 x 22 = _____ , 2 x 27 = _____ ,

2 x 47 = _____ , 2 x 32 = _____ , 2 x 41 = _____ , 2 x 28 = _____ , 2 x 45 = _____ , 2 x 39 = _____ .

5 x 7 = _____ , 5 x 11 = _____ , 5 x 12 = _____ , 5 x 14 = _____ , 5 x 17 = _____ , 5 x 18 = _____ ,

5 x 20 = _____ , 5 x 21 = _____ , 5 x 22 = _____ , 5 x 30 = _____ , 5 x 31 = _____ , 5 x 32 = _____ .

6 divided by 2 = _____ , 12 divided by 2 = _____ , 14 divided by 2 = _____ ,

20 divided by 2 = _____ , 22 divided by 2 = _____ , 24 divided by 2 = _____ ,

30 divided by 2 = _____ , 40 divided by 2 = _____ , 50 divided by 2 = _____ ,

46 divided by 2 = _____ .

3 x 4 = _____ , 3 x 11 = _____ , 3 x 12 = _____ , 3 x 13 = _____ , 3 x 20 = _____ , 3 x 21 = _____ ,

3 x 22 = _____ , 3 x 30 = _____ , 3 x 31 = _____ , 3 x 32 = _____ , 3 x 40 = _____ , 3 x 41 = _____ .

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Multiplying by 9 Using Patterns

Unlike with other numbers, multiplying any *single-digit* number by 9 results in a recognizable pattern. For example:

2 x 9 = **18**	**1 + 8** = 9
3 x 9 = **27**	**2 + 7** = 9
4 x 9 = **36**	**3 + 6** = 9
5 x 9 = **45**	**4 + 5** = 9

You should notice that 2 x 9 = 18 and that adding together the two digits of the answer equals 9. In other words, 1 + 8 = 9.

Fill out the rest of the chart by writing the correct number on the blank spaces.

6 x 9 = **54**	**5 + 4** = 9
7 x 9 = **63**	___ + ___ = 9
8 x 9 = **72**	___ + ___ = 9
9 x 9 = **81**	___ + ___ = 9

Does this pattern work for 9 x 10? Yes or No?

Does it work for 9 x 11? Yes or No?

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Multiplying by 6 Using Patterns

Unlike with other numbers, multiplying *even* numbers by 6 results in a recognizable pattern. For example:

6 x **2** = **12**
6 x **4** = 2**4**
6 x **6** = 3**6**
6 x **8** = 4**8**

You should notice that the number that is multiplied by six (the second number in the equations above) is the same as the last digit of the answer. For example, if you multiply 6 by 2, the last digit of the answer is also 2. (The answer is 12.) This happens every time you multiply six by an even number. (This doesn't work for *odd* numbers.)

Write the correct number on the blank spaces.

1. 6 x 10 = 60

2. 6 x 12 = _____

3. 6 x 14 = _____

4. 6 x 16 = _____

Challenge questions:

5. 6 x 18 = _____

6. 6 x 26 = _____

7. 6 x 42 = _____

8. 6 x 74 = _____

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Answer Sheets

Computation Station

Find the Patterns! Addition
Find the Patterns! Multiplication
Multiplying by 10, 100, or 1,000!
Relating Single Digit Addition to a Double Digit
Using Estimation: Knowing What's Too Big and Too Small
Using Rounding Up or Down to Estimate an Answer
Mixed Problems Requiring Estimation
Fast Addition Moving Left to Right: The Break Down
Fast Addition Moving Left to Right
Multiplying by 2 and 5 Using Patterns
Dividing by 2 and 3 Using Patterns
Multiplying by 3 Using Patterns
Mixed Problems
Multiplying by 9 Using Patterns
Multiplying by 6 Using Patterns

Answer Sheet

Name _____ Date _____

Find the Patterns! Addition

Addition facts are easier when you know the patterns! Take a look at the addition table below: Do you notice any patterns?

+	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12	13
2	2	3	4	5	6	7	8	9	10	11	12	13	14
3	3	4	5	6	7	8	9	10	11	12	13	14	15
4	4	5	6	7	8	9	10	11	12	13	14	15	16
5	5	6	7	8	9	10	11	12	13	14	15	16	17
6	6	7	8	9	10	11	12	13	14	15	16	17	18
7	7	8	9	10	11	12	13	14	15	16	17	18	19
8	8	9	10	11	12	13	14	15	16	17	18	19	20
9	9	10	11	12	13	14	15	16	17	18	19	20	21
10	10	11	12	13	14	15	16	17	18	19	20	21	22
11	11	12	13	14	15	16	17	18	19	20	21	22	23
12	12	13	14	15	16	17	18	19	20	21	22	23	24

These patterns follow three main rules. Review the rules below and then complete the exercise below:

Rule One. The even numbers on the above table are 2, 4, 6, 8, 10, and 12. When you add any even number to another even number, your answer will be an even number.
EX:
2 + 2 = 4 4 is an even number.
6 + 12 = 18 18 is an even number.

Rule Two. The odd numbers on the above table are 1, 3, 5, 7, 9, and 11. When you add any even number to an odd number, your answer will be an odd number.
EX: 3 + 4 = 7 7 is an odd number.

Rule Three. When you add any number to itself, your answer will always be an even number.
EX:
4 + 4 = 8 8 is an even number.
5 + 5 = 10 10 is an even number (Even though 5 is an odd number!)

Answer Sheet

Name _____ Date _____

ANSWERS

Based on the three rules above, pay attention to whether the answer is even or odd.
Put a check next to the answers that have to be wrong:

1. 4 + 8 = 12 _____
2. 6 + 8 = 17 ✓
3. 42 + 24 = 65 ✓
4. 16 + 18 = 23 ✓
5. 102 + 86 = 188 _____
6. 1002 + 144 = 1,143 ✓
7. 3 + 8 = 11 _____
8. 3 + 12 = 16 ✓
9. 3 + 42 = 45 _____
10. 3 + 34 = 38 ✓
11. 3 + 110 = 114 ✓
12. 3 + 3,654 = 3,657 _____
13. 6 + 6 = 12 _____
14. 66 + 66 = 132 _____
15. 666 + 666 = 1,331 ✓
16. 24 + 24 = 48 = _____
17. 22 + 22 = 43 = ✓
18. 3,432 + 3,432 = 6,865 ✓

Answer Sheet

Name _____ Date _____

Find the Patterns! Multiplication

Similar to addition facts, multiplication facts follow patterns, too. Observe the multiplication table below.

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Answer Sheet

Name _____ Date _____

Review the three multiplication rules and complete the exercise.

Rule One.

When you multiply any number by an even number the product is always even.
3 x 4 = 12 3 is an odd number, but 4 is even. Notice that the product, 12, is even.

2 x 6 = 12 2, 6, and 12 are all even.

Rule Two.

When you multiply any number by 3, the digits of the product always add up to a multiple of 3.

The multiples of 3 up to 100 are as follows:

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51,

54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99.

EX:
3 x 4 = 12.
Add: 1 + 2 = 3.
3 is a multiple of 3 because 3 x 1 = 3

3 x 12 = 36.
Add: 3 + 6 = 9.
9 is a multiple of 3 because 3 x 3 = 9

Rule Three.

When you multiply any number by 5, the last digit of the answer has to be either 5 or 0.

EX:
5 x 3 = 15 The last digit of the product is 5.

5 x 12 = 60, and notice that the last digit of the answer is 0.

Answer Sheet

Name _____ Date _____

ANSWERS

Based on the three rules above, put a check next to the answers that have to be wrong:

1. $6 \times 8 = 48$ _____
2. $24 \times 14 = 336$ _____
3. $16 \times 28 = 447$ ✓
4. $30 \times 32 = 960$ _____
5. $146 \times 86 = 12{,}556$ _____
6. $152 \times 92 = 13{,}985$ ✓
7. $3 \times 11 = 33$ _____
8. $3 \times 12 = 35$ ✓
9. $3 \times 21 = 63$ _____
10. $3 \times 13 = 38$ ✓
11. $3 \times 25 = 75$ _____
12. $3 \times 30 = 91$ ✓
13. $5 \times 4 = 20$ _____
14. $5 \times 12 = 72$ ✓
15. $5 \times 17 = 85$ _____
16. $5 \times 18 = 88$ ✓
17. $5 \times 20 = 100$ _____
18. $5 \times 22 = 106$ ✓

Answer Sheet

Name _____ Date _____

ANSWERS

Multiplying by 10, 100, or 1,000!

Multiplying any number by 10, 100, or even 1,000 is easy if you know these tricks.

If you have to multiply any number by 10, just place a 0 at the end of the original number.

EX: 10 × 14 = 140

If you have to multiply a number by 100, just place two 0s at the end of the original number.

EX: 100 × 14 = 1400

And if you have to multiply a number by 1,000, just place three 0s at the end of the original number.

EX: 1000 × 14 = 14,000

Answer the following problems:

10 x 24 = 240

1. 10 x 12 = **120**

2. 10 x 32 = **320**

3. 10 x 87 = **870**

4. 10 x 376 = **3,760**

5. 10 x 6,395 = **63,950**

Answer Sheet

Name _____ Date _____

100 x 24 = 2,400

6. 100 x 16 = **1,600**

7. 100 x 38 = **3,800**

8. 100 x 94 = **9,400**

9. 100 x 672 = **67,200**

10. 100 x 4,936 = **493,600**

1,000 x 24 = 24,000

11. 1,000 x 17 = **17,000**

12. 1,000 x 39 = **39,000**

13. 1,000 x 91 = **91,000**

14. 1,000 x 289 = **289,000**

15. 1,000 x 3,386 = **3,386,000**

Answer Sheet

Name _____ Date _____

ANSWERS

Relating Single Digit Addition to a Double Digit.

If you know that 3 + 5 = 8 you can easily solve 30 + 50 because you don't have to worry about adding numbers in the ones column.

$$\begin{array}{r} 30 = 3 \text{ tens} \\ +\ 50 = 5 \text{ tens} \\ \hline 80 = 8 \text{ tens} \end{array}$$

You can use the same rule to add numbers with three digits, or even 4 digits. For example,

$$\begin{array}{r} 300 = 3 \text{ hundreds} \\ +\ 500 = 5 \text{ hundreds} \\ \hline 800 = 8 \text{ hundreds} \end{array}$$

Just take off the zeros and add the numbers. Then, make sure you put the zeros back!

Let's try it with different numbers:

6 + 5 = 11
60 + 50 + 110
600 + 500 = 1,100

Now, use this rule to add the following numbers. Write the correct answers on the following blanks:

1. 4 + 8 = 12

   40 + 80 = 120

   400 + 800 = 1,200

Answer Sheet

Name _____ Date _____

2. 4 + 3 = 7

   40 + 30 = 70

   400 + 300 = 700

3. 4 + 1 = 5

   40 + 10 = 50

   400 + 100 = 500

4. 12 + 16 = 28

   120 + 160 = 280

   1,200 + 1,600 = 2,800

5. 15 + 18 = 33

   150 + 180 = 330

   1,500 + 1,800 = 3,300

6. 14 + 17 = 31

   140 + 170 = 310

   1,400 + 1,700 = 3,100

7. 18 + 36 = 54

   180 + 360 = 540

   1,800 + 3,600 = 5,400

Answer Sheet

Name _____ Date _____

ANSWERS

Using Estimation: Knowing What's Too Big and Too Small

Adding and subtracting large numbers can sometimes be difficult. Estimating is an easy way to figure out if your answer is close, or if you need to try again.

EX:
227 + 631 = _____
This looks hard. But there are some things you can know right away just by looking at it.

For example, what if you had an answer like 78?
You should know immediately that it must be wrong.
A 3-digit number + a 3-digit number can never equal a 2-digit number. It's too small!

OR, what if you had an answer like 12,428?
You should also know this is wrong.
A 3-digit number + a 3-digit number can never equal a 5-digit number. It's way too big!

If 227 + 631 is a difficult problem for you, you can still estimate an answer.
You should be able to determine that the answer probably has 3 digits or, at most, 4 digits.
(The actual answer is 858, a large three-digit number.)
Note: The same thing is true for subtraction.

Answer the following multiple choice problems. None of the possible answers are correct, but one is closer to the correct answer than any of the others. Pick the answer provided that is closest to the correct answer.

1. 428 + 298 =

a. 650
b. 65
c. 6,500

2. 82 + 45 =

a. 11
b. 1,100
c. 110

3. 634 + 56 =

a. 6,700
b. 67
c. 670

4. 856 – 32 =

a. 800
b. 8,000
c. 80

5. 7,324 – 119 =

a. 72
b. 720
c. 7,200

Answer Sheet

Name _____ Date _____

ANSWER

Using Rounding Up or Down to Estimate an Answer

What is easier to do in your in head?

800 + 100
OR
372 + 621 ?

You probably chose 800 + 100. All you have to do is add 8 + 1 and add two zeros. Sometimes when you need a quick answer that doesn't have to be exact, you can estimate by rounding.

Let's take 372 + 621 again. How can we turn this into an easy problem with lots of zeros? You can do this by rounding to the nearest hundred.

1. Look at the number in the tens place, the one immediately to the right of the hundreds place.
2. If it is 5 or over, round up to the next hundred by adding 1 to the hundreds place.
3. For 372, the tens digit is 7. It's 5 or greater, so we add 1 to 3 and get 4 in the hundreds place. 4_ _.
4. What do we put in the tens and ones place? We put zeros because we have rounded up. 400.
5. Let's do the same with 621. Because 2 is less than 5, we round down to the nearest hundred which is 6.

Now it's time to do the addition

400 + 600 = 1,000.

This is our estimated answer. What's the exact answer?
It's 993, which is pretty close in value.

Answer Sheet

Name _____ Date _____

Answer the following multiple choice questions by rounding up or rounding down the numbers in the problem provided. None of the possible answers is correct, but one is closer to the correct answer than any of the others. Pick the approximate answer provided that is closest to the correct answer.

1. 328 + 598 =

a. 800
b. 80
c. 8,000

2. 52 + 49 =

a. 10
b. 1,000
c. 100

3. 784 + 81 =

a. 8,800
b. 88
c. 880

4. 756 - 39 =

a. 7,000
b. 700
c. 70

5. 4,124 - 139 =

a. 39
b. 390
c. 3,900

Answer Sheet

Name _____ Date _____

ANSWERS

Mixed Problems Requiring Estimation

Find the best estimate by rounding up or rounding down.

None of the possible answers are correct, but one is closer to the correct answer than any of the others. Pick the answer provided that is closest to the correct answer.

1. 327 + 516 = 800	a. 80	b. 800	c. 8,000
2. 689 + 173 = 900	a. 900	b. 9,000	c. 90
3. 542 + 198 = 700	a. 7,000	b. 70	c. 700
4. 263 + 77 = 380	a. 38	b. 380	c. 3,800
5. 482 + 237 = 700	a. 600	b. 700	c. 800
6. 617 – 426 = 200	a. 200	b. 2,000	c. 20
7. 387 + 187 = 600	a. 60	b. 6,000	c. 600
8. 871 – 329 = 600	a. 60	b. 600	c. 6,000
9. 352 – 51 = 300	a. 300	b. 30	c. 3,000
10. 78 + 491 = 580	a. 5,800	b. 580	c. 58
11. 789 + 821 = 1,600	a. 1,600	b. 1,500	c. 1,700
12. 835 – 263 = 500	a. 400	b. 500	c. 700

Challenge:

1. 4,279 + 2,912 = 7,000	a. 70,000	b. 7,000	c. 700
2. 3,897 + 5,267 = 8,000	a. 8,000	b. 80,000	c. 800
3. 5,933 – 3,361 = 3,000	a. 300	b. 3,000	c. 30,000

Answer Sheet

Name _____ Date _____

Fast Addition Moving Left to Right: The Break Down

One way to add large numbers quickly is to break down the second number into smaller parts and then add all the parts from left to right. For example:

34 + 27 = _____ is hard to do in your head. So, let's *break it down*.

27 is the same as 20 + 7.
Once you know this, the original problem becomes: 34 + 20 + 7 = _____ .
Now add this in your head:
34 + 20 = 54.
Then, 54 + 7 = 61.
You have your answer: 34 + 27 = 61.

Here's another example in 4 steps:

48 + 87 = _____

1. Rewrite the second number: 87 = 80 + 7.

2. Write the new problem:
48 + 80 + 7 = _____

3. Add left to right
48 + 80 = 128. Now add the 7 128 + 7 = 135.

135 is the answer!

Write the number that should go where the blank spaces are in the following three-part solutions using the adding left to right method:

1. 31 + 23 =

a. 23 = 20 + __3__
b. 31 + 20 + 3 =
c. 31 + 20 = 51. Then, 51 + __3__ = 54. The answer is 54.

2. 44 + 67 =

a. 67 = __60__ + 7
b. 44 + 60 + 7 =
c. 44 + 60 = 104. Then, 104 + __7__ = 111. The answer is 111.

3. 27 + 52 =

a. 52 = __50__ + __2__
b. __27__ + 50 + 2 =
c. __27__ + 50 = 77. Then, 77 + __2__ = 79. The answer is 79.

Answer Sheet

Name _____ Date _____

ANSWERS

Fast Addition Moving Left to Right

Fast addition moving left to right is done in three steps. The three steps are as follows:

The problem is 32 + 23 = _____

* Step One: Rewrite the second number: 23 = 20 + 3
* Step Two: Write the new problem: 32 + 20 + 3 = _____
* Step Three: Add left to right: 32 + 20 = 52. Then, 52 + 3 = 55. The answer is 55.

In answering the problems below, use the three-step format (show your work):

Here's one more example before you do the rest of the problems by yourself. Fill in the blank spaces:

37 + 55 =

a. 55 = 50 + 5

b. 37 + 50 + 5 =

c. 37 + 50 = 87. Then, 87 + 5 = 92. The answer is 92.

---

1. 27 + 54 = _____

54 = 50 + 4
27 + 50 + 4 =
27 + 50 = 77. Then, 77 + 4 = 81. The answer is 81.

Answer Sheet

Name _____ Date _____

2. 41 + 35 = _____

35 = 30 + 5
41 + 30 + 5 =
41 + 30 = 71. Then, 71 + 5 = 76. The answer is 76.

3. 18 + 77 = _____

77 = 70 + 7
18 + 70 + 7 =
18 + 70 = 88. Then, 88 + 7 = 95. The answer is 95.

4. 36 + 36 = _____

36 = 30 + 6
36 + 30 + 6 =
36 + 30 = 66. Then, 66 + 6 = 72. The answer is 72.

5. 62 + 26 = _____

26 = 20 + 6
62 + 20 + 6 =
62+ 20 = 82. Then, 82 + 6 = 88. The answer is 88.

6. 51 + 44 = _____

44 = 40 + 4
51 + 40 + 4 =
51 + 40 = 91. Then, 91 + 4 = 95. The answer is 95.

Answer Sheet

Name _____ Date _____

x2 Multiplying by 2 and 5 Using Patterns x5

Everyone should memorize the multiplication tables. Sometimes, though, there are other ways to quickly multiply and divide numbers by recognizing patterns.

For example, to multiply by 2, you can memorize the multiplication table, or you can recognize that multiplying a number by 2 is just *doubling* that number. For example:

2 x 8 = 16. Another way to find out the answer to 2 x 8 is to recognize that doubling 8 (8 + 8) also equals 16.

This works for bigger numbers, too. 2 x 136 = 272. Another way to find out the answer to 2 x 136 is to recognize that *doubling* 136 (136 + 136) also equals 272.

Another example of how recognizing patterns can help you multiply numbers is multiplying by 5. Any time you multiply a number by 5, the last digit in the answer *must be either* 5 *or* 0. If the last digit is anything other than a 5 or 0, it is wrong. For example:

- 5 x 2 = 10: The first digit of this answer is 1, and the last digit is 0.
- 5 x 3 = 15: The last digit is 5
- 5 x 8 = 40: The last digit is 0
- 5 x 18 = 90: The last digit is 0
- 5 x 253 = 1,265: The last digit is 5
- 5 x 12 *can't be* 72 because the last digit is 2 (The answer is 70)

Answer Sheet

Name _____ Date _____

Problems: **ANSWERS**

2 x 9 = 18 , 2 x 11 = 22 , 2 x 15 = 30 , 2 x 27 = 54 ,

2 x 32 = 64 , 2 x 77 = 154 , 2 x 112 = 224 , 2 x 164 = 328 ,

2 x 234 = 468 , 2 x 367 = 734 , 2 x 426 = 852 .

5 x 7 = 35 , 5 x 12 = 60 , 5 x 14 = 70 , 5 x 17 = 85 ,

5 x 20 = 100 , 5 x 25 = 125 .

Put a check by the problems that have to be wrong:

1. 5 x 16 = 80 _____

2. 5 x 19 = 93 ✓

3. 5 x 78 = 391 ✓

4. 5 x 92 = 460 _____

5. 5 x 156 = 784 ✓

6. 5 x 333 = 1665 _____

Answer Sheet

Name _____ Date _____

Dividing by 2 and 3 Using Patterns

Everyone should memorize the multiplication tables. Sometimes, though, there are other ways to quickly multiply and divide numbers by recognizing patterns.

To divide by 2 you can memorize the multiplication table, or you can recognize that dividing a number by 2 is just figuring out what *half* of the number is. For example:

6 divided by 2 = 3. *Half* of 6 is 3. You know this because 3 + 3 is 6. So, if you know *half* of 6 is 3, then you know how to divide by 2.

This works for bigger numbers too. 860 divided by 2 = 430. This means that 430 + 430 = 860 (which also means that 430 is *half* of 860). And 1,428 divided by 2 = 714. This means that 714 + 714 = 1,428 (which also means that 714 is *half* of 1,428).

To divide by 3 you can memorize the multiplication table, or you can recognize that dividing a number by 3 is just figuring out what *one-third* of the number is. For example:

6 divided by 3 = 2. *One-third* of 6 is 2. You know this because 2 + 2 + 2 is 6. So, if you know *one-third* of 6 is 2, then you know how to divide by 3.

This works for bigger numbers, too. 963 divided by 3 = 321. This means that 321 + 321 + 321 = 963 (which also means that 321 is *one-third* of 963). And 3,369 divided by 3 = 1,123 . This means that 1,123 + 1,123 + 1,123 = 3,369 (which also means that 1,123 is *one-third* of 3,369).

Answer Sheet

Name _____ Date _____

Solve the division problems below using this method, and explain your answer.

Ex: 42 divided by 2 = _____ . 21 + 21 = 42. Therefore, half of 42 = 21.

1. 40 divided by 2 = 20 .

2. 44 divided by 2 = 22 .

3. 68 divided by 2 = 34 .

4. 100 divided by 2 = 50 .

5. 146 divided by 2 = 73 .

Ex: 42 divided by 3 = _____ . 14 + 14 + 14 = 42. Therefore, one-third of 42 is 14.

6. 9 divided by 3 = 3 .

7. 15 divided by 3 = 5 .

8. 21 divided by 3 = 7 .

9. 33 divided by 3 = 11 .

10. 51 divided by 3 = 17 .

Answer Sheet

Name _____ Date _____

Multiplying by 3 Using Patterns

Multiplying by 3 is easier than multiplying by other numbers because of a certain pattern. When you multiply any number by 3, the digits of the answer must add up to a multiple of 3. Here are the multiples of 3 up to 100:

> 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99.

3 x 4 = 12. If you add together the two digits of the answer, you get 3. That is because 1 + 2 = 3. 3 is the first number on the list of multiples of 3 above. This is how you know the answer is right! If the answer is not on the list above, it is wrong.

3 x 16 = 48. Add up the two digits of the answer, 4 + 8 = 12. Since 12 is on the list of multiples of 3 above, the answer is probably right.

Solve the multiplication problems below and check your answer using this method. Show your work.

1. 3 x 8 = 24

2. 3 x 11 = 33

3. 3 x 14 = 42

4. 3 x 19 = 57

5. 3 x 20 = 60

6. 3 x 27 = 81

Answer the question. Then, put a check by the problems that have to be wrong:

Ex: 3 x 9 = 26. Does 2 + 6 = a multiple of 3? (In other words, is 8 on the list above?) No.

7. 3 x 13 = 39. Does 3 + 9 = a multiple of 3? Yes

8. 3 x 15 = 45. Does 4 + 5 = a multiple of 3? Yes

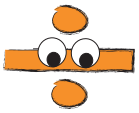
9. 3 x 21 = 62. Does 6 + 2 = a multiple of 3? No ✓

10. 3 x 26 = 78. Does 7 + 8 = a multiple of 3? Yes

11. 3 x 33 = 97. Does 9 + 7 = a multiple of 3? No ✓

Answer Sheet

Name _____ Date _____



Mixed Problems

Review the multiplication and division patterns, then solve the problems below.

Multiplying by 2: Recognize that multiplying a number by 2 is just doubling that number. For example: 2 x 8 = 16. Another way to find out the answer to 2 x 8 is to recognize that doubling 8 (8 + 8) also equals 16.

Multiplying by 5: Any time you multiply a number by 5, the last digit in the answer must be either 5 or 0. If the last digit is anything other than a 5 or 0, it is wrong.

Dividing by 2: Recognize that dividing a number by 2 is just figuring out what half of the number is. For example: 6 divided by 2 = 3. Half of 6 is 3. You know this because 3 + 3 is 6. So, if you know half of 6 is 3, then you know how to divide by 2.

Multiplying by 3: Multiplying by 3 is easier than you think because of a certain pattern. When you multiply any number by 3, the digits of the answer must add up to a multiple of 3. For example, 3 x 4 = 12. If you add together the two digits of the answer, you get 3. That is because 1 + 2 = 3.

2 x 4 = 8 , 2 x 50 = 100 , 2 x 13 = 26 , 2 x 18 = 36 , 2 x 22 = 44 , 2 x 27 = 54 ,

2 x 47 = 94 , 2 x 32 = 64 , 2 x 41 = 82 , 2 x 28 = 56 , 2 x 45 = 90 , 2 x 39 = 78 .

5 x 7 = 35 , 5 x 11 = 55 , 5 x 12 = 60 , 5 x 14 = 70 , 5 x 17 = 85 , 5 x 18 = 90 ,

5 x 20 = 100 , 5 x 21 = 105 , 5 x 22 = 110 , 5 x 30 = 150 , 5 x 31 = 155 , 5 x 32 = 160 .

6 divided by 2 = 3 , 12 divided by 2 = 6 , 14 divided by 2 = 7 ,

20 divided by 2 = 10 , 22 divided by 2 = 11 , 24 divided by 2 = 12 ,

30 divided by 2 = 15 , 40 divided by 2 = 20 , 50 divided by 2 = 25 ,

46 divided by 2 = 23 .

3 x 4 = 12 , 3 x 11 = 33 , 3 x 12 = 36 , 3 x 13 = 39 , 3 x 20 = 60 , 3 x 21 = 63 ,

3 x 22 = 66 , 3 x 30 = 90 , 3 x 31 = 93 , 3 x 32 = 96 , 3 x 40 = 120 , 3 x 41 = 123 .

Answer Sheet

Name _____ Date _____

Multiplying by 9 Using Patterns

Unlike with other numbers, multiplying any *single-digit* number by 9 results in a recognizable pattern. For example:

2 x 9 = **18**	**1 + 8** = 9
3 x 9 = **27**	**2 + 7** = 9
4 x 9 = **36**	**3 + 6** = 9
5 x 9 = **45**	**4 + 5** = 9

You should notice that 2 x 9 = 18 and that adding together the two digits of the answer equals 9. In other words, 1 + 8 = 9.

Fill out the rest of the chart by writing the correct number on the blank spaces.

6 x 9 = **54**	**5 + 4** = 9
7 x 9 = **63**	**6** + **3** = 9
8 x 9 = **72**	**7** + **2** = 9
9 x 9 = **81**	**8** + **1** = 9

Does this pattern work for 9 x 10? Yes or No?

Does it work for 9 x 11? Yes or No?

Answer Sheet

Name _____ Date _____

ANSWERS

Multiplying by 6 Using Patterns

Unlike with other numbers, multiplying *even* numbers by 6 results in a recognizable pattern. For example:

6 x **2** = **12**
6 x **4** = 2**4**
6 x **6** = 3**6**
6 x **8** = 4**8**

You should notice that the number that is multiplied by six (the second number in the equations above) is the same as the last digit of the answer. For example, if you multiply 6 by 2, the last digit of the answer is also 2. (The answer is 12.) This happens every time you multiply six by an even number. (This doesn't work for *odd* numbers.)

Write the correct number on the blank spaces.

1. 6 x 10 = 60

2. 6 x 12 = **72**

3. 6 x 14 = **84**

4. 6 x 16 = **96**

Challenge questions:

5. 6 x 18 = **108**

6. 6 x 26 = **156**

7. 6 x 42 = **252**

8. 6 x 74 = **444**