

# Oral Exam Study Guide

## Using the Study Guide

### Most Difficult Multiplication Facts

- Although I may ask you any of the facts from the multiplication facts table, focus especially on the highlighted most difficult ones.
- Recall that you only need to know *half* of the multiplication facts table since  $2 \times 3 = 3 \times 2$ , according to the commutative property of multiplication.
- You may want to learn the facts in this order: 2, 10, 11, 5, 3, 4, 9, 6, 7, 8, 12.
- Be mindful to the patterns of each number to help your recall.
- Secure “beachheads” in each row by memorizing easy products.
  - Then add or subtract multiples of that number to arrive at the answer.

### Divisibility Rules

- The divisibility rules for 2, 5, and 10 are fairly easy to remember.
- The numbers 3 and 9 have the *same* divisibility rule.

### Prime Numbers 2-47

- Notice that prime numbers are not listed in the multiplication facts table since by definition, a prime number has *two different factors*, itself and 1.
  - For example, 17 is prime because its only factors are 17 and 1.
- A composite number has *more than two* factors.
  - For example, 6 is composite because it has the factors 6, 1, 3, 2.
- The number 1 is neither prime nor composite since the *factors are the same*.
- The number 2 is the only even prime number.
- Besides 2, all prime numbers are odd. However, not all odd numbers are prime.
  - For example, the numbers 9, 15, 21, 35, etc. are odd, but not prime.
- Memorize all the prime numbers up to 47.

### Oral Exam Test Sheet

- See both sides of the Oral Exam test sheet for guidance.

### Study Strategy

- You get 60 seconds to answer 10 questions, averaging 6 seconds per question.
- Work on *accuracy first*, and *speed second*.
- Have study sessions in the morning, during the day, and in the evening.
- Study for 15-30 minutes each session, every day, until the Oral Exam.

## Most Difficult Multiplication Facts

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

# DIVISIBILITY RULES

<b>Divisible By?</b>	<b>Rule for Divisibility</b>	<b>Examples</b>
<b>2</b>	A number is <b>divisible by 2</b> if its ones digit is even (0, 2, 4, 6, 8).	10, 86, 102, 384
<b>3</b>	A number is <b>divisible by 3</b> if the sum of its digits is divisible by 3.	18, 36, 123, 609
<b>5</b>	A number is <b>divisible by 5</b> if its ones digit is 0 or 5.	20, 65, 130, 785
<b>9</b>	A number is <b>divisible by 9</b> if the sum of its digits is divisible by 9.	27, 63, 162, 819
<b>10</b>	A number is <b>divisible by 10</b> if its ones digit is 0.	30, 90, 170, 540

# PRIME NUMBERS FROM 2 TO 97

**2, 3, 5, 7, 11, 13, 17, 19, 23, 29,  
31, 37, 41, 43, 47, 53, 59, 61,  
67, 71, 73, 79, 83, 89, 97**

# Oral Exam

Last Updated: 7/4/24

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Attempt: \_\_\_\_\_ of 2                      Score: \_\_\_\_\_%                      Time Expired? Y

**Instructions:**

- (1) I ask a question, (2) you say the answer, (3) I write your answer.
- You have 60 seconds to answer 10 questions.
- A minimum 8 out of 10 (80% score) is required to pass.

**Key:**

- C = Correct  
I = Incorrect  
N = No Answer

Pick <input checked="" type="checkbox"/>	Multiplication Facts	C	I	N
<input type="checkbox"/>	2 × 6 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2 × 7 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2 × 8 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2 × 9 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3 × 6 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3 × 7 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3 × 8 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3 × 9 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4 × 6 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4 × 7 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4 × 8 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4 × 9 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	5 × 6 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	5 × 7 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	5 × 8 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	5 × 9 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	5 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	6 × 6 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	6 × 7 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	6 × 8 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	6 × 9 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	6 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	7 × 7 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	7 × 8 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	7 × 9 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	7 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	8 × 8 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	8 × 9 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	8 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	9 × 9 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	9 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	10 × 11 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	10 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	11 × 11 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	11 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	12 × 12 = _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pick <input checked="" type="checkbox"/>	Divisibility Rules	C	I	N
<input type="checkbox"/>	2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	5: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	9: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	10: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	46 divisible by _____ ? Why?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	51 divisible by _____ ? Why?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	475 divisible by _____ ? Why?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	_____ divisible by _____ ? Why?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pick <input checked="" type="checkbox"/>	Prime Numbers	C	I	N
<input type="checkbox"/>	2 prime?    Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3 prime?    Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	5 prime?    Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	7 prime?    Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	11 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	13 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	17 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	19 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	23 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	29 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	31 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	37 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	41 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	43 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	47 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	A prime 0-9?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	A prime 10-19?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	A prime 20-29?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	A prime 30-39?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	A prime 40-49?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	9 prime?    Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	15 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	27 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	33 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	49 prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	_____ prime?   Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Details

- The **Oral Exam** exhibits mastery of (1) multiplication facts, (2) divisibility rules, and (3) prime numbers.
- You get *two* attempts to pass the Oral Exam, which is required to pass MAT 025.
- If you get less than an 80% score, only *one* retake of the Oral Exam is permitted, but not on the same day.
- Since you get 60 seconds to answer 10 questions, you have on average 6 seconds to answer each question.
- Before your exam, I will randomly pick 10 questions from the Oral Exam test sheet that involves any combination of (1) multiplication facts, (2) divisibility rules, and (3) prime numbers.
- You may be asked any of the following mix of questions:
  - 10 multiplication facts.
  - 5 multiplication facts and 5 divisibility rules.
  - 5 multiplication facts and 5 prime numbers.
  - 5 divisibility rules and 5 prime numbers.
  - 10 prime numbers.
  - 6 multiplication facts, 2 divisibility rules, and 2 prime numbers.
  - Any other combination of multiplication facts, divisibility rules, and prime numbers.
- Use this test sheet to continually practice with someone until you consistently score 80% or higher.

## Preparing for the Oral Exam

- Prepare for any multiplication fact from 2 to 12.
  - **Sample Question 1:** What is the *product* of the two given *factors*?
    - Version A: “What is 6 times 9?”
    - Version B: “6 times 9 is *what*?”
    - Version C: “What is 9 times 6?” [Order of factors switched]
    - Version D: “9 times 6 is *what*?” [Order of factors switched]
  - **Sample Question 2:** What are two *factors* of the given *product* from the multiplication table?
    - Version A: “54 is *what* number times *what* number?”
    - Version B: “*What* number times *what* number is 54?”
  - **Sample Question 3:** What is the *other factor* when given *one factor* and the *product*?
    - Version A: “*What* times 6 is 42?”
    - Version B: “6 times *what* is 42?” [Order of factors switched]
    - Version C: “42 is 6 times *what*?”
    - Version D: “42 is *what* times 6?” [Order of factors switched]
- Prepare for any divisibility rule from 2, 3, 5, 9, and 10.
  - **Sample Question 1:**
    - Version A: “What is the divisibility rule for the number 9?”
    - Version B: “The number 9 has what divisibility rule?”
  - **Sample Question 2:**
    - Version A: “The number 475 is divisible by what number based on its divisibility rule? What is the rule?”
    - Version B: “What number divides into 475 based on its divisibility rule? What is the rule?”
- Prepare for any of the 15 prime numbers from 2 to 47.
  - **Sample Question 1:** “Is 19 a prime number?”
  - **Sample Question 2:** “Is 27 a prime number?”
  - **Sample Question 3:** “Name a prime number between 40 and 49.”