Rules of Divisibility

differentiated interactive notes & practice worksheets

by Joy M. Hall

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Rules of Divisibility

if it is even. (end with 0, 2, 4, 6, 8, or 0)

A number is divisible by 3 if... 

by it ends in a 5 or a 0.

A number is divisible by 4 if...

must be divisible by 2 and 4.

*A number is divisible by 10 if it ends in 0!
### Divisibility Rules

<table>
<thead>
<tr>
<th>Number Divisible By</th>
<th>Example Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>10, 12, 20, 22</td>
</tr>
<tr>
<td>4</td>
<td>4, 8, 12, 16</td>
</tr>
<tr>
<td>3</td>
<td>6, 12, 18, 30</td>
</tr>
<tr>
<td>6</td>
<td>6, 12, 18, 30</td>
</tr>
<tr>
<td>7</td>
<td>7, 21, 28, 35</td>
</tr>
<tr>
<td>8</td>
<td>8, 16, 24, 32</td>
</tr>
<tr>
<td>9</td>
<td>9, 18, 27, 36</td>
</tr>
<tr>
<td>10</td>
<td>10, 20, 30, 40</td>
</tr>
</tbody>
</table>

### Divisibility by 11

A number is divisible by 11 if the difference between the sum of the digits in the odd positions and the sum of the digits in the even positions is a multiple of 11.

### Example

- For the number 121, the sum of the digits in the odd positions is 1 + 1 = 2, and the sum of the digits in the even position is 2. The difference is 2 - 2 = 0, which is a multiple of 11, so 121 is divisible by 11.
A number is divisible by 2 if...

A number is divisible by 4 if...

A number is divisible by 6 if...

A number is divisible by 8 if...

A number is divisible by 3 if...

A number is divisible by 5 if...

A number is divisible by 7 if...

A number is divisible by 9 if...
**Divisibility Rules**

- **Divisible by 2**: The last digit is even. (It ends with 0, 2, 4, 6, or 8.)
- **Divisible by 4**: The last two digits are divisible by 4. (4, 8, 12, 16, 20, …)
- **Divisible by 6**: The number is divisible by both 2 and 3. Both rules have to work.
- **Divisible by 8**: The last three digits in the number are divisible by 8.

<table>
<thead>
<tr>
<th>Example: 342 = 3 + 4 + 2 = 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Add all the digits.</td>
</tr>
<tr>
<td>3. Check if the sum is divisible by 9.</td>
</tr>
<tr>
<td>4. If so, the number is divisible by 9.</td>
</tr>
<tr>
<td>5. Do a quick mental math division to double check.</td>
</tr>
<tr>
<td>6. Take the last digit and double it.</td>
</tr>
<tr>
<td>7. Subtract that from the remaining numbers.</td>
</tr>
<tr>
<td>8. Repeat until you have 1 or 2 digits.</td>
</tr>
</tbody>
</table>

1. Take the last digit and double it.
2. Subtract that from the remaining numbers.
3. Repeat until you have 1 or 2 digits.
4. Is that number divisible by 7?
5. If so, do a quick mental math division to double check.

**Divisibility by 3 and 9**

- **Divisible by 3**: The sum of the digits is divisible by 3. (3, 6, 9, 12, 15, …)
- **Divisible by 9**: The sum of the digits is divisible by 9. (9, 18, 27, 45, …)

<table>
<thead>
<tr>
<th>Example: 645 = 6 + 4 + 5 = 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Add all the digits.</td>
</tr>
<tr>
<td>2. Check if the sum is divisible by 3.</td>
</tr>
<tr>
<td>3. If so, the number is divisible by 3.</td>
</tr>
</tbody>
</table>
Directions: Cut on the dotted lines and glue the notes on the inside of the foldable rules of divisibility page.

NOTE: There is one extra note that will be glued on the notes page separately from the rest.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>The last three digits in the number are divisible by 8.</td>
<td>1. Take the last digit and double it.</td>
</tr>
<tr>
<td></td>
<td>2. Subtract that from the remaining numbers.</td>
</tr>
<tr>
<td></td>
<td>3. Repeat until you have 1 or 2 digits.</td>
</tr>
<tr>
<td></td>
<td>4. Is that number divisible by 7?</td>
</tr>
<tr>
<td></td>
<td>5. If so, do a quick mental math division to double check.</td>
</tr>
<tr>
<td>The last two digits are divisible by 4. (4, 8, 12, 16, 20, ...) - can use the hundreds chart to check)</td>
<td></td>
</tr>
<tr>
<td>It ends in a 5 or a 0.</td>
<td></td>
</tr>
</tbody>
</table>

* A number is divisible by 10 if it ends with a 0.

It is even. (It ends with a 0, 2, 4, 6, or 8.)

It is divisible by both 2 and 3. Both rules have to work.

| 1. Add all the digits.                                                   | 1. Add all the digits.                                              |
|                                                                            | 2. If the sum is divisible by 3, so is the number. (3, 6, 9, 12, 15, ... - can use the hundreds chart to check) |
|                                                                            | Example: 645 = 6 + 4 + 5 = 15                                       |
|                                                                            | 2. If the sum is divisible by 9, so is the number. (9, 18, 27, 45, ... - can use the hundreds chart to check) |
|                                                                            | Example: 342 = 3 + 4 + 2 = 9                                       |
Directions: Use your notes on Rules of Divisibility to complete this page. Circle each divisor that the number is divisible by.

1. 432
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

2. 357
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

3. 2,360
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

4. 5,671
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

5. 16,303
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

6. 38,475
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

7. 400,005
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

8. 782,340
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

9. 7,321,694
   is this number divisible by...
   2  3  4  5  6  7  8  9  10

10. 6,862,356
    is this number divisible by...
    2  3  4  5  6  7  8  9  10
<table>
<thead>
<tr>
<th></th>
<th>Divisibility Test</th>
<th></th>
<th>Divisibility Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>432</td>
<td>2.</td>
<td>357</td>
</tr>
<tr>
<td></td>
<td>Is divisible by:</td>
<td></td>
<td>Is divisible by:</td>
</tr>
<tr>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>3.</td>
<td>2,360</td>
<td>4.</td>
<td>5,671</td>
</tr>
<tr>
<td></td>
<td>Is divisible by:</td>
<td></td>
<td>Is divisible by:</td>
</tr>
<tr>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>5.</td>
<td>16,303</td>
<td>6.</td>
<td>38,475</td>
</tr>
<tr>
<td></td>
<td>Is divisible by:</td>
<td></td>
<td>Is divisible by:</td>
</tr>
<tr>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>7.</td>
<td>400,005</td>
<td>8.</td>
<td>782,340</td>
</tr>
<tr>
<td></td>
<td>Is divisible by:</td>
<td></td>
<td>Is divisible by:</td>
</tr>
<tr>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
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<tr>
<td>9.</td>
<td>7,321,694</td>
<td>10.</td>
<td>6,862,356</td>
</tr>
<tr>
<td></td>
<td>Is divisible by:</td>
<td></td>
<td>Is divisible by:</td>
</tr>
<tr>
<td></td>
<td>2 3 4 5 6 7 8 9 10</td>
<td></td>
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</table>
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1. **432**
   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

2. **357**
   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

3. **2,360**
   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

4. **5,671**
   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

5. **16,303**
   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

6. **38,475**
   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

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   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

8. **782,340**
   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

9. **7,321,694**
   - is this number divisible by...
     - 2
     - 3
     - 5
     - 10

10. **6,862,356**
    - is this number divisible by...
      - 2
      - 3
      - 5
      - 10
Directions: Use your notes on Rules of Divisibility to complete this page. Circle each divisor that the number is divisible by.

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   - Is this number divisible by...
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     - 10

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   - Is this number divisible by...
     - 2
     - 3
     - 5
     - 10

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   - Is this number divisible by...
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     - 3
     - 5
     - 10

6. 38,475
   - Is this number divisible by...
     - 2
     - 3
     - 5
     - 10

7. 400,005
   - Is this number divisible by...
     - 2
     - 3
     - 5
     - 10

8. 782,340
   - Is this number divisible by...
     - 2
     - 3
     - 5
     - 10

9. 7,321,694
   - Is this number divisible by...
     - 2
     - 3
     - 5
     - 10

10. 6,862,356
    - Is this number divisible by...
      - 2
      - 3
      - 5
      - 10
<table>
<thead>
<tr>
<th>Number</th>
<th>Divisibility Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>588</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>1,105</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>4,132</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>20,043</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>13,156</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>211,032</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>362,880</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>2,031,037</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>4,128,796</td>
<td>2 3 4 5 6 7 8 9 10</td>
</tr>
</tbody>
</table>
Directions: Use your notes on Rules of Divisibility to complete this page. Circle each divisor that the number is divisible by.

1. 210
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

2. 588
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

3. 1,105
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

4. 4,132
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

5. 20,043
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

6. 13,156
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

7. 211,032
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

8. 362,880
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

9. 2,031,037
   is this number divisible by...
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

10. 4,128,796
    is this number divisible by...
    - 2
    - 3
    - 4
    - 5
    - 6
    - 7
    - 8
    - 9
    - 10
Directions: Use your notes on Rules of Divisibility to complete this page. Circle each divisor that the number is divisible by.

1. 210
   is this number divisible by...
   2  3  5  10

2. 588
   is this number divisible by...
   2  3  5  10

3. 1,105
   is this number divisible by...
   2  3  5  10

4. 4,132
   is this number divisible by...
   2  3  5  10

5. 20,043
   is this number divisible by...
   2  3  5  10

6. 13,156
   is this number divisible by...
   2  3  5  10

7. 211,032
   is this number divisible by...
   2  3  5  10

8. 362,880
   is this number divisible by...
   2  3  5  10

9. 2,031,037
   is this number divisible by...
   2  3  5  10

10. 4,128,796
    is this number divisible by...
    2  3  5  10
Directions: Use your notes on Rules of Divisibility to complete this page. Circle each divisor that the number is divisible by.

1. 210
   is this number divisible by...
   \[ \begin{array}{c}
   2 \ 3 \ 5 \ 10
   \end{array} \]

2. 588
   is this number divisible by...
   \[ \begin{array}{c}
   2 \ 3 \ 5 \ 10
   \end{array} \]

3. 1,105
   is this number divisible by...
   \[ \begin{array}{c}
   2 \ 3 \ 5 \ 10
   \end{array} \]

4. 4,132
   is this number divisible by...
   \[ \begin{array}{c}
   2 \ 3 \ 5 \ 10
   \end{array} \]

5. 20,043
   is this number divisible by...
   \[ \begin{array}{c}
   2 \ 3 \ 5 \ 10
   \end{array} \]

6. 13,156
   is this number divisible by...
   \[ \begin{array}{c}
   2 \ 3 \ 5 \ 10
   \end{array} \]

7. 211,032
   is this number divisible by...
   \[ \begin{array}{c}
   2 \ 3 \ 5 \ 10
   \end{array} \]

8. 362,880
   is this number divisible by...
   \[ \begin{array}{c}
   2 \ 3 \ 5 \ 10
   \end{array} \]

9. 2,031,037
    is this number divisible by...
    \[ \begin{array}{c}
    2 \ 3 \ 5 \ 10
    \end{array} \]

10. 4,128,796
    is this number divisible by...
    \[ \begin{array}{c}
    2 \ 3 \ 5 \ 10
    \end{array} \]
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