# DIVISIBILITY BY 2

# **Rule: Any** [even number](http://www.mathwarehouse.com/dictionary/E-words/even-number.php) **can be divided by2. Even numbers are multiples of 2. A number is even if ends in 0,2,4,6, or 8.**

# DIVISIBILITY BY 3

# **Rule: A number is divisible by 3 if the sum of its digits can be divided by 3. Example: 408 : 4+0+8 = 12 and 12 is divisible by 3 therefore 408 is divisible by 8**

# DIVISIBILITY BY 4

# **Rule: A number is divisible by 4 if the number's  last two digits are divisible by 4.**

**Examples of numbers that are divisible by 4**

* **112 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpgsince the last two digits, 12, are divisible by 4, the number 112 is satisfies this rule and is also divisible by 4.**
* **10,948 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpgthe last two digits, 48, are divisible by 4. Therefore, the whole number is also.**

# DIVISIBILITY BY 5

# **Rule: A number is divisible by 5 if the its last**[digit](http://www.mathwarehouse.com/dictionary/D-words/definition-of-digit.php) **is a 0 or 5.**

# DIVISIBILITY BY 6

# **Rule A number is divisible by 6 if it is** [even](http://www.mathwarehouse.com/dictionary/E-words/even-number.php) **and if the sum of its** [digits](http://www.mathwarehouse.com/dictionary/D-words/definition-of-digit.php) **is divisible by 3.**

**Examples of numbers that are divisible by 6**

* **12 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg  satisfies both conditions:** 
  + **1) 12 is** [even](http://www.mathwarehouse.com/dictionary/E-words/even-number.php)
  + **2) the sum of its** [digits](http://www.mathwarehouse.com/dictionary/D-words/definition-of-digit.php) **(1+2 =3)  is divisible by 3. Therefore, 12 passes this test.**
* **114 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpgsatisfies both conditions** 
  + **1) 1+1+4 = 6 which is divisible by 3**
  + **2) 114 is even**
* **241,122** http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg**This passes the test because it's even and the sum of its digits can be** [evenly divided](http://www.mathwarehouse.com/dictionary/D-words/definition-of-divisible.php#evenlydivide) **by 3. ( 2+4+1+1+2+2=12 and 12 is divisible by 3)**

# DIVISIBILITY BY 7

**To determine if a number is divisible by 7, take the last digit off the number, double it and subtract the doubled number from the remaining number. If the result is evenly divisible by 7 (e.g. 14, 7, 0, -7, etc.), then the number is divisible by seven. This may need to be repeated several times.**

# **Example: Is 3101 evenly divisible by 7?**

**310 - take off the last digit of the number which was 1**

**-2 - double the removed digit and subtract it**

**308 - repeat the process by taking off the 8**

**-16 - and doubling it to get 16 which is subtracted**

**14 - the result is 14 which is a multiple of 7**

# DIVISIBILITY BY 8

# **Rule A number passes the test for 8 if the last three digits form a number can be divided by 8.**

**Examples of numbers that satisfy this rule and are divisible by 8**

* **9,640 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg640 ÷ 8 = 80 so the whole number, 9,640, is divisible by 8**
* **77, 184 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg184 ÷ 8 = 23 so  77,184 passes this divisibility test.**
* **67, 536 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg536 is divisible by 8 ( 536 ÷ 8 = 67) so 67,536, is also.**
* **-30 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg640 ÷ 8 = 80 so the whole number, 9640, passes this test.**
* **20,233,322,496 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpgWell, maybe you were wondering if this divisibility rule was really helpful or not. Once you get a giant number like 20,233,322,496, you start to realize what a nice trick this is to have up your sleeve! All you have to do is** [divide](http://www.mathwarehouse.com/dictionary/D-words/definition-of-divide.php) **496 by 8 to learn that the entire number is divisible by 8.**

# DIVISIBILITY BY 9

# **Rule A number is divisible by 9 if the sum of the digits are** [evenly divisibly](http://www.mathwarehouse.com/dictionary/D-words/definition-of-divisible.php) **9.**

**Examples of numbers that satisfy this rule and are divisible by 9**

* **4,518 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg4+5+1+8=18 and since 18 ÷9 = 2 , the whole number, 4,518, is divisible by 9**
* **7,209 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg7+2+0+9 = 18, and by the same logic of the prior example, 7,209 passes this divisibility test.**
* **6,993 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg,6993 is divisible by 9(6+9+9+3 = 27 & 27 ÷ 9 = 3) so 6,993 satisfies the rule for 9.**
* **10,006,470 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpgWell, maybe you were wondering if this divisibility trick was really helpful or not. Once you get a giant number like 10,006,470, you start to realize what a nice trick this is to have up your sleeve! All you have to do is add the digits (1+ 6+4+7 = 18) to quickly see that the entire number is divisible by 9 (18÷9 = 2).**

# DIVISIBILITY BY 10

# **Rule A number passes the test for 10 if its final digit is** [0](http://www.mathwarehouse.com/dictionary/Z-words/zero.php)**..**

# DIVISIBILITY BY 11

# **Rule A number passes the test for 11 if the difference of the sums of alternating digits is divisible by 11.(This abstract and confusing sounding rule is much clearer with a few examples)**

**Examples of numbers that satisfy this rule**

* **946 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg(9+6) - 4 = 11 which is, of course, evenly divided by 11 so 946 passes this divisibility test**
* **10,813 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg(1+8+3) - (0+1) = 12-1 =11. Yes, this satisfies the rule for 11!**
* **25, 784 = http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg(2+ 7 + 4) - (5+8) = 13 - 13 =0 . Yes, this does indeed work. In case you found this last bit confusing, remember that any number** [evenly divides](http://www.mathwarehouse.com/dictionary/D-words/definition-of-divide.php#evenlydivide) **0. Think about it, how many 11's are there in** [0](http://www.mathwarehouse.com/dictionary/Z-words/zero.php)**? None, right. Well that means that 11 divides** [zero](http://www.mathwarehouse.com/dictionary/Z-words/zero.php)**, zero times!**
* **119,777,658 http://www.mathwarehouse.com/images/direction_arrrow_CCCCFF.jpg(1+ 9 + 7 + 6 + 8) - (1+ 7 + 7 +5) = 31 - 20 = 11**

# DIVISIBILITY BY 12

1. Rule – A number is divisible by 12 if sum of its digits is divisible by 3 and last two digits are divisible by 4.   
   (Example: Number 11436 – Sum of digits is 1+1+4+3+6=15 which is divisible by 3 and last two digits are 36 which are divisible by 4; therefore 11436 is divisible by 12.)

# DIVISIBILITY BY 13

# Add four times the last digit to the remaining leading truncated number. If the result is divisible by 13, then so was the first number. Apply this rule over and over again as necessary. Example: 50661-->5066+4=5070-->507+0=507-->50+28=78 and 78 is 6\*13, so 50661 is divisible by 13.

# DIVISIBILITY BY 14

# DIVISIBILITY BY 15

# Rule - A number is divisible by 15 if it is divisible by 3 and 5. (Example: Number 14805 – Sum of the digits is 1+4+8+0+5=18 which is divisible by 3 and last digit is 5 which is divisible by 5; 14805 is divisible by 1

# DIVISIBILITY BY 16

# DIVISIBILITY BY 17

# Subtract five times the last digit from the remaining leading truncated number. If the result is divisible by 17, then so was the first number. Apply this rule over and over again as necessary. Example: 3978-->397-5\*8=357-->35-5\*7=0. So 3978 is divisible by 17.

# DIVISIBILITY BY 18

1. Rule - A number is divisible by 18 if it is divisible by 9 and 2.  
   (Example: Number 17694 – Sum of the digits is 1+7+6+9+4=27 which is divisible by 9 and last digit is 4 which is divisible by 2; therefore 17694 is divisible by 18.)

# DIVISIBILITY BY 19

# Add two times the last digit to the remaining leading truncated number. If the result is divisible by 19, then so was the first number. Apply this rule over and over again as necessary. EG: 101156-->10115+2\*6=10127-->1012+2\*7=1026-->102+2\*6=114 and 114=6\*19, so 101156 is divisible by 19.

# DIVISIBILITY BY 20

1. Rule - A number is divisible by 20 if its tens digit is even and last digit (units) is 0.  
   (Example: Number 64020 – Tens digit of 64020 is even and last digit (units) is 0; therefore 64020 is divisible by 20.)

# DIVISIBILITY BY 23

# 3\*23=69, ends in a 9, so ADD. Add 7 times the last digit to the remaining leading truncated number. If the result is divisible by 23, then so was the first number. Apply this rule over and over again as necessary. Example: 17043-->1704+7\*3=1725-->172+7\*5=207 which is 9\*23, so 17043 is also divisible by 23.

# DIVISIBILITY BY 20

# DIVISIBILITY BY 29

# Add three times the last digit to the remaining leading truncated number. If the result is divisible by 29, then so was the first number. Apply this rule over and over again as necessary. Example: 15689-->1568+3\*9=1595-->159+3\*5=174-->17+3\*4=29, so 15689 is also divisible by 29.

# DIVISIBILITY BY 20