Divisibility Rules - Worksheet

Skill

Group A - Divisible by 2, 4, 8, 5 or 10

Here are the divisibility rules for 2, 4, 8, 5 and 10.

Divisible by 2	An even number. The units digit is 0, 2, 4, 6, or 8.
Divisible by 4	The last two digits are divisible by 4.
Divisible by 8	The last three digits are divisible by 8.
Divisible by 5	The units digit is 0 or 5.
Divisible by 10	The units digit is 0.

Use them to test the following numbers for divisibility. Tick the boxes where the number passes the divisibility test. The first one is done for you.

	by 2	by 4	by 8	by 5	by 10
220	✓	✓		✓	✓
135					
360					
765					
1260					
3010					
15832					

Divisibility Rules - Worksheet

Group B - Divisible by 3, 6, 9 or 12

Here are the divisibility rules for 3, 6, 9 and 12.

Divisible by 3	The sum of its digits is a multiple of 3.
Divisible by 6	The number is even and the sum of its digits is a multiple of 3.
Divisible by 9	The sum of its digits is a multiple of 9.
Divisible by 12	The number is divisible by 3 and 4. The sum of its digits is a multiple of 3 and the last two digits are divisible by 4.

Use them to test the following numbers for divisibility. Tick the boxes where the number passes the divisibility test.

	by 3	by 6	by 9	by 12
93				
135				
180				
210				
2184				
5355				
77112				

Divisibility Rules - Worksheet

Group C - Divisible by 7 or 11

Here are the divisibility rules for 7 and 11.

Divisible by 7	Multiply the last digit by 2 and then subtract from the rest of the number. Repeat if necessary. If this value is a multiple of 7, the original number was a multiple of 7. Or Multiply the last digit by 5 and add this to the remaining digits. Repeat if necessary. If this value is a multiple of 7, the original number is divisible by 7.
Divisible by 11	If the alternating sum of the digits of a number is any multiple of 11 (positive, negative or zero), the original number is a multiple of 11. The **alternating sum** of the digits of 23456 would be 2 - 3 + 4 - 5 + 6 = 4.

Use them to test the following numbers for divisibility. Tick the boxes where the number passes the divisibility test.

	by 7	by 11
183		
315		
792		
1287		
3465		
51408		
134596		

Divisibility Rules - Worksheet

Applied

1) **(a)** Use the divisibility rules for 8 and 3 to test if 2184 is divisible by 24

(b) Joe wanted to test if 10374 was divisible by 18. He used the divisibility tests for 3 and 6 and stated that because it passed the tests for 3 and 6, it must also be divisible by 18? Comment on Joe's method.

2) **(a)** A rectangle with integer dimensions has an area of 1680 cm^2. Determine, using a divisibility test, whether it is possible for the width of the rectangle to be 15 cm.

(b) A triangle whose base and height are integers has an area of 238 cm^2. Determine, using a divisibility test, whether it is possible for the base of the triangle to be 14 cm.

3) **(a)** Sarah wished to test a number for divisibility by 84. Which divisibility tests of smaller values should she use for her test?

(b) Use the tests from part (a) to see if 11970 is divisible by 84.

4) **(a)** A number 56[n]24 is divisible by 8, where [n] is a missing digit. What is the lowest possible value of [n]?

(b) The number 9271[n]45 is divisible by 11. Find the value of [n].

5) **(a)** By considering the first 4 multiples of 20, describe a test to check if a number is divisible by 20.

(b) By considering the first 4 multiples of 25, describe a test to check if a number is divisible by 25.

Divisibility Rules - Answers

	Question	Answer
	Skill Questions	
Group A		

	by 2	by 4	by 8	by 5	by 10
220	✓	✓		✓	✓
135					
360					
765					
1260					
3010					
15832					

	by 2	by 4	by 8	by 5	by 10
220	✓	✓		✓	✓
135				✓	
360	✓	✓	✓	✓	✓
765				✓	
1260	✓	✓		✓	✓
3010	✓			✓	✓
15832	✓	✓	✓		

Group B

	by 3	by 6	by 9	by 12
93				
135				
180				
210				
2184				
5355				
77112				

	by 3	by 6	by 9	by 12
93	✓			
135	✓		✓	
180	✓	✓	✓	✓
210	✓	✓		
2184	✓	✓		✓
5355	✓		✓	
77112	✓	✓	✓	✓

Group C

	by 7	by 11
183		
315		
792		
1287		
3465		
51408		
134596		

	by 7	by 11
183		
315	✓	
792		✓
1287		✓
3465	✓	✓
51408	✓	
134596	✓	✓

Divisibility Rules - Answers

	Question	Answer
	Applied Questions	
1)	a) Use the divisibility rules for 8 and 3 to test if 2184 is divisible by 24	a) 184 is divisible by 8 2+1+8+4=15, 15 is divisible by 3 2184 is divisible by 24
	b) Joe wanted to test if 10374 was divisible by 18. He used the divisibility tests for 3 and 6 and stated that because it passed the tests for 3 and 6, it must also be divisible by 18? Comment on Joe's method.	b) Joe has used the wrong tests. He should have used the highest powers of the prime factor of 18 which are 2 and 9.
2)	a) A rectangle with integer dimensions has an area of 1680 cm^2. Determine, using a divisibility test, whether it is possible for the width of the rectangle to be 15 cm.	a) The last digit is 0 so it is divisible by 5. 1+6+8+0=15, so it is divisible by 3. Therefore, it is divisible by 15.
	b) A triangle whose base and height are integers has an area of 238 cm^2. Determine, using a divisibility test, whether it is possible for the base of the triangle to be 14 cm.	b) $238 \times 2 = 476$. 476 is even so divisible by 2. $47 - 2 \times 6 = 35 = 7 \times 5$, so is divisible by 7. 476 is therefore divisible by 14.

Divisibility Rules - Answers

3)	**a)** Sarah wished to test a number for divisibility by 84. Which divisibility tests of smaller values should she use for her test?	**a)** $84 = 2^2 \times 3 \times 7$ Sarah should use 4, 3 and 7.
	b) Use the tests from part (a) to see if 11970 is divisible by 84.	**b)** 1+1+9+7+0 = 18, so it is divisible by 3. $1197 - 2 \times 0 = 1197,$ $119 - 2 \times 7 = 105,$ $10 - 2 \times 5 = 0,$ so it is divisible by 7. 70 is not divisible by 4. So 11970 is not divisible by 84.
4)	**a)** A number 56[n]24 is divisible by 8, where [n] is a missing digit. What is the lowest possible value of [n]?	**a)** 124 is not divisible by 8. 224 is divisible by 8, so the missing digit is 2.
	b) The number 9271[n]45 is divisible by 11. Find the value of [n].	**b)** Let the missing digit be x. $9 - 2 + 7 - 1 + x - 4 + 5 = 14 + x$ $14 + x$ must be a multiple of 11. $x = 8$

Divisibility Rules - Answers

5)	**a)** By considering the first 4 multiples of 20, describe a test to check if a number is divisible by 20.	**a)** 20, 40, 60, 80, ... The last digit must be 0 and the second to last must be even.
	b) By considering the first 4 multiples of 25, describe a test to check if a number is divisible by 25.	**b)** 25, 50, 75, 100,... If the last two digits are 00, 25, 50 or 75, it is divisible by 25.