

Name: _____ Date _____ #48 Number Sets

For each set of numbers decided if it is closed or not for each operation. If you say it is not closed, provide a counter example to prove your answer.

1. The natural numbers are closed under...		
Closed	Operation	Counter-example if you said it is not closed
Yes	Addition	
No	Subtraction	$5 - 8 = -2$ -2 is not natural
Yes	Multiplication	
No	Division	$10 \div 4 = \frac{5}{2}$ $\frac{5}{2}$ is not natural

2. The integers are closed under...		
Closed	Operation	Counter-example if you said it is not closed
Yes	Addition	
Yes	Subtraction	
Yes	Multiplication	
No	Division	$-3 \div -12 = \frac{1}{4}$ $\frac{1}{4}$ is not an integer

3. The rational numbers are closed under...		
Closed	Operation	Counter-example if you said it is not closed
Yes	Addition	
Yes	Subtraction	
Yes	Multiplication	
Yes	Division	

Identify the set(s) to which each of the following numbers belongs by marking an "x" in the appropriate boxes. Remember it may belong to more than 1 set.

	Number	Natural	Integer	Rational
4.	6	X Best	X	X
5.	-3		X Best	X

		\mathbb{N}	\mathbb{Z}	\mathbb{Q}
6.	$-\frac{1}{9}$			X_{Best}
7.	$\sqrt{100} = 10$	X_{Best}	X	X
8.	$6 + 11 = 17$	X_{Best}	X	X
9.	$(-2)(-7) = 14$	X_{Best}	X	X
10.	$\frac{-10}{2} = -5$		X_{Best}	X
11.	$\frac{12}{\sqrt{196}} = \pm \frac{12}{14}$			X_{Best}
12.	$-7 - (-17) = 10$	X_{Best}	X	X
13.	$\sqrt{8^2} = 8$	X_{Best}	X	X
14.	-9		X_{Best}	X
15.	$\frac{5}{2}$			X_{Best}
16.	219	X_{Best}	X	X
17.	$\frac{\sqrt{25}}{5} = \frac{5}{5}$ or 1	X_{Best}	X	X
18.	$\frac{-\sqrt{8}}{\sqrt{2}} = -\sqrt{\frac{8}{2}} = -\sqrt{4} = -2$	X can be argued	X_{Best}	X
19.	$\frac{1}{3} \div \sqrt{9}$ $\frac{1}{3} \div 3$ or $\frac{1}{3} \cdot \frac{1}{3} = \frac{1}{9}$			X_{Best}
*20.	$6.25 = 6\frac{1}{4}$ or $\frac{25}{4}$			X_{Best}

while square roots can be + or -, if the problem specifically has the - sign, they want the negative square root

it could technically be

$\frac{1}{3} \div -3$ also or $-\frac{1}{9}$

But when they don't put the - sign, they want the positive square root