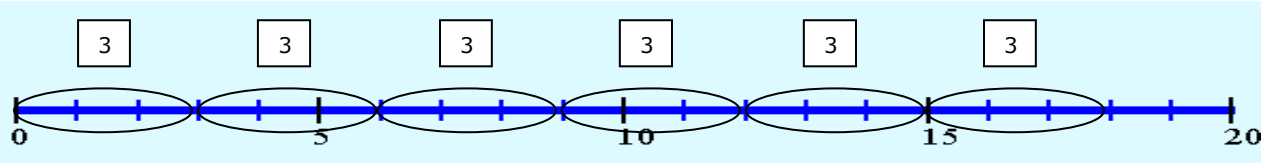
Division: goes-into (gzinta) vs. divvy-up

20 ÷ 3

There are a lot of different ways to think about 20 ÷ 3. Sure, it's division—because of the ÷, but take a look: you can also see the subtraction and addition and multiplication and fractions in it. A great source for online illustrations, examples, practice, and extensions is the National Library of Virtual Manipulatives: http://matti.usu.edu/nlvm/nav/vlibrary.html [That's where I created some of the illustrations for this handout. Others I made from scratch. —Larry]

	gzinta	divvy-up
question	how many 3's in 20?	20 divided into 3 groups: how much does each group get?
start	put 20 (2 tens) in the pot	put 20 (2 tens) in the pot set up 3 containers
do this	**grab 3 ones out of the pot and keep 'em in a bunch.** put a ring around the bunch to keep it separate. [you'll be counting the bunches of 3.]	**put one from the pot in each container**
ask	look at the pot. is there enough left to take 3 more? if yes, grab 3 more and keep them in a separate bunch. if no, stop	look at the containers: izzit fair (does each container have the same? if yes, increment each container's share again, if no, stop and put the items that make it unfair back in the pot
end	stop when you can't grab another 3, count how many threes you grabbed. say how much is left over in the pot	stop when there's nothiing left in the pot or when unfairness happens (when you don't have enough in the pot for each group the same amount. if there's a remainder, say what it is.
see	how many bunches of 3 you have how much is left in the pot	how much there is in each container how much is left over in the pot
say	3 goes into 20 x times with y left over	20 divided into 3 groups means each group gets x with y left over
check	are your left overs more than 3? if they are, you can have another bunch of 3 do you have exactly three in each bunch?	are your left overs more than 3? if they are, you can distribute another round does each group have the same amount?

number line

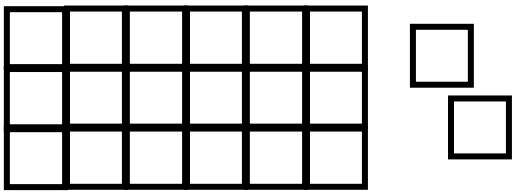


for illustrations and practice, go to

http://matti.usu.edu/nlvm/nav/frames_asid_156_g_1_t_1.html and hit ÷, then New Problem.
or try http://matti.usu.edu/nlvm/nav/frames_asid_180_g_1_t_1.html

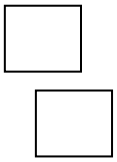
filling arrays

make a row or column of 3 (I'll use a column here) until you'd go over 20 if you put another one in



or

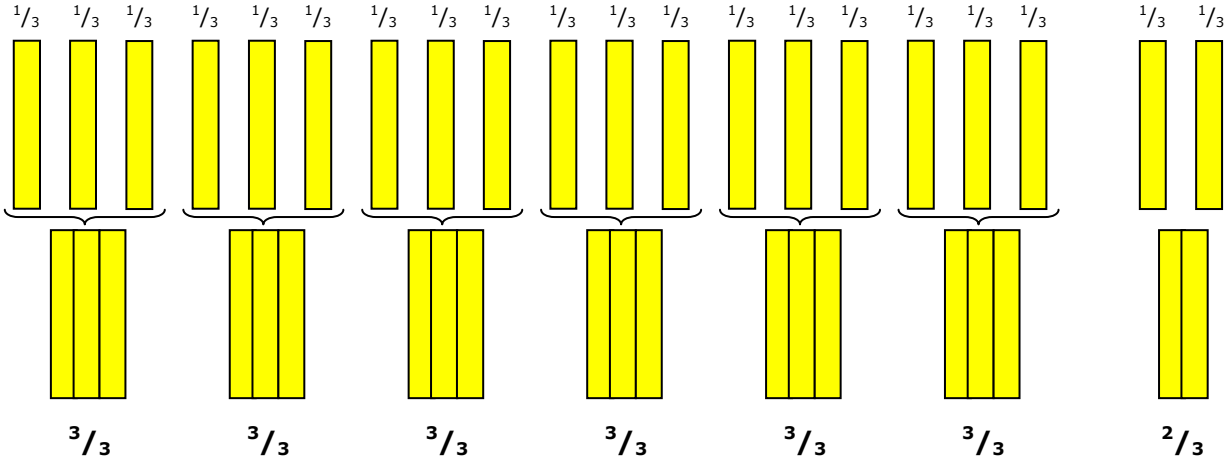
1	4	7	10	13	16
2	5	8	11	14	17
3	6	9	12	15	18



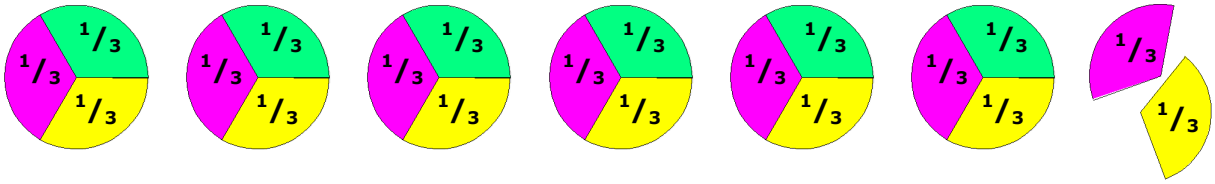
so you have a 3 x 6 or 6 x 3 array with 2 left over

fractions

20 ÷ 3 can also be thought of as 20/3 which is "twenty thirds" or 20 * 1/3. You still end up having to group the thirds into groups of 3 to find out how many wholes you have.



Or you could think of it like this, since 20 ÷ 3 can be written 20/3 which is "twenty thirds" or 20 * 1/3 :



for online examples, go to
http://matti.usu.edu/nlvm/nav/frames_asid_102_g_1_t_1.html
and http://matti.usu.edu/nlvm/nav/frames_asid_103_g_1_t_1.html

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