Model 1 Dividing Numbers

9 / 4	*evaluates to*	2
10 / 4	*evaluates to*	2
11 / 4	*evaluates to*	2
12 / 4	*evaluates to*	3
13 / 4	*evaluates to*	3
14 / 4	*evaluates to*	3
15 / 4	*evaluates to*	3
16 / 4	*evaluates to*	4

9 / 4.0	*evaluates to*	2.25
10 / 4.	*evaluates to*	2.5
11. / 4	*evaluates to*	2.75
12 / 4.0	*evaluates to*	3.0
13 / 4.	*evaluates to*	3.25
14.0 / 4	*evaluates to*	3.5
15 / 4.0	*evaluates to*	3.75
16 / 4.	*evaluates to*	4.0

Questions (15 min) Start time:

1. In the first table, which number(s) divided by 4 evaluate to 3? What is significant about the number of answers you have written down?

2. How do the answers in the first table differ from the second table?

3. To the right of the second table, round each answer to the closest integer. How do those values compare to what you see in the first table?

4. Carefully explain the difference between the number formats in the first and second tables.

5. Complete the table:

14. / 4.	*evaluates to*	
14. / 4	*evaluates to*	
14 / 4.	*evaluates to*	
14 / 4	*evaluates to*	

6. Dividing real numbers (also known as ***floating-point*** numbers) gives you different results from dividing integers. In the previous question:

a) Which rows evaluate to an integer?

b) Which rows evaluate to a real number?

c) When will Java perform ***integer division***?

7. Imagine you are writing a Java program that requires division.

a) What must be true about the ***operands*** (the numbers before and after the operator) for you to get the mathematically correct answer?

b) Does it need to be true for both operands?

8. Consider what you know about addition (+). If you add two integers in Java, will the result always be mathematically correct? Justify your answer.

9. What about subtraction (-) and multiplication (*)? If you subtract or multiply two integers in Java, will the answer always be mathematically correct? Justify your answer.

10. Summarize what you have learned about the difference between integer division and floating-point division.