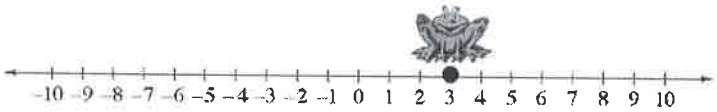
3.2.1 How does it move?

Addition, Subtraction, and Opposites

In this section, you will work to solve problems that involve distances and directions using diagrams and numbers. This work will begin your investigation of **integers** (positive and negative whole numbers and zero).

3-90. Elliott is so interested in the frogs that he is developing a video game about them. In his game, a frog starts on a number line like the one below. The frog can hop to the left and to the right.



For each part below, the game starts with the frog sitting at the number 3 on the number line. Use your **resource page** to answer Elliott's challenges below.

start

number lines

a. If the frog starts at 3, hops to the right 4 units, to the left 7 units, and then to the right 6 units, where will the frog end up?

b. If the frog makes three hops to the right and lands on 10, list the lengths of two possible combinations of hops that will get it from 3 to 10.

c. Could the frog land on a positive number if it makes three hops to the left? Use an example to show your thinking.

d. Additional Challenge: The frog made two hops of the same length to the right and then hopped 6 units to the left. If the frog ended up at 11 on the number line, how long were the first two hops?

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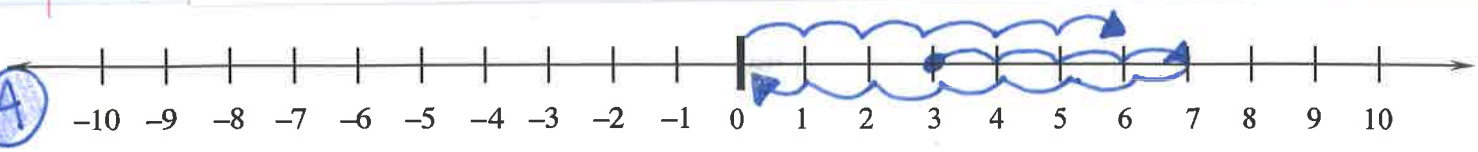
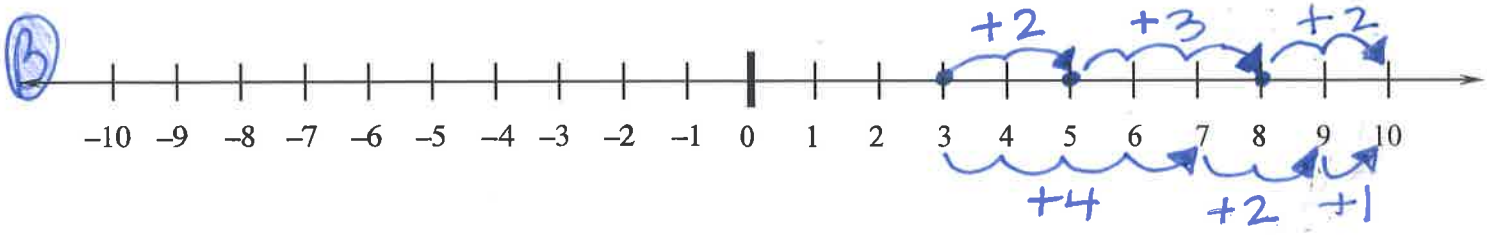
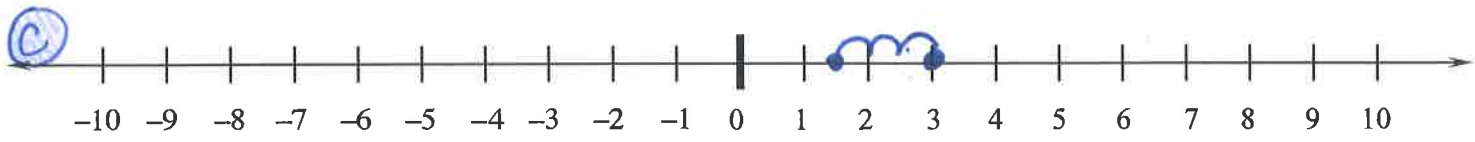
A


–10 –9 –8 –7 –6 –5 –4 –3 –2 –1 0 1 2 3 4 5 6 7 8 9 10

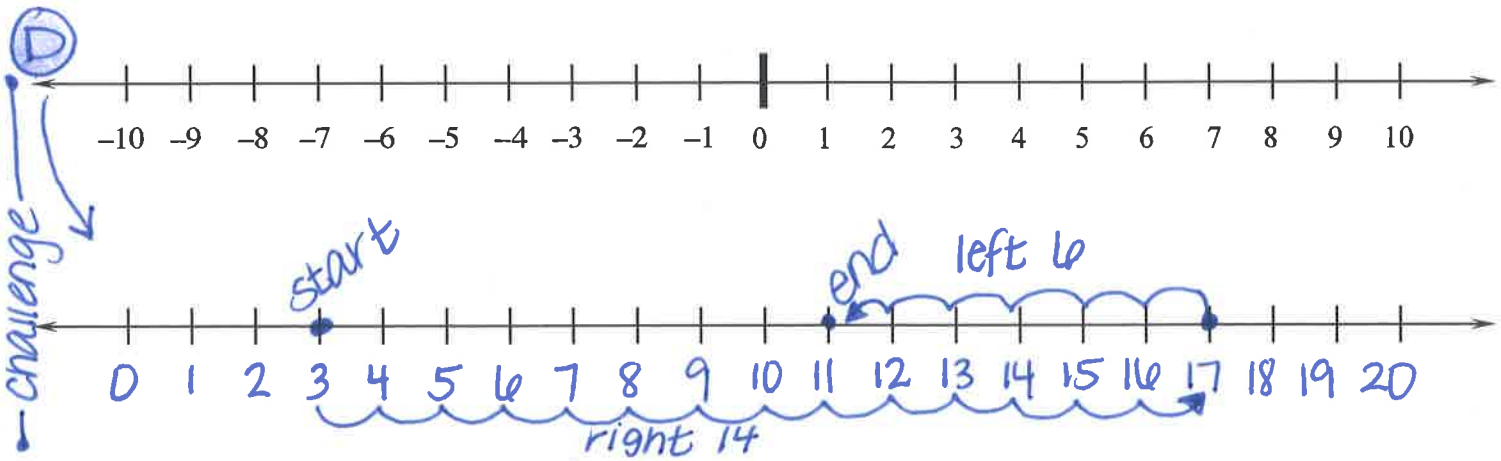
B


+2
+3
+2
–10 –9 –8 –7 –6 –5 –4 –3 –2 –1 0 1 2 3 4 5 6 7 8 9 10
+4
+2
+1

C


–10 –9 –8 –7 –6 –5 –4 –3 –2 –1 0 1 2 3 4 5 6 7 8 9 10

D


–10 –9 –8 –7 –6 –5 –4 –3 –2 –1 0 1 2 3 4 5 6 7 8 9 10
challenge
start
end
left 16
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
right 14

7

3-90 (A) The frog will end up on 6.

(B) Two possible combinations are
right 2, right 3, right 2
right 4, right 2, right 1

(C) Yes, the frog can land on a positive number if each jump is less than 1. For example, left ½, left ½, left ½ would land on 1½.
*Note: Zero is not a positive number.

(D) Working backwards, I discovered that the frog jumped 14 right to land on 17 then 6 left to land of 11.

Since the 14 jumps to the right were 2 hops of the same length, each hop was ____ to the right.

challenge