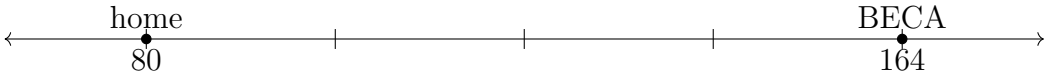
### 3.2 Extension: Ratio partition of a line segment

1. Do Now: Dr. Huson's commute is from 80th Street to 164th Street.
   (a) On what block is he half way? Mark it and label it with the street number.
   (b) On the way to work, mark and label the block when he is three-quarters of the way to BECA.

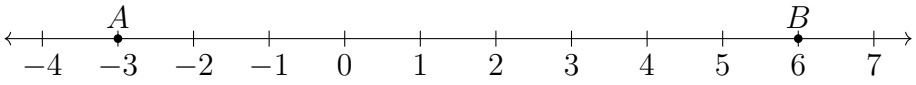



2. Find each pair of numbers with the given sum.
   (a) Example: Two numbers with a ratio of $3:1$ that sum to 20 are $15:5$.
   (b) $2:1$, sum 9

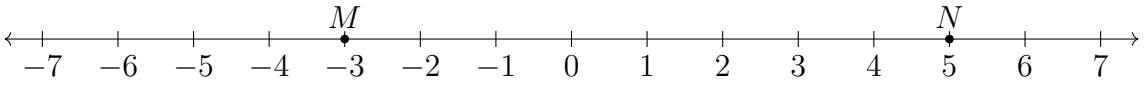
   (c) $1:1$, sum 100

   (d) $2:3$, sum 20

3. Divide (partition) $\overline{AB}$, $A=-3$ and $B=6$, into three equal parts. Mark and label the dividing points $P$ and $Q$.




4. Partition $\overline{MN}$, $M=-3$ and $N=5$, in the ratio $3:1$ with point $P$.



5. Simplify as a fraction each expression.

   (a) $\frac{1}{2} + \frac{1}{3} =$

   (b) $\frac{1}{2} \times \frac{1}{3} =$

**Review: Scientific notation**

*By "scientific notation" we mean in the form $a \times 10^k$ where $1 \leq a < 10$ and $k$ is an integer.*

6. Convert each value to scientific notation.

   (a) 40,000

   (b) 560,000

7. Expand each value to regular numeric form. (i.e. an integer)

   (a) $7 \times 10^3$

   (b) $2.5 \times 10^4$

8. Calculate each product. Leave in exponential form.

   (a) $10^3 \times 10^3$

   (b) $10^2 \times 10^6$

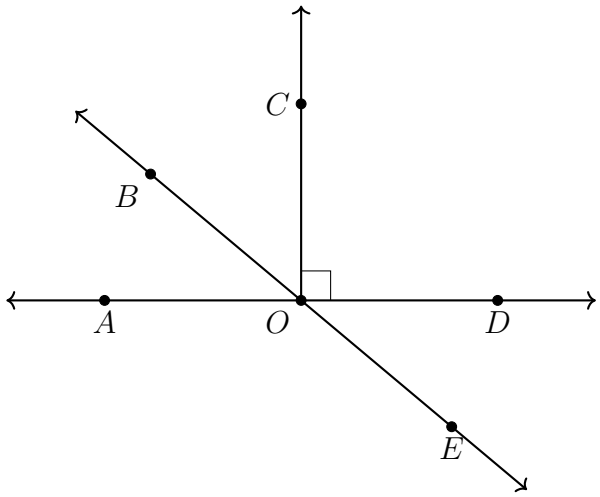
9. Calculate and write as scientific notation.

   (a) $400 \times 9.5^2 - 1100$

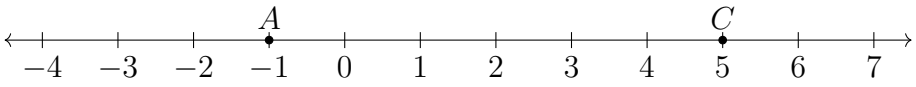
   (b) The mean distance of the earth to the moon, 92,00,000 miles.

10. The dimensions of an official ping pong table are 9 feet by 5 feet. Express the area of a table in square *inches*.

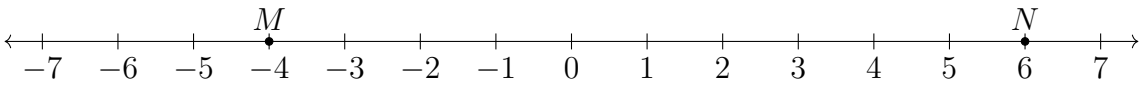
11. In the diagram below $\angle BOC = 8x$ and $\angle DOE = 3x + 13$. CCSSM.8.G.B.5
Find $m\angle AOB$.



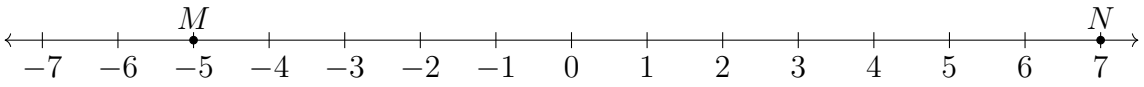
12. The point $B$ is two thirds of the way from $A = -1$ to $C = 5$. Find the coordinate of $B$. Mark and label $B$ on the graph of $\overleftrightarrow{AC}$.



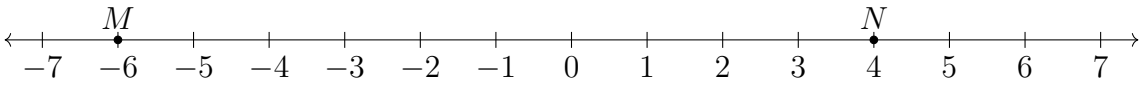

13. Point $P$ partitions $\overline{MN}$, $M = -4$ and $N = 6$, in the ratio $3 : 2$. Find the value of point $P$. Mark and label $P$ on the graph.




14. Point $P$ partitions $\overline{MN}$, $M = -5$ and $N = 7$, in the ratio $3 : 1$. Find the value of point $P$. Mark and label $P$ on the graph.




15. Point $P$ partitions $\overline{MN}$, $M = -6$ and $N = 4$, in the ratio $1 : 4$. Find the value of point $P$. Mark and label $P$ on the graph.




16. In the line segment $\overline{ABC}$, $\overline{AB}$ is twice as long as $\overline{BC}$. $AB = 12x - 6$ and $AC = 15x + 9$. Find $BC$.