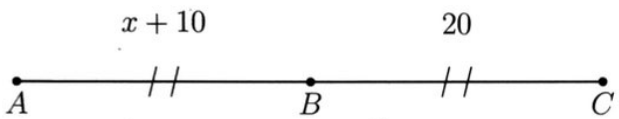
BECA / Dr. Huson / Geometry
Unit 8: Year-to-date Regents review
16 February 2023

Name: Solutions

8.3 Classwork: Partitioning a line segment

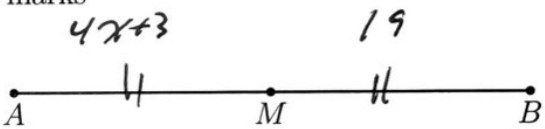
1. Point B is the midpoint of $\overline{AC}$, with $AB = x + 10$, $BC = 20$. First write an equation representing the situation, find x, then check it.



$x+10 = 20$
$x = 10$

$(10)+10 = 20$ ✓

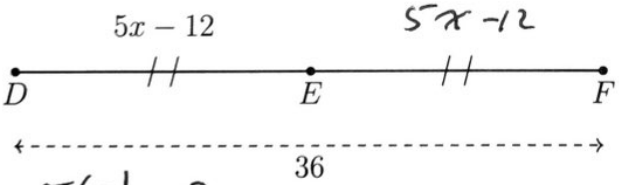
2. Given M is the midpoint of $\overline{AB}$, $AM = 4x + 3$, $MB = 19$.
   (a) Mark the diagram with the values and tick marks
   (b) Write an equation and solve for x
   (c) Check your result



$4x+3 = 19$
$4x = 16$
$x = 4$

$AM = 4(4)+3 = 19$
$19 = 19$ ✓

3. Point E bisects $\overline{DEF}$ and $DE = 5x - 12$, $DF = 36$. Find x. (show check)

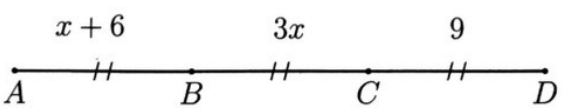


$2(5x-12) = 36$
$5x-12 = 18$
$5x = 30$
$x = 6$

$DE = 5(6)-12$
$= 18$

$18+18 = 36$ ✓

4. Points B and C trisect segment $\overline{AD}$ with segment lengths as shown. Find x.



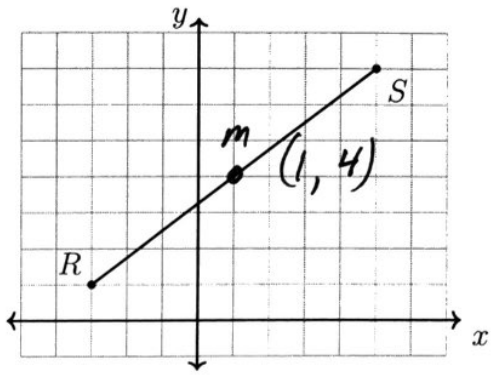
$3x = 9$
$x = 3$

$(3)+6 = 9$ ✓

5. Find the coordinates of the midpoint M of $\overline{RS}$, $R(-3,1)$ and $S(5,7)$. Mark and label it on the graph.

$M = \left(\frac{-3+5}{2}, \frac{1+7}{2}\right)$

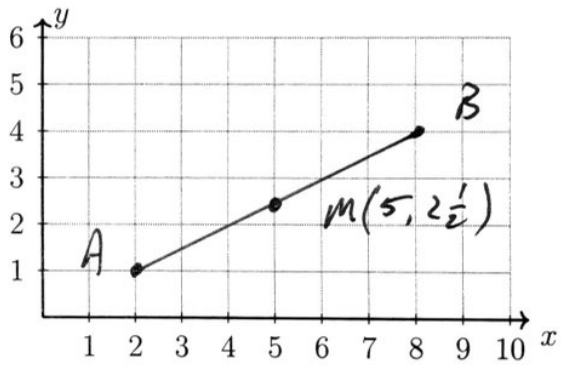
$= (1, 4)$



6. On the graph below, draw $\overline{AB}$, with $A(2,1)$ and $B(8,4)$, labeling the end points. Determine and state the coordinates of the midpoint M of $\overline{AB}$ and mark and label it on the graph.

$M = \left(\frac{2+8}{2}, \frac{1+4}{2}\right)$

$= (5, 2\frac{1}{2})$

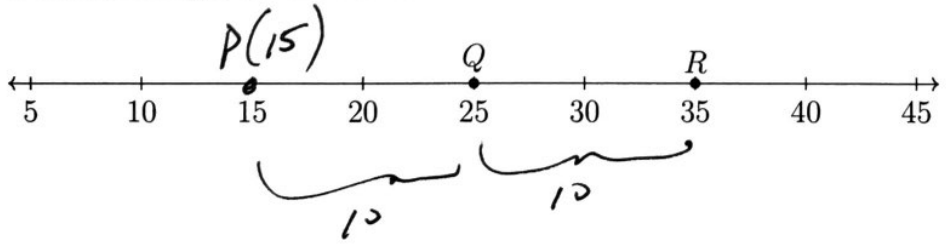


7. Find the midpoint of $\overline{AB}$, with $A(12,-3)$ and $B(5,13)$.

$M = \left(\frac{12+5}{2}, \frac{-3+13}{2}\right) =$ ~~10~~

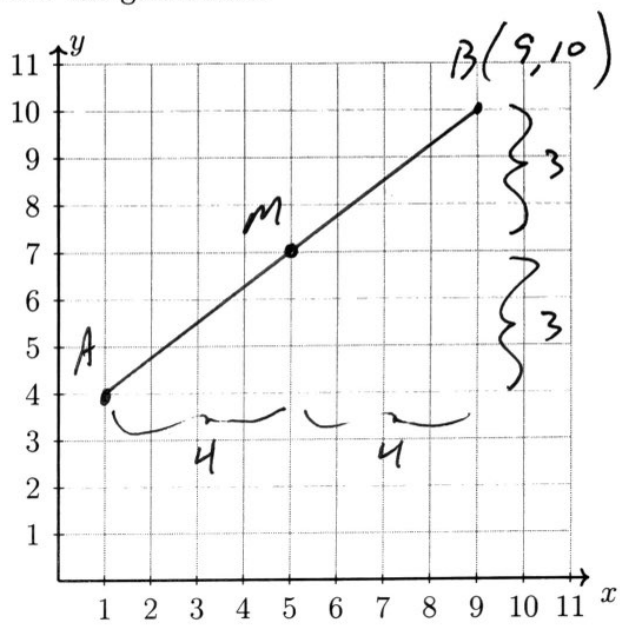
$(8\frac{1}{2}, 5)$

8. Given collinear points with Q the bisector of $\overline{PR}$, $Q(25)$ and $R(35)$. Find P, marking it and labeling it on the number line.



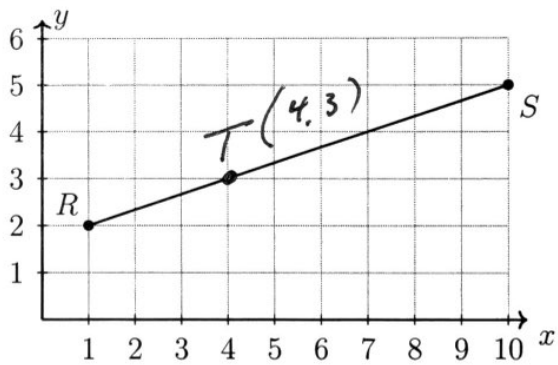
9. Given the midpoint $M(5,7)$ of $\overline{AB}$ with $A(1,4)$. Find the coordinates of point B. Mark and label all three points and segment $\overline{AB}$ the grid below.

$T_{+4,+3}$
$A \to M$
$T_{+4,+3}$
$M \to B\ (9,10)$



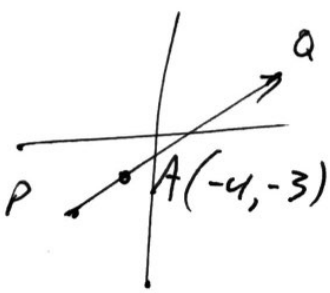
10. Point T divides $\overline{RS}$ so that $RT : TS = 1 : 2$. If R has coordinates $(1,2)$ and S has coordinates $(10,5)$, find the coordinates of T and mark and label it on the graph.

$T_{+9,+3}$
$R \to S$
$\frac{1}{3}T = T_{+3,+1}$
$T_{+3,+1}$
$R \to T(4,3)$



11. The endpoints of directed line segment PQ have coordinates of $P(-7,-5)$ and $Q(5,3)$. What are the coordinates of point A, on $\overline{PQ}$, that divide $\overline{PQ}$ into a ratio of 1:3? 1/4 : 3/4

$T_{+12,+8}$
$P \to Q$
$\frac{1}{4}T = T_{+3,+2}$
$T_{+3,+2}$
$P(-7,-5) \to A(-4,-3)$



12. The coordinates of the endpoints of directed line segment ABC are $A(-8, 7)$ and $C(7, -13)$. If $AB : BC = 3 : 2$, what are the coordinates of B?

$\frac{3}{5} : \frac{2}{5}$ $\quad\quad$ $\frac{3}{5}T = T_{+9,-12}$

$T_{+15,-20}$

$A(-8,7) \rightarrow C(7,-13)$ $\quad\quad$ $T_{+9,-12}$

$A(-8,7) \longrightarrow B(1,-5)$

13. Directed line segment DE has endpoints $D(-4, -2)$ and $E(1, 8)$. Point F divides such that $DF : FE$ is $2 : 3$. What are the coordinates of F?

$\frac{2}{5} : \frac{3}{5}$ $\quad\quad$ $T_{+5,+10}$

$\frac{1}{5}T = T_{+1,+2}$

$D(-4,-2) \rightarrow F(-3,0)$

14. Point G divides $\overline{AB}$ so that $AG : GB = 1 : 2$. If A has coordinates $(-1, -3)$ and B has coordinates $(8, 9)$, what are the coordinates of G?

$T_{+9,+12}$ $\quad\quad$ $\frac{1}{3} : \frac{2}{3}$

$\frac{1}{3}T = T_{+3,+4}$

$A(-1,-3) \longrightarrow G(+2,1)$

15. The coordinates of the endpoints of directed line segment PQ are $P(-7, -5)$ and $Q(5, 3)$. If PQ is divided into a ratio of 1:3, what are the coordinates of point A?

$T_{+12,+8}$ $\quad\quad$ $\frac{1}{4} : \frac{3}{4}$

$\frac{1}{4}T = T_{+3,+2}$

$P(-7,-5) \rightarrow A(-4,-3)$