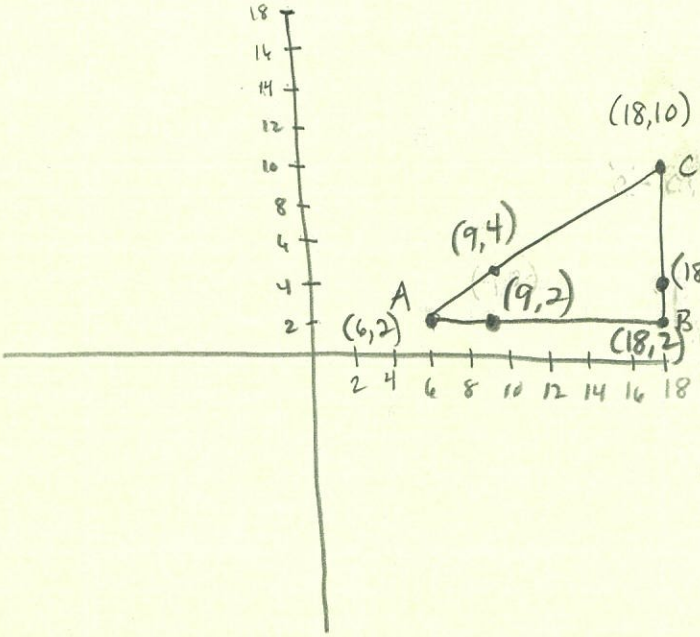
Don't worry too much about the instructions, just use what we learned in class!

3.



(18,10) Parts a-d)

Total Length: 12 from A → B

1:3

$\frac{1}{4}(12) = 3$ $\frac{3}{4}(12) = 9$

Starting from A, count 3 units to find the point

Parts e-g)

Total Length: 8

1:3

$\frac{1}{4}(8) = 2$ $\frac{3}{4}(8) = 6$

Starting from B, count 2 units up to find the point.

4. The point that partitions segment $\overline{AC}$ is (9,4). We know this because we combined the results from Part 3, taking the x-coordinate from the point on the horizontal segment $\overline{AB}$ and the y-coordinate from the point on the vertical segment $\overline{BC}$.

5. a. G(3,4) H(6,10) Divide $\overline{GH}$ by 1:2 $1+2=3$

Total length for x

$(6-3) = 3$

$\frac{1}{3}(3) = 1$

$x = 3 + 1 = 4$

↑ x-coordinate of G

Total length of y

$(10-4) = 6$

$\frac{1}{3}(6) = 2$

$y = 4 + 2 = 6$

↑ y-coordinate of G

$\boxed{(4,6)}$

b. U(-3,-2) M(6,1) Divide $\overline{UM}$ by 2:1 $2+1=3$

Total length in x-dir.

$(6-(-3)) = 9$

$\frac{2}{3}(9) = 6$

$x = (-3) + 6 = 3$

↑ x-coordinate of U

Total length in y-dir.

$(1-(-2)) = 3$

$\frac{2}{3}(3) = 2$

$y = (-2) + 2 = 0$

↑ y-coordinate of U

$\boxed{(3,0)}$

c. P(5, -2) K(-5, 3) Divide $\overline{PK}$ by 1:3 $1+3=4$

Total Length in x-direction

$(-5-5) = -10$

$\frac{1}{4}(-10) = -\frac{5}{2}$

$x = 5 - \frac{5}{2} = \frac{10}{2} - \frac{5}{2} = \frac{5}{2}$

Total Length in y-direction

$(3-(-2)) = 5$

$\frac{1}{4}(5) = \frac{5}{4}$

$y = -2 + \frac{5}{4} = -\frac{8}{4} + \frac{5}{4} = \frac{-3}{4}$

$\left(\frac{5}{2}, \frac{-3}{4}\right)$ or $(2.5, -0.75)$

Summarize the Mathematics

Point M divides the directed line segment AB for $A(x_1, y_1)$ and $B(x_2, y_2)$ into a ratio $g:h \rightarrow \frac{g}{g+h}$

a) Length of horizontal component (consider x-coordinates)

$(x_2 - x_1)$

Length of vertical component (consider y-coordinates)

$(y_2 - y_1)$

distance M is away from A horizontally (use fraction from ratio)

$\frac{g}{(g+h)}(x_2 - x_1)$

distance M is away from A vertically (use fraction again)

$\frac{g}{(g+h)}(y_2 - y_1)$

Coordinates (add the distances from above the the x and y coordinate of A

$$x = x_1 + \left(\frac{g}{g+h}\right)(x_2 - x_1) \qquad y = y_1 + \left(\frac{g}{g+h}\right)(y_2 - y_1)$$