SHOW ALL WORK!!!!!
REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

Three long straight wires are perpendicular to the paper at the points labeled A, B, C. The currents are given below. + is out of the paper, - is into the paper.

(a) Calculate the x-component of the magnetic field at P (with sign).
(b) Calculate the y-component of the magnetic field at P (with sign).
(c) Calculate the magnitude of the resulting magnetic field at P.
(d) Calculate the direction of the magnetic field at P, as an angle measured counter-clockwise from the positive x-axis.

\[ I_A = +15.2 \, \text{A}; \quad I_B = +12.7 \, \text{A}; \quad I_C = -17.2 \, \text{A}; \quad a = 3.65 \, \text{cm} \]

\[ B = \frac{\mu I}{2\pi d} \]

\[ B_{Ax} = \frac{\mu I_A}{2\pi a} \]
\[ B_{Ay} = -\frac{\mu I_B}{2\pi a} \]
\[ B_A = \frac{\mu I_A}{4\pi a} \]

\[ B_B = \frac{\mu I_B}{2\pi a} \]
\[ B_{Bx} = 0 \]
\[ B_{By} = -\frac{\mu I_B}{2\pi a} \]

\[ B_C = \frac{\mu I_C}{2\pi \sqrt{5} a} \]
\[ B_{Cx} = \frac{\mu I_C}{5\pi a} \]
\[ B_{Cy} = \frac{\mu I_C}{10\pi a} \]

At P, \[ B_x = B_{Ax} + B_{Bx} + B_{Cx} = \frac{\mu I_A}{4\pi a} + 0 + \frac{\mu I_C}{5\pi a} \approx 7.93 \times 10^{-5} \, \text{T} \]

\[ B_y = B_{Ay} + B_{By} + B_{Cy} = -\frac{\mu I_B}{4\pi a} - \frac{\mu I_B}{2\pi a} + \frac{\mu I_C}{10\pi a} \approx -9.24 \times 10^{-5} \, \text{T} \]