MECH 234 + 235
VECTOR COMPONENTS

PROB. 2.24
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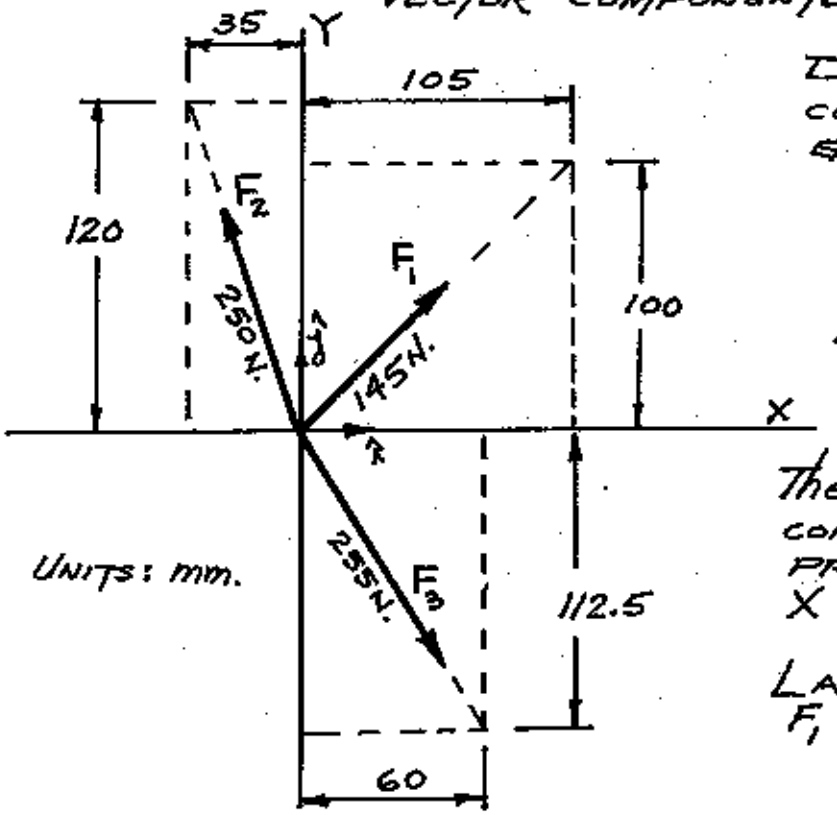

DETERMINE X + Y COMPONENTS OF EACH FORCE.

HINT:

LET FORCE VECTOR BE PROPORTIONAL TO DIAGONAL.

Therefore, X + Y COMPONENTS ARE PROPORTIONAL TO X + Y DIMENSIONS.

LABEL FORCES F_1, F_2, F_3

$\overline{F_1}$ DIAGONAL = HYPOTENUSE = $\sqrt{105^2+100^2}$ = 145 mm.

$\frac{F}{d} = \frac{145^{N.}}{145\,mm.} = \frac{F_{1X}}{d_X} = \frac{F_{1Y}}{d_Y}$ This one is obvious but here's the work:

$F_{1X} = \frac{105\,mm}{145\,mm}(145^{N.}) = 105^{N.}\,\hat{i}$ →

$F_{1Y} = \frac{100\,mm}{145\,mm}(145^{N.}) = 100^{N.}\,\hat{j}$ ↑

$\overline{F_2}$ DIAGONAL = $\sqrt{35^2+120^2}$ = 125 mm.

$\frac{F}{d} = \frac{250^{N.}}{125\,mm.} = \frac{F_{2X}}{d_X} = \frac{F_{2Y}}{d_Y}$ No calculator needed here!

$F_{2X} = \frac{35\,mm}{125\,mm}(250^{N.}) = -70^{N.}\,\hat{i}$ ←

$F_{2Y} = \frac{120\,mm}{125\,mm}(250^{N.}) = 240^{N.}\,\hat{j}$ ↑

$\overline{F_3}$ DIAGONAL = $\sqrt{60^2+112.5^2}$ = 127.5 mm

$F_{3X} = \frac{60mm}{127.5\,mm}(255^{N.}) = 120^{N.}\,\hat{i}$ →

$F_{3Y} = \frac{112.5\,mm}{127.5\,mm}(255^{N.}) = -225^{N}\,\hat{j}$ ↓