Math 4060 (Cherry)

Written Assignment #17 Due Wednesday, March 8

1. Determine all five-point incidence geometries, up to isomorphism. Explain how you know you have found them all. Which of the geometries satisfy Playfair's axiom P? (Compare this with Exercise 6.1 in Hartshorne.)

Written Assignment #18 Due Friday, March 10

1. Let's have a look at what happens if we modify Example 6.1.1 to use the integers $\mathbf{Z}$ instead of the real numbers $\mathbf{R}$. That is let's consider a geometry whose "points" are ordered pairs (x, y), where both x and y must be *integers.* "Lines" will be equations of the form $Ax + By = C$, where A, B, and C are *integers* with A and B not both zero. Note that if two different equations have the same solution sets, we consider them to define the same line. That is we do not consider the line $x + y = 1$ to be different than the line $2x + 2y = 2$. Even though the equations are technically different, we consider them to define the same line because they have the same solutions. Which of the four axioms discussed in section 6 (I1, I2, I3, P) does this "geometry" satisfy? Justify your answers.