

Proofs I

1.5.5: A circle has center $(2, 4)$.

- (a) Prove that $(-1, 5)$ and $(5, 1)$ are not both on the circle.
- (b) Prove that if the radius of the circle is less than 5, then the circle does not intersect the line $y = x - 6$.
- (c) Prove that if $(0, 3)$ is not inside the circle, then $(3, 1)$ is not inside the circle.

1.5.7: Suppose $a, b, c,$ and d are positive integers. Prove each biconditional statement.

- (a) ac divides bc if and only if a divides b .
- (b) $a + 1$ divides b and b divides $b + 3$ if and only if $a = 2$ and $b = 3$
- (c) $a + c = b$ and $2b - a = d$ if and only if $a = b - c$ and $b + c = d$.
- (d) $a + 2c \neq d$ or $b - a \neq 2d$ if and only if $b + 2c \neq 3d$ or $3a + 4c \neq b$.