(a) The relation is reflexive, symmetric, and transitive.
(b) The relation is reflexive and symmetric, but not transitive.
(c) The relation is not reflexive, symmetric, or transitive.

Let the binary operation $*$ be defined by $a * b = a + b + 2$. Is $*$ commutative?

Is there an identity in $\mathbb{Z}$ for $*$? (Explain.)

Are there inverses in $\mathbb{Z}$ for $*$? (Explain.)

Is the order relation $\leq$ a partial order relation on $\mathbb{Z}$? (Explain briefly.)

Is $\leq$ a total order relation on $\mathbb{Z}$? (Explain briefly.)

Draw the directed graph which corresponds to the relation $\leq$.

Let the ordered pair in the relation $\leq$.

Let the binary relation $\subseteq$ on $\{\mathbb{Z}, 4, 6\}$ be defined by $a \subseteq b$ if and only if $a$ is a divisor of $b$.

Which of the following statements are true for the relation $\subseteq$?

(a) $a \subseteq b$ and $b \subseteq a$ for some $a, b \in \{\mathbb{Z}, 4, 6\}$.
(b) $a \subseteq b$ for every $a, b \in \{\mathbb{Z}, 4, 6\}$.
(c) $a \subseteq b$ for some $a, b \in \{\mathbb{Z}, 4, 6\}$.

What is the minimum number of people in a group to guarantee that at least 3 people in the group all have their birthdays in the same month?