Example: Let the universe of discourse be all people and define

B(x): x is a basketball player

T(x): x is tall.

F(x): x is fast.

Write each of the following sentences in symbolic form using the given predicates.

(a) All basketball players are tall.

$$\forall x(B(x) \rightarrow T(x))$$

Why not

$$\forall x(B(x) \wedge T(x))$$

That would mean that all people are basketball players and tall.

Note: We can write this statement several more different ways such as

- Every basketball player is tall.
- If someone is a basketball player then (s)he is tall.
- Any person who is a basketball player is tall.

(b) Some basketball players are slow.

$$\exists x(B(x) \wedge \neg F(x))$$

Why not

$$\exists x(B(x) \rightarrow \neg F(x))$$

That would be true for all people who are not basketball players.

Note: We can write this statement several more different ways such as

- There is a basketball player who is slow.
- There is a person who is a basketball player and is slow.

(c) No basketball players are slow.

$$\neg\exists x(B(x) \wedge \neg F(x))$$

Which is logically equivalent to

$$\forall x \neg \left(B(x) \wedge \neg F(x)\right) \equiv \forall x \left(\neg B(x) \vee F(x)\right)$$

$$\equiv \forall x \left(B(x) \rightarrow F(x)\right)$$

Note: We can write this statement several more different ways such as

- There does not exists a basketball player who is slow.
- All basketball players are fast.