1.a

Solution, here the given statement is

“no goods cars is cheap” which is in the form of “ ∀x , if P(x), then ~Q(x)”

So, consider P (x) ="x is a good car''

and Q(x) = "x is cheap".

Then, the statement "No good cars are cheap" implies "For all cars x, if x is a good car, then x is not cheap".

Here, the given argument can be rewritten as

∀x , if P(x), then ~Q(x)

P (Rimbuad)

:. ~Q (Rimbaud )

If we take the Rimbuad as the particular value R, then the argument becomes

∀x, if P(x), then ~Q(x)

~Q(R)

:.P(R)

The reverse error applies to this argument. The conclusion is false because the converse error is an improper reference rule. As a result, the reasoning is invalid.

1.b  
Here the given statement is

“no goods cars is cheap” which is in the form of “ ∀x , if P(x), then ~Q(x)”

Let P (x) denotes "x is a good car''

and Q(x) denotes "x is cheap".

Then, the statement "No good cars are cheap" implies "For all cars x, if x is a good car, then x is not cheap".

Here, the given argument can be rewritten as

∀x , if P(x), then ~Q(x)

~Q (Simba

:. P (Simbaru )

If we take the Simbaru as the particular value s, then the argument becomes

∀x, if P(x), then ~Q(x)

~Q(s)

:.P(s)

The argument is invalid because the belongs to the converse error.

2.

Here, Rewriting the above statements in if-then form,

1. If a bird is at least 9 feet tall, then it is Ostrich
2. If a bird is in this aviary, then it belongs to me
3. If a bird is on mince pies, then it is not an Ostrich
4. If a bird belongs to me, it is at least 9 feet high.

Then, Writing the third premise in contrapositive form:

If a bird is an Ostrich, then it does not live on mince pies

So, the reordered premises are:

b.If a bird is in this aviary, then it belongs to me

d.If a bird belongs to me, it is at least 9 feet high

a.If a bird is at least 9 feet high, then it is an ostrich

c.If a bird is an ostrich, then it does not live on mince pies

Putting c and b together, we get

No bird in this aviary lives on mince pies

Hence, the reordered premises are shown above.

3.

a.

yes, the number 6m + 8n is even.

Here by the definition of even, for any number n, n = 2 k where k is any integer.

So, taking 2 common from the number 6m + 8n, it will become 2(3m + 4n), which is in the form of n = 2k. therefore the number is even.

b.

The number 10mn+7 can be written as (10m+8)-1= 2(5m+4)-1

By the definition, n is an odd if such that n=2k+1, where k is an integer.

Here, it can be written as 2(5m+4)-1. So, the number is odd.

c.

here, the given statement is not true for all m>n>0

let’s say m = 4 and n = 3. Then m2 – n2 is 16 – 9 which is 7. Which is prime number. There fore the given number is prime number not composite.

4. Theorem: The sum of any even integer and any odd integer is odd.

Proof: Suppose m is any even integer and n is (a). By definition of even, m=2r for some

(b), and by definition of odd, n=2s+1 for some integer s . By substitution and algebra,

𝑚+ 𝑛= (𝑐) = 2(𝑟+ 𝑠) + 1

Since r and s are both integers, so is their sum r+s . Hence m+n has the form twice some

integer plus one, and so (d) by definition of odd.

Answers,

a => any odd integer

b => integer r

c => 2r + 2s+1

d => m + n is odd

5. Theorem: For every integer k , if k > 0 then 𝑘2 +2𝑘+ 1 is composite.

"Proof: Suppose k is any integer such that k > 0. If 𝑘2 +2𝑘+ 1 is composite, then

𝑘2 +2𝑘+ 1 = 𝑟𝑠 for some integers r and s such that

1 < 𝑟< 𝑘2 + 2𝑘+ 1

and

1 < 𝑠< 𝑘2 + 2𝑘+ 1

Since

𝑘2 + 2𝑘+ 1 = 𝑟𝑠

and both r and s are strictly between 1 and 𝑘2 +2𝑘+ 1, then 𝑘2 +2𝑘+ 1 is not prime.

Hence 𝑘2 +2𝑘+ 1 is composite as was to be shown."