(11)

$f(n) = n^2 - n + 11$

For $n = 11$,

$f(11) = 11^2 - 11 + 11 = 121$

So, 121 which we got is not a prime no.

(12)

~~f(x,y)~~

$f(x,y) = 2^{2x} + 3^{2y+1}$

For $x = 1, y = 2$

$f(1,2) = 2^2 + 3^{2(2)+1} = 4 + 3^5$

$= 247$

But 247 is not a prime number.

(13)

$\left|\frac{1}{m} - \frac{1}{n}\right| > \frac{1}{2}$

let $m = 1$ & $n = 1$

$\left|\frac{1}{1} - \frac{1}{1}\right| = 0 < \frac{1}{2}$.

So, given statement is disproved.

(14)

let $n = 6$

$n^2 = 36$ which is divisible by 4.

but 6 is not divisible by 4.

hence, given statement is disproved

(15)

$(a+b)^2 = a^2 + b^2$

let $a = 2, b = 2$

$(2+2)^2 = 16$ but $2^2 + 2^2 = 8$

So, Statement is not an algebraic expression.

(16)

$$\frac{1}{x+2} = \frac{1}{x} + \frac{1}{2}.$$

let $x = 2$.

$\frac{1}{4} \neq \frac{1}{2} + \frac{1}{2} \Rightarrow \frac{1}{4} \neq 1$

So, given statement is not true for $\forall x \in N$

(17)

If $pq = x$, then $p = \frac{x}{q}$ $\forall p, q, x \in R$.

Let $p = 10$

$q = 0$

$pq = x$. but $p = \frac{x}{q}$.

$10 \cdot 0 = x$ $\quad$ $10 = \frac{x}{0}$

$x = 0$ $\quad$ $\neq$ undefine

hence, given statement is not define. for $\forall p, q, x \in R$.

(18)

$a + b$ can be less than. $\min(a, b)$ $\forall a, b \in R$

let $a = -2$, $b = -3$

$\min(-2, -3) = -2$.

and. $a + b = -2 - 3 = -5$.

$a + b < \min(-2, -3)$

$-5 < -2$

(19)

if x^2 is rational then x is rational.

let $x = \sqrt{2}$,

$x^2 = (\sqrt{2})^2 \Rightarrow$ rational

but $x = \sqrt{2} \Rightarrow$ irrational!

hence, disproved.

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$$\lceil x + y \rceil = \lceil x \rceil + \lceil y \rceil$$

$x = 1.5$, $y = 2.4$

$$\lceil 1.5 + 2.4 \rceil = \lceil 3.9 \rceil = 4$$

but, $\lceil 1.5 \rceil + \lceil 2.4 \rceil = 2 + 3 = 5$

hence, disproved as $4 \neq 5$.