Homework Week 2 task(problem) #20

Rational Zero theorem

$$\frac{f(x)}{x-k} = f(k) \quad f(x) = 2x^4 - 5x^3 + x^2 - 4$$

let's assum that $x = 2$

$f(2) = 2(2)^4 - 5(2)^3 + 2^2 - 4 = 2 \cdot 16 - 5 \cdot 8 + 4 - 4 =$

$= 32 - 40 = -8$ this is remaining.

for what walues of x is the value of the entire expression equal to zero? $f(x) = 0$

~~$f(x) = 2x^3 + 3x^2 - 8x -$~~ $\quad f(x) = 2x^5 - 5x^3 + x^2 - 4$

$\frac{p}{q}$ $\quad p = 2$ the first polynomial of expression

q – is a free coefficient. $q = 4$ ± 4 also

2 $\pm 1; \pm 2$

4 $\pm 1; \pm 2; \pm 4$

$\frac{p}{q}: \pm 1, \pm 2, \pm, \pm\frac{1}{2}, \pm\frac{1}{4}$)

if any of these real number can lead to rational zero, there will be one of the following factors of -4. divided by one of the factors of 2

$\frac{p}{q} = \pm\frac{1}{2}; \pm 1; \pm 2; \pm 4;$

Homework week 4 task 12 (problem).

We have int-s: 0, 1, 2, 3, 4. and propositional function. $P(x)$

a) $\exists x\, P(x)$

$P(0) \lor P(1) \lor P(2) \lor P(3) \lor P(4)$.

b) $\forall x\, P(x)$

$P(0) \land P(1) \land P(2) \land P(3) \land P(4)$.

Problem 12 week 4

c) $\exists x \neg P(x)$

$\neg P(0) \vee \neg P(1) \vee \neg P(2) \vee \neg P(3) \vee \neg P(4).$

d) $\forall x \neg P(x)$

$\neg P(0) \wedge \neg P(1) \wedge \neg P(2) \wedge \neg P(3) \wedge \neg P(4).$

e) $\neg \exists x P(x)$

$\neg (P(0) \vee P(1) \vee P(2) \vee P(3) \vee P(4))$

f) $\neg \forall x P(x)$

$\neg (P(0) \wedge P(1) \wedge P(2) \wedge P(3) \wedge P(4))$

$\neg \exists x P(x) = \neg (P(0) \vee P(1) \vee P(2))$

$\Updownarrow$

$\forall x \neg P(x) = \neg P(0) \wedge \neg P(1) \wedge \neg P(2)$

Problem 13

U = students in class. U = consists of all peeple,

a) $h(x) = x$ can speak Hindi.

$S(x) = x$ is students in your class.

$\exists x H(x)$

$\forall x S(x) \wedge h(x)$ consists of all peeple

$\exists x S(x) \wedge h(x)$ in class

b) $f(x) = x$ is friendly peeple

1) $\forall x Sx \rightarrow f(x)$ $\forall x Sx \wedge f(x)$

2) $\forall x \rightarrow f(x)$ $\forall x Sx \rightarrow f(x)$

c) $\exists x P(x)$ $C(x) = x$ isn't born in California.

$\exists x S(x) \rightarrow \neg C(x)$ $\exists x Sx \wedge C(x)$

$\forall x \rightarrow \neg C(x)$. $\forall x S(x) \rightarrow \neg C(x)$

d) $M(x) = x$ has been in a movie.

$\exists x\, S(x) \rightarrow M(x)$ $\exists x\, S(x)\, M(x)$

$\forall x \rightarrow M(x)$ $\forall x\, S(x) \rightarrow M(x)$

e) $P(x)$ = students x has taken programming class.

$\neg \exists x\, (P_x)$ $\neg \exists x\, S_x\, P(x)$