(7) Ex. 4.2 Problem 10 :-

r is rational $\Leftrightarrow \exists$ integers a & b such that $r = \frac{a}{b}$ & $b \neq 0$

Given :- $\frac{5m+12n}{4n}$, $n \neq 0$

Here as $n \neq 0$, $4n \neq 0$. i.e. an integer

Also $5m + 12n$ is an integer.

$\therefore$ By definition, $\frac{5m+12n}{4n}$ is rational.

(8) Ex. 4.2 Problem 14 :-

The square of any rational no. is a rational no.

a) Let $r = \frac{p}{q} \in \mathbb{Q}$ (such that) $p, q \in \mathbb{Z}$, $GCD(p, q) = 1$.

Then $r^2 = \left(\frac{p}{q}\right)^2 = \frac{p^2}{q^2} \in \mathbb{Q}$.

b) True

$r = \frac{p}{q} \in \mathbb{Q}$. $p, q \in \mathbb{Z}$ & $gcd(p, q) = 1$

$\therefore$ $r^2 = p^2/q^2$ we get $p^2, q^2 \in \mathbb{Z}$

Also $GCD(p^2, q^2) = 1$.

(9) Ex 4.2 Problem 22 :-

If a is any odd integer then $a^2 + a$ is even.

True/False. Explain.

(1) True (2) Given :- a is any odd integer.

$\therefore$ a^2 is odd ——— property 3

By property 2,

$a^2 + a$ is even

P1 = Sum, * & diff. of any 2 even integers are even

(10) Ex 4.2 Problem 23 :- True or false. Explain.

P2 = Sum & diff. of any two odd integers are even.

(1) True (2) Given $k \rightarrow$ even integer, $m \rightarrow$ odd integer.

$\therefore k + 2 \rightarrow$ even (Property 1). $(m-1) \rightarrow$ even (property 2)

$(k+2)^2 \rightarrow$ even (property 1) $(m-1)^2 \rightarrow$ even (property 2)

$\therefore (k+2)^2 - (m-1)^2 =$ even (property 1).