e. is $1 \in \{1\}$?

- yes, 1 is an element in the set, it is the only element in the set.

14. Let $R = \{a\}$, $S = \{x, y\}$, and $T = \{p, q, r\}$ find each of the following sets.

a) $R \times (S \times T)$

$= \{(a,(x,p)), (a,(x,q)), (a,(x,r)), (a,(y,p)), (a,(y,q)), (a,(y,r))\}$

b) $(R \times S) \times T$

$= \{((a,x),p), ((a,x),q), ((a,x),r), ((a,y),p), ((a,y),q), ((a,y),r)\}$

c) $R \times S \times T$

$= \{(a,x,p), (a,x,q), (a,x,R), (a,y,p), (a,y,q), (a,y,r)\}$.

1.3 a)

2) is $2 \in 2$? is $-1 \in -1$? is $(3,3) \in S$? Is $(3,-3) \in S$?

yes yes yes No

- $\frac{1}{2} - \frac{1}{2} = 0$ is an integer.
- since $\frac{1}{(-1)} - \frac{1}{(-1)} = 0$ is an integer
- $\frac{1}{3} - \frac{1}{3} = 0$ is an integer.
- $\frac{1}{3} - \frac{1}{(-3)} = \frac{2}{3}$ is not an integer.

b)

$S = \{(x,y) \in S \mid \frac{1}{x} - \frac{1}{y}$ is an integer$\}$

$\frac{1}{1} - \frac{1}{1} = 0$, $\frac{1}{1} + \frac{1}{1} = 2$, $-\frac{1}{1} - \frac{1}{1} = -2$, $-\frac{1}{1} + \frac{1}{1} = 0$, $\frac{1}{2} + \frac{1}{2} = 1$, $-\frac{1}{2} - \frac{1}{2} = -1$

$-\frac{1}{2} + \frac{1}{2} = 0$, $\frac{1}{3} - \frac{1}{3} = 0$, $-\frac{1}{3} + \frac{1}{3} = 0$

$(-3,-3)$

$S = \{(1,1), (1,-1), (2,2), (3,3), (-1,-1), (-1,1), (2,-2), (-2,2), (-2,-2)\}$