Multiplying eq. (2) by 2 and subtracting eq. (1) from eq. 2

$2a = 10$

$a = 5$

Substituting the value of 'a' in eq. (2) we get

$15 - 12b = 3$

$-12b = -12$

$b = 1$

Hence for $\boxed{a = 5}$ and $\boxed{b = 1}$ the system of equation has infinitely many solution.

(v) GIVEN:

$$2x + 3y = 7$$

$$(a - b)x + (a + b)y = 3a + b - 2$$

To find: To determine for what value of k the system of equation has infinitely many solutions

We know that the system of equations

$a_1x + b_1y = c_1$

$a_2x + b_2y = c_2$

For infinitely many solution

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

Here

$$\frac{2}{(a - b)} = \frac{3}{(a + b)} = \frac{7}{3a + b - 2}$$

Consider the following

$$\frac{3}{(a + b)} = \frac{7}{3a + b - 2}$$

$9a + 3b - 6 = 7a + 7b$

$2a - 4b = 6$ ...... (1)

Again consider the following

$$\frac{2}{(a - b)} = \frac{7}{3a + b - 2}$$

$6a + 2b - 4 = 7a - 7b$

$a - 9b = -4$ ...... (2)

Multiplying eq. (2) by 2 and subtracting eq. (1) from eq. (2)

$-14b = -14$

$b = 1$

Substituting the value of b in eq. (2) we get

$a - 9 = -4$

$a = 5$

Hence for $\boxed{a = 5}$ and $\boxed{b = 1}$ the system of equation has infinitely many solution.

(vi) GIVEN:

$$2x + 3y - 7 = 0$$

$$(a - 1)x + (a + 1)y = 3a - 1$$

To find: To determine for what value of k the system of equation has infinitely many solutions

Rewrite the given equations

$$2x + 3y - 7 = 0$$

$(a-1)x+(a+1)y=3a-1$

We know that the system of equations

$a_1x+b_1y=c_1$

$a_2x+b_2y=c_2$

For infinitely many solution

$\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$

Here

$\frac{2}{(a-1)}=\frac{3}{(a+1)}=\frac{7}{3a-1}$

Consider the following

$\frac{3}{(a+1)}=\frac{7}{3a-1}$

$9a-3=7a+7$

$2a=10$

$a=5$

Hence for $\boxed{a=5}$ the system of equation have infinitely many solutions.

(vii) GIVEN :

$2x+3y=7$

$(a-1)x+(a+2)y=3a$

To find: To determine for what value of k the system of equation has infinitely many solutions

We know that the system of equations

$a_1x+b_1y=c_1$

$a_2x+b_2y=c_2$

For infinitely many solution

$\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$

Here

$\frac{2}{(a-1)}=\frac{3}{(a+2)}=\frac{7}{3a}$

Consider the following

$\frac{3}{(a+2)}=\frac{7}{3a}$

$9a=7a+14$

$2a=14$

$a=7$

Hence for $\boxed{a=7}$ the system of equation have infinitely many solutions.

*********** END **********