Problem-Solving 2

1. Sally (a fictitious name) is nearsighted and colour-blind. When she goes to a local grocery where fruits are placed on high shelves, she cannot see them very well. She can only recognise the size and blurred shape of the fruits. For example, tangerines are round and relatively small. Let us represent her knowledge about fruits by the following fuzzy relation:

	tangerine	apple	pineapple	watermelon	strawberry
long	0	0	0.3	0	0.8
round	0.9	1	0.3	1	0.2
large	0.2	0.4	0.7	1	0.1

Guess the fruit that Sally sees if she recognises a fruit that is:

Case a: "round and big" represented by 0/long + 0.7/round + 1/large
Case b: "relatively long, somewhat round, and not very large" represented by 0.5/long + 0.5/round + 0.3/large

2. A fuzzy set A is defined by

$$A = 0.3/a + 0.7/b + 1/c + 0.8/d + 0.5/e$$

Use the extension principle to find the fuzzy set $B = f(A)$, where the function $f(\cdot)$ is defined by

$$f(x) = \begin{cases} i, x = e \\ j, x = d \\ i, x = c \\ k, x = b \\ j, x = a \end{cases}$$

3. An object is governed by the equation $z = x^2 + xy$. Its fuzzy x coordinate and fuzzy y coordinate is defined by the fuzzy set

$$x = 0.4/5 + 0.6/10$$
$$y = 0.5/1 + 0.6/2 + 0.7/3$$

respectively. Using the extension principle, find the fuzzy z coordinate.