3 Two different types of juice extractor, machine *X* and machine *Y*, are being compared. The manufacturer claims that machine *Y* extracts more juice per orange on average than machine *X*.

A random sample of 20 oranges is selected and each carefully measured. Oranges of a similar size and mass are then paired and numbered from 1 to 10. One orange from each pair is randomly allocated to machine *X* with the other allocated to machine *Y*. The amount of juice, in ml, extracted from each orange is recorded in the following table.

	pair									
	1	2	3	4	5	6	7	8	9	10
machine *X*	65	73	58	61	72	79	64	65	69	71
machine *Y*	68	72	64	63	75	82	63	63	72	74

(a) Use a *t*-test to test the manufacturer's claim at the 1% significance level. [7]

(b) State an assumption required for the test in **3(a)** to be valid. [1]

The manufacturer notices that the amount of juice extracted from the oranges in pair 4 were recorded incorrectly. In fact, the amount of juice extracted from machine *X* was 60 ml and from machine *Y* was 62 ml.

(c) Explain, with justification, whether the conclusion of the test in **3(a)** remains the same. [2]