

## Exercise 1.92

Judge the following statements as true or false. If you believe a statement to be false, provide a corrected version.

- (a) Air and water are both elements.
- (b) All mixtures contain at least one element and one compound.
- (c) Compounds can be decomposed into two or more other substances; elements cannot.
- (d) Elements can exist in any of the three states of matter.
- (e) When yellow stains in a kitchen sink are treated with bleach water, the disappearance of the stains is due to a physical change.
- (f) A hypothesis is more weakly supported by experimental evidence than a theory.
- (g) The number 0.0033 has more significant figures than 0.033.
- (h) Conversion factors used in converting units always have a numerical value of one.
- (i) Compounds always contain at least two different elements.

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### Solution

- (a) False, air is a homogeneous mixture consisting mostly of nitrogen gas and oxygen gas, and water is a compound consisting of two hydrogen atoms and an oxygen atom.
- (b) False, a mixture is a combination of two or more substances (elements or compounds) in which the substances retain their chemical identities.
- (c) True
- (d) True (at room temperature, for example, gold is a solid, mercury is a liquid, and helium is a gas)
- (e) False, the disappearance is due to a chemical change.
- (f) True
- (g) False, 0.0033 and 0.033 both have two significant figures because the zeros prior to the nonzero digits don't count.
- (h) True, the reason conversion factors can be multiplied together at whim is because they all have a value of 1.
- (i) True