

Working with ratio: answers

Education in Chemistry

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rsc.li/2r3j3RA

Working with shapes

1.
 - a)
 - i) 1:1
 - ii) 1:2
 - b)
 - i) 2:1
 - ii) 1:2
 - iii) 2:3
 - c)
 - i) 3:2
 - ii) 1:2
 - iii) 1:4
2.
 - a) $\frac{1}{8}$
 - b) $\frac{7}{16}$
 - c) $\frac{1}{8}$
3.
 - a)
 - i) $\frac{1}{7}$
 - ii) $\frac{1}{13}$
 - b)
 - i) 1.3 m²
 - ii) 0.7 m²
 - c) Using your answers to b, calculate the **total** area of the yellow, black and grey areas.

Working with ratio in chemistry

1.
 - a) $\frac{2}{5}$
 - b) 2.08 g
 - c) $\frac{5}{7}$ x mass of bronze = 10.2
So mass of bronze = $10.2 \times \frac{7}{5} = 14.28$ g

2.

a) 0.78 g

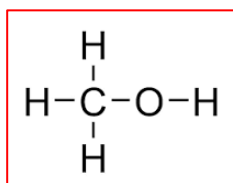
b)

	Carbon	Hydrogen	Oxygen
Mass of element in g	0.585	0.195	0.78
Moles of element ($\frac{\text{mass in g}}{A_r}$)	0.04875 mol	0.195 mol	0.04875 mol
Simplest whole number ratio (divide each number by the smallest amount of moles)	1	4	1

So the simplest formula for X is: CH_4O

c) As the simplest unit (empirical formula) has a mass of $12 + (4 \times 1) + 16 = 32$, and this is equal to the relative molecular mass of X, the molecular formula must be the same as the empirical formula.

d)



3.

a) Molar mass of white phosphorus, $\text{P}_4 = (31 \times 4) = 124 \text{ g}$

Moles of phosphorus, $\text{P}_4 = \frac{20.7}{124}$

$= 0.166.. \text{ mol}$

$= \mathbf{0.17 \text{ mol}}$ (to 2 significant figures)

b) As the ratio of phosphorus to phosphorus(III) chloride from the chemical equation is 1 : 4, the moles of the latter must be:

$4 \times 0.166.. \text{ mol} = 0.667.. \text{ mol}$

$= \mathbf{0.67 \text{ mol}}$ (to 2 significant figures)

c) Mass of phosphorus(III) fluoride = moles of phosphorus(III) fluoride \times molar mass of PF_3

Molar mass of $\text{PF}_3 = 31 + (19 \times 3) = 88$

So mass of $\text{PF}_3 = 0.667.. \text{ mol} \times 88 = 58.7.. \text{ g}$

$= \mathbf{59 \text{ g}}$ (to 2 significant figures)