

Graham's Law Problems

$$1.) \quad \frac{1}{4} = \frac{\sqrt{X}}{\sqrt{32}}$$

Square both sides:

$$\frac{1}{16} = \frac{X}{32}$$

Cross multiply:

$$16X = 32$$

$$X = 16 \text{ g/mol}$$

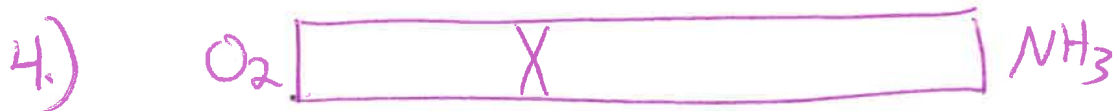
$$2.) \quad \frac{1}{3.20} = \frac{\sqrt{X}}{\sqrt{4}}$$

$$X = 0.399 \text{ g/mol}$$

Note: I made up numbers for this question. So the answer does not make sense.

3.) NH_3 , it's the lightest.

CCl_4 , it's the heaviest.



O_2 is heavier.

$$5.) \quad \frac{25.0}{X} = \frac{\sqrt{70}}{\sqrt{38}}$$

$$X = 18.4 \text{ m/s}$$

6.) Notice these are times. Not speeds. Therefore they must be inverted. The longer time represents a slower speed.

$$\frac{38}{55} = \frac{\sqrt{28}}{\sqrt{X}}$$

$$X = 58.7 \text{ g/mol}$$

Pressure conversions:

$$1) \quad \frac{109 \text{ kPa}}{101.3 \text{ kPa}} \times 1 \text{ atm} = 1.076 \text{ atm}$$

$$2) \quad \frac{0.62 \text{ atm}}{1 \text{ atm}} \times 760 \text{ mmHg} = 471.2 \text{ mmHg}$$

$$3) \quad \frac{1.07 \text{ atm}}{1 \text{ atm}} \times 760 \text{ torr} = 813.2 \text{ Torr}$$

$$4) \quad \frac{758.7 \text{ mmHg}}{760 \text{ mmHg}} \times 1 \text{ atm} = 0.998 \text{ atm}$$

$$5) \quad \frac{761.3 \text{ mmHg}}{760 \text{ mmHg}} \times 101.3 \text{ kPa} = 101.5 \text{ kPa}$$

$$6) \quad \frac{43.2 \text{ psi}}{14.7 \text{ psi}} \times 1 \text{ atm} = \boxed{2.9 \text{ atm}}$$

$$\rightarrow \quad \frac{34.8 \text{ psi}}{14.7 \text{ psi}} \times 101.3 \text{ kPa} = \boxed{240 \text{ kPa}}$$