Graham's Law Problems

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

Square both sides:

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

Cross multiply:

$$16X = 32$$

$$X = 16\ g/mol$$

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

$$X = 0.39\ g/mol$$

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.

4.) O_2 [X] NH_3

O_2 is heavier.

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

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

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

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

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

Pressure conversions:

1) $$\frac{109\ kPa}{} \left| \frac{1\ atm}{101.3\ kPa} \right. = \boxed{1.076\ atm}$$

2) $$\frac{0.62\ atm}{} \left| \frac{760\ mmHg}{1\ atm} \right. = \boxed{471.2\ mmHg}$$

3) $$\frac{1.07\ atm}{} \left| \frac{760\ torr}{1\ atm} \right. = \boxed{813.2\ Torr}$$

4) $$\frac{758.7\ mmHg}{} \left| \frac{1\ atm}{760\ mmHg} \right. = \boxed{0.998\ atm}$$

5) $$\frac{761.3\ mmHg}{} \left| \frac{101.3\ kPa}{760\ mmHg} \right. = \boxed{101.5\ kPa}$$

6) $\frac{43.2 \text{ psi}}{} \left| \frac{1 \text{ atm}}{14.7 \text{ psi}} \right. = \boxed{2.9 \text{ atm}}$

7) $\frac{34.8 \text{ psi}}{} \left| \frac{101.3 \text{ kpa}}{14.7 \text{ psi}} \right. = \boxed{240 \text{ kPa}}$