Mathematics 122 Quiz 2 Name: Key

The weight in kilograms, w, and the length in meters, ℓ in meters, of a pipe are related by

① ② ③

w	5	10	15	20
ℓ	3	5	7	9

1 pt (1) Explain why this is a linear relationship. (This will involve at least one English sentence.) The slopes at ①, ②, ③ are

① $\frac{\Delta w}{\Delta \ell} = \frac{10-5}{5-3} = \frac{5}{2}$ ② $\frac{\Delta w}{\Delta \ell} = \frac{15-10}{7-5} = \frac{5}{2}$

③ $\frac{20-15}{9-7} = \frac{5}{2}$. The slopes are constant so it is linear.

1 pt (2) Find w as a function of ℓ.

$$\frac{\Delta w}{\Delta \ell} = \frac{w-5}{\ell-3} = \frac{5}{2}$$

$$w - 5 = \frac{5}{2}(\ell-3)$$

$$w = \frac{5}{2}(\ell-3)+5$$

$$= \frac{5}{2}\ell - \frac{15}{2} + 5$$

$$= \frac{5}{2}\ell - \frac{5}{2}$$

$w = \frac{5}{2}\ell - \frac{15}{2}$

also ok

$w = 2.5\ell - 7.5$

$w = \frac{5}{2}(\ell-3)+5$

1 pt (3) Find ℓ as a function of w.

$$\frac{w-5}{\ell-3} = \frac{5}{2}$$

$$\frac{\ell-3}{w-5} = \frac{2}{5}$$

$$\ell - 3 = \frac{2}{5}(w-5)$$

$$\ell = \frac{2}{5}(w-5)+3$$

$$= \frac{2}{5}w - 2 + 3$$

$$= \frac{2}{5}w + 1$$

$\ell = \frac{2}{5}w + 1$

also ok

$\ell = .4w + 1$

$\ell = \frac{2}{5}(w-5)+3$