#1 $A = (10.0)(2.5)$ (2 sig fig)

$A = 25$

$\frac{\Delta A}{A} = \frac{\Delta l}{l} + \frac{\Delta w}{w}$ (error - 1 sig fig)

$\frac{\Delta A}{A} = \frac{0.1}{10} + \frac{0.1}{2.5}$ $\Delta A = (0.05)(25)$

$\frac{\Delta A}{A} = 0.05$ $\Delta A = 1.25$

$\Delta A = \pm 1$ (1 sig fig)

$\therefore A = 25 \pm 1\ cm^2$

#2 precise (c) 33.2 ± 0.1 ← smallest variation

accurate (b) 36.5 ± 0.5 ← closest to actual

#3 $\overbrace{24.31}^{2\text{ dec.}} \pm \overbrace{0.3}^{1\text{ sig}} - \overbrace{16.765}^{3\text{ dec}} \pm \overbrace{0.3}^{1\text{ sig}}$

$= \boxed{7.55 \pm 0.6}$

$\Rightarrow 7.6 \pm 0.6$

Research
*matching uncertainty & measurement

#4 $X = A(B-C)$

$(B-C) = 12.7 \pm 0.2 - 4.3 \pm 0.1$

$= 8.4 \pm 0.3$

$X = \overbrace{(123 \pm 0.5)}^{3\text{ SF}}\overbrace{(8.4 \pm 0.3)}^{2\text{ SF}}$

$= 1033.2$

$= \underline{1000} \pm 40$

1 SF

$\frac{\Delta x}{x} = \frac{0.5}{123} + \frac{0.3}{8.4}$

(1000)

$\Delta x = 40$

5. $V = (6.2)(23)(2.75)$ (2 SF)

$= 392.15$

$= \underline{390}\ cm^3$

$\frac{\Delta V}{V} = \frac{0.1}{6.2} + \frac{0.1}{2.3} + \frac{0.1}{2.75}$

0.02 0.04 0.04

$\frac{\Delta V}{390} = 0.09597... \rightarrow 0.1$

$\Delta V = 390\,(0.1)$ $\quad \therefore V = 390 \pm 39\ cm^3$

$\Delta V = 39\ cm^3$

Density $D = \frac{170\ g}{390\ cm^3}$ $\quad \frac{\Delta D}{D} = \frac{\Delta m}{m} + \frac{\Delta V}{V}$

$D = 0.44\ g/cm^3$ $\quad \frac{\Delta D}{0.44} = \frac{0.5}{170} + \frac{39}{390}$

0.003 0.1

$D = 0.44 \pm 0.04\ \frac{g}{cm^3}$ $\quad \frac{\Delta D}{0.44} = 0.1003$

$\Delta D = 0.44\,(0.1)$

$\Delta D = 0.04$

6.

Total $= 2.38 + 0.42 + 3.91 + 5.73$

$= 12.44\ g$

$\Delta m = 0.05 + 0.05 + 0.05 + 0.05$

$\Delta m = 0.20\ g$

$m = 12.44 \pm 0.20\ g$