1) a) $\{8, 33, 2, 20\}$

mean $= (8+33+2+20)/4 = 15.75$
median $= (2, 8, 20, 33) = (8+20)/2 = 14$
mode $=$ all 4 values $= 8, 33, 2, 20$

b) $\{8, 58, 2, 20\}$

mean $= (8+58+2+20)/4 = 22$
median $= (2, 8, 20, 58) = (8+20)/2 = 14$
mode $=$ all 4 values $= 2, 8, 20, 58$

2) a) $\{7, 15, 22, 23, 38\}$

mean $= (7+15+22+23+38)/5 = 21$
median $= (7, 15, \underline{22}, 23, 38) = 22$
mode $=$ all 5 values $= 7, 15, 22, 23, 38$

$\underrightarrow{(+4)}$ $\{11, 19, 26, 27, 42\}$

mean $= (11+19+26+27+42)/5 = (21+4) = 25$
median $= (11, 19, \underline{26}, 27, 42) = 22+4 = 26$
mode $=$ all values $+4$

$\underrightarrow{(\times 4)}$ $\{28, 60, 88, 92, 152\}$

mean $= (28+60+88+92+152)/5 = (21 \times 4) = 84$
median $= (28, 60, \underline{88}, 92, 152) = (22 \times 4) = 88$
mode $=$ all values $\times 4$

b) $\{10, 18, 25, 26, 41\}$

mean $= (10+18+25+26+41)/5 = 24$
median $= (10, 18, \underline{25}, 26, 41) = 25$
mode $=$ all 5 values

$\underrightarrow{(+5)}$ $\{15, 23, 30, 31, 46\}$

mean $= (15+23+30+31+46)/5 = (24+5) = 29$
median $= (15, 23, \underline{30}, 31, 46) = (25+5) = 30$
mode $=$ all 5 values $+ 5$

$\underrightarrow{(\times 5)}$ $\{50, 90, 125, 130, 205\}$

mean $= (50+90+125+130+205)/5 = (24 \times 5) = 120$
median $= (50, 90, \underline{125}, 130, 205) = (25 \times 5) = 125$
mode $=$ all 5 values $\times 5$

C) $\{14, 30, 44, 46, 76\}$ $\xrightarrow{(+2)}$ $\{16, 32, 46, 48, 78\}$

mean = $(14+30+44+46+76)/5 = 42$ mean = $(16+32+46+48+78)/5 = (42+2) = 44$

median = $(14, 30, \underline{44}, 46, 76) = 44$ median = $(16, 32, \underline{46}, 48, 78)$ $(44+2) = 46$

mode = all 5 values

$\xrightarrow{(\times 2)}$ $\{28, 60, 88, 92, 152\}$

mean = $(28+60+88+92+152)/5 = (42 \times 2) = 84$

median = $(28, 60, \underline{88}, 92, 152) = (44 \times 2) = 88$

mode = all 5 values $\times 2$

3) all of the values in the set would have to be the same #

ex) $\{5, 5, 5, 5\}$

mean = $(5+5+5+5)/4 = 5$

variance = $\sigma^2 = \dfrac{\Sigma(x-\mu)^2}{n} = \dfrac{\Sigma(5-5)^2}{4} = \dfrac{0}{4} = 0$

Standard
deviation = $\sigma = \sqrt{\sigma^2} = \sqrt{0} = 0$

4) $X = \{9, 11, 22\}$

$Y = \{7, 15\}$

$Z = 9-7, 9-15, 11-7, 11-15, 22-7, 22-15$

$Z = \{2, -6, 4, -4, 15, 7\}$
$\{-6, -4, 2, 4, 7, 15\}$

* This shows that $\mu_z = \mu_x - \mu_y$
  $(3 = 14-11)$ and $\sigma_z^2 = \sigma_x^2 + \sigma_y^2$
  $(48.\overline{6} = 32.\overline{6} + 16)$.

mean x = $(9+11+22)/3 = 14$

mean y = $(7+15)/2 = 11$

mean z = $(-6 + -4 + 2 + 4 + 7 + 15)/6 = 3\overline{}$

var x = $\dfrac{(9-14)^2 + (11-14)^2 + (22-14)^2}{3} = \dfrac{25+9+64}{3} = 32.\overline{6}$

var y = $\dfrac{(7-11)^2 + (15-11)^2}{2} = \dfrac{16+16}{2} = 16$

var z = $\dfrac{(-6-3.\overline{6})^2 + (-4-3.\overline{6})^2 + (2-3.\overline{6})^2 + (4-3.\overline{6})^2 + (7-3.\overline{6})^2 + (15-3.\overline{6})^2}{6}$

$= \dfrac{292}{6} = 48.\overline{6}$