REG-DISP-2425-ASM-SET 4-MATH

Suggested solutions

Conventional Questions

1. (a) Let Ada'a score be x.

$$\frac{x - 90}{\sqrt{64}} = -0.75 \qquad\qquad\qquad\qquad\qquad\text{1M}$$

$$x = 84 \qquad\qquad\qquad\qquad\qquad\text{1A}$$

Her score is 84.

(b) Ada's score lies between 1 standard deviation below mean and the mean.   1

Score of 1 standard deviation below mean is at the $50 - \dfrac{68}{2} = 16$th percentile.

Thus, Ada's score is at least the 16th percentile. The claim is agreed.   1A

2. (a) Let $\bar{x}$ be the mean of the scores of the examination.

$$\frac{71 - \bar{x}}{6} = 1.5 \qquad\qquad\qquad\qquad\qquad\text{1M}$$

$$\bar{x} = 62 \qquad\qquad\qquad\qquad\qquad\text{1A}$$

(b) Score of David $= 62 - 2.5(6) = 47$ 1M

Range of scores $\geq 71 - 47 = 24 > 23$

The claim is disagreed.   1A

3. (a) Let m marks be the mean of the test.

$$\frac{86 - m}{8} = 1.5 \qquad\qquad\qquad\qquad\qquad\text{1M}$$

$$m = 74$$

Standard score of Ringo $= \dfrac{68 - 74}{8}$

$$= -0.75 \qquad\qquad\qquad\qquad\qquad\text{1A}$$

(b) (i) Required standard deviation $= 8(1 + 30\%) = 10.4$ marks   1A

(ii) Let z and x be the original standard score and the original score of a student respectively.

$$z = \frac{x - 74}{8}$$

New standard score $= \dfrac{[x(1 + 30\%) + 3] - [74(1 + 30\%) + 3]}{10.4}$ 1M+1A

$$= \frac{1.3(x - 74)}{10.4}$$

$$= \frac{x - 74}{8}$$

$$= z$$

The claim is agreed.   1A

4.   (a)   Standard score $= \dfrac{74 - 64}{4}$ 1M

                  $= 2.5$ 1A

     (b)   Standard score of Samuel after the adjustment

              $= \dfrac{74(1 + 10\%) - 64(1 + 10\%)}{4(1 + 10\%)}$ 1M

              $= 2.5$

              < 2.75

           Sophia performs better in the test.   1A