## Solutions

Marking: **K** knowledge, **App** use of the case or data, **An** analysis (a chain of reasons: cause, then effect), **Ev** evaluation (a judgement with a reason). In calculations, **M1** is for the method and **A1** for the answer; **B1** is an independent mark.

Each answer shows the steps, then the **result**.

**2.1**

mean $\dfrac{200}{7} = \mathbf{28.6}$

median **27**, mode **27**

range $38 - 22 = \mathbf{16}$

**2.2**

mean 6; $\sum (x - \bar{x})^2 = 4 + 0 + 4 = 8$

$s = \sqrt{\dfrac{8}{2}} = \mathbf{2}$

**2.3**

$IQR = \mathbf{6.4}$

upper fence $30.9 + 1.5 \times 6.4 = \mathbf{40.5}$

$42 > 40.5$: an outlier

**2.4**

the median

a few very high salaries pull the mean up, so it overstates typical pay

**3.1**

(a) mean $\dfrac{270}{10} = \mathbf{27.0}$; median $\dfrac{26 + 27}{2} = \mathbf{26.5}$

(b) $Q_1 = \mathbf{24}$, $Q_3 = \mathbf{30}$, $IQR = \mathbf{6}$

(c) fences 15 and 39: no outliers

(d) $\sqrt{\dfrac{298}{9}} = \mathbf{5.75}$ minutes

**3.2**

(a) mean $\dfrac{438}{11} = \mathbf{39.8}$; median **27**

(b) the median: one error moved the mean by about 13 minutes, but the median by 0.5; 168 is far above the fence of 39; check the record, note that it is a timer error, then remove it and say so in the report

**3.3**

(a) drawn heights 1.4 and 2.9: about **2.1** times; true ratio $\dfrac{28.9}{27.4} = \mathbf{1.05}$



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(b) start the axis at 0, or mark a broken axis clearly and show the values

(c) **4**: Q is faster on average, but with an sd of 8 many of Q's deliveries are very late (App); customers notice late orders more than the average (An); P is more reliable: almost all within about 4 minutes of 27 (An); judgement: rank by the share of orders over a limit, e.g. 35 minutes, as well as the mean (Ev). **2–3**: spread mentioned, little use of the numbers. **1**: one relevant point.