

### Question 1

a) (i)  $5040 = 2 \times 2520$

$= 2 \times 2 \times 1260$

$= 2 \times 2 \times 2 \times 630$

$= 2 \times 2 \times 2 \times 2 \times 315$

$= 2 \times 2 \times 2 \times 2 \times 3 \times 105$

$= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 35$

$= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 7$

$= 2^4 \times 3^2 \times 5 \times 7$

(ii)  $\frac{5}{6} - \frac{3}{8} + \frac{11}{12} =$

L.C.M. = 24.

$\frac{5}{6} - \frac{3}{8} + \frac{11}{12} = \frac{20-9+22}{24} = \frac{11}{8}$

(b) (i)  $\frac{300}{4} : \frac{48}{4} = \frac{75}{3} : \frac{12}{3}$   
 $25 : 4$

(ii)  $A : B : C : D$

$4 : 9 : 5 : 2$

Grade A =  $\frac{4}{20} \times 300 = 60$

Grade B =  $\frac{9}{20} \times 300 = 135$

Grade C =  $\frac{5}{20} \times 300 = 75$

Grade D =  $\frac{2}{20} \times 300 = 30$

Answers are plausible if  $\Sigma = 300$

a) 16 hrs 27 min  $\Rightarrow 2237000$

$16 \times 60 + 27 \Rightarrow 2237000$

$\frac{987 \text{ min}}{2237000} \Rightarrow \frac{2237000}{2237000}$

1 pound  $\Rightarrow 0.000441 \text{ min}$

$4.41 \times 10^{-4} \text{ min per pound}$

(ii)  $16 + \frac{27}{60} \Rightarrow 2237000$

$16.45 \Rightarrow 2237000$

1 hr = 135987 = 136000 pounds/hr

### Question 2

a) (i) Descriptive investigation; we are intending to obtain time for each software only

(ii) primary because the researcher is collecting raw data himself

(b) (i) Position, Frequency, variability

(ii) There is a problem because the kind of relationship formed from the rest of observations is disobeyed in the case when we have extreme values. (e.g. about for 347 in second column no problem.)

(c)

|                 | Industry std | Inhouse |
|-----------------|--------------|---------|
| Min             | 311          | 310     |
| Lower quartile  | 345          | 318     |
| Median          | 368          | 325     |
| Upper quartile  | 384          | 335     |
| Max             | 605          | 347     |
| Mean            | 377.5        | 326.4   |
| SD              | 64.8         | 9.7     |
| IQR             | 39           | 17      |
| Range           | 294          | 37      |
| Size of dataset | 16           | 15      |

$IQR = Q_3 - Q_1 = 384 - 345$

$= 335 - 318$

Range = max - min = 605 - 311

$= 347 - 310$

(d) (i) Mean, median

Based on mean, industry standard software has higher location median

(ii) Industry standard has wider spread based on range

Industry std has wider spread based on IQR

Industry std has wider spread based on SD

(c) It is reasonable because all investigations proved it has narrow spread, small range, and generally its running time is less. Conclusion stage, the researcher confirms that

hypothetic

(5) mean becomes ~~smaller~~ <sup>larger</sup> and median does not change. Median involves locating the middle value while mean involves summing up all values even with the error

(9) No it wouldn't because his inference remain the same on comparative time

### Question 2

a) Including an equal sign in the function, this changes a function to an equation. Not following instructions to simplify instead the student solved Subtracting 20 instead of identifying similar terms

b) multiplying R.H.s by 6, only the left should have been

(i) Poor substitution

$$6(\underline{x} + 9) = 12 \times 7$$

$$(x+9) = \frac{12 \times 7}{6}$$

Substituting the correct answer to 3(b) as 5

$$\Rightarrow x+9=14 \quad x=5$$

$$5+9=14 \text{ therefore correct}$$

### Question 4

(i)  $9(t-5t)$  already in the simplest state

$$(ii) 11 + m(13 - 3m) = 11 + 13m - 3m^2$$

$$-3m^2 + 13m + 11$$

$$\Rightarrow m = \frac{-13 \pm \sqrt{13^2 + 132}}{-6} = -0.89, 5.1$$

$$-3m^2 + 13m + 11 = (m + 0.89)(m - 5.1)$$

$$(iii) 7t - 7(9t - 8t) = 7t - 63t + 56t$$

$$63t - 63t = 63(t - 5)$$

$$(iv) 7p(5 + 3p^2) - 5(2p - 8 + 3p^3) = 35p + 21p^3 - 10p + 40 - 15p^3$$

$$= 6p^3 + 25p + 40$$

$$(v) 5x^2 + 15x - 25$$

$$5(x^2 + 3x - 5)$$

$$6p^2 + 30p - 5p + 40$$

$$5(p^2 + 5) - 5(p + 8)$$

$$b) (i) 7a - 13 = 8 + 4a$$

$$7a - 4a = 21 \Rightarrow \frac{3a}{3} = \frac{21}{3} \quad a = 7$$

$$(ii) 4y - 6 = 2y - 20$$

$$4y - 6 = 2y - 20 \Rightarrow \frac{2y}{2} = \frac{-14}{2} - 7$$

$$y = -7$$

$$4(-7) - 6 = 2(-7) - 20$$

$$-28 - 6 = -14 - 20$$

$$-34 = -34$$

equal therefore correct.