Weighted mean

Grade 6 | Worked solutions

GCSE Statistics topic practice

1 A cafe makes its own blend of coffee by mixing three types of coffee bean.

Type of bean	Brazilian	Colombian	Kenyan
Cost per kg	£12	£16	£21
Mass used	5 kg	3 kg	2 kg

Work out the mean cost per kilogram of the blend. (3 marks)

Weighted mean = sum of (cost × mass) ÷ sum of masses

$5 \times 12 = 60$

$3 \times 16 = 48$

$2 \times 21 = 42$

$60 + 48 + 42 = 150$

$5 + 3 + 2 = 10$

$150 \div 10 = 15$

£15 per kg

2 A company scores each person it interviews in three areas. The final score is a weighted mean of the three scores. The table shows the weights and the scores of two people.

	Skills test	Experience	Interview
Weight	5	3	2
Priya	72	60	85
Marcus	64	80	78

a. Show that Priya's final score is 71. (2)

b. The job is given to the person with the higher final score. Who gets the job? You must show your working. (2)

(4 marks)

a)

$5 \times 72 = 360$

$3 \times 60 = 180$

$2 \times 85 = 170$

$360 + 180 + 170 = 710$

Divide by the sum of the weights

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$5 + 3 + 2 = 10$

$710 \div 10 = 71$

b)

$5 \times 64 = 320$

$3 \times 80 = 240$

$2 \times 78 = 156$

$320 + 240 + 156 = 716$

$716 \div 10 = 71.6$

$71.6 > 71$ so Marcus gets the job.

a) $710 \div 10 = 71$ b) Marcus with 71.6

3 The final mark for a college course is a weighted mean of three marks, each out of 100.

Component	Coursework	Written exam	Practical
Weighting	30%	50%	20%

a. Amira scores 70 for coursework, 58 in the written exam and 85 in the practical. Work out her final mark. (2)

b. Ben scores 60 for coursework and 80 in the practical. He needs a final mark of at least 65 to pass with distinction. Work out the lowest mark he can score in the written exam to pass with distinction. (2)

(4 marks)

a)

$0.3 \times 70 = 21$

$0.5 \times 58 = 29$

$0.2 \times 85 = 17$

$21 + 29 + 17 = 67$

b)

First find what Ben has so far

$0.3 \times 60 = 18$

$0.2 \times 80 = 16$

$18 + 16 = 34$

The exam must give the rest

$65 - 34 = 31$

$31 \div 0.5 = 62$

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a) 67 b) 62

4 Two Year 11 classes sit the same science test. Class 11A has 28 students and a mean mark of 62%. Class 11B has 22 students and a mean mark of 57%.

a. Work out the mean mark for all 50 students. (3)

b. Dan says, "The mean for all the students is (62 + 57) ÷ 2 = 59.5%." Explain why Dan is wrong. (1)

(4 marks)

a)

Use the class sizes as the weights

$28 \times 62 = 1736$

$22 \times 57 = 1254$

$1736 + 1254 = 2990$

$2990 \div 50 = 59.8$

b)

The classes are not the same size.

11A has more students, so its mean must count for more than the 11B mean.

a) 59.8% b) the classes have different sizes

5 A website gives each mobile phone a rating out of 10. The rating is a weighted mean of three scores. The table shows the scores and the weights for one phone.

	Camera	Battery	Screen
Score out of 10	8	6	9
Weight	3	2	x

The rating of this phone is 8.

a. Work out the value of x. (3)

b. Work out the ordinary mean of the three scores, without weights. Explain why it is lower than the rating of 8. (2)

(5 marks)

a)

$8 \times 3 = 24$

$6 \times 2 = 12$

Sum of (score × weight) $= 24 + 12 + 9x$

Sum of the weights $= 3 + 2 + x$

Weighted mean = 8

$36 + 9x = 8 \times (5 + x)$

$36 + 9x = 40 + 8x$

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$$\begin{array}{lll} -8x & 36 + x = 40 & -8x \\ -36 & x = 4 & -36 \end{array}$$

b)

$8 + 6 + 9 = 23$

$23 \div 3 = 7.67$

The screen has the highest score.

In the rating it also has the biggest weight,

so it pulls the weighted mean up to 8.

a) $x = 4$ b) 7.67, the top score has lost its big weight

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