

MARKS

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8. Suppose the weights in kilograms of the melons produced by a large market garden can be modelled by a normal distribution with a mean of 1 kg and a standard deviation of 0.25 kg. The selling price per saleable melon is \$3.00 for melons lighter than 0.8 kg, \$5.00 for those heavier than 1.3 kg, and \$4.00 for all others. Find the average selling price per melon for the market garden's crop of saleable melons.

Let the random variable W represent the weight (in kg) of a randomly-selected saleable melon from the market garden;

we use the model: $W \sim N(1, 0.25)$.

$$\text{Then: } \Pr(W < 0.8) = \Pr[N(0, 1) < \frac{0.8-1}{0.25}] = \Pr[N(0, 1) < -0.8] = 0.21186$$

$$\Pr(W > 1.3) = \Pr[N(0, 1) > \frac{1.3-1}{0.25}] = \Pr[N(0, 1) > 1.2] = 0.11507$$

$$\Pr(0.8 \leq W \leq 1.3) = \Pr[-0.8 \leq N(0, 1) \leq 1.2] = 0.40879 + 0.24750 = \frac{0.67307}{1.00000} \quad (\text{OK})$$

Hence, the average selling price per saleable melon is:

$$\begin{aligned} & 0.21186 \times \$3.00 + 0.67307 \times \$4.00 + 0.11507 \times \$5.00 \\ &= \$0.63558 + \$2.69228 + \$0.57535 \\ &= \$3.90321 \approx \$3.90; \end{aligned}$$

that is, the melons sell for an average of about \$3.90 each.

\$3.90

Average price