SECTION C: EXTENDED-ANSWER QUESTIONS (TECHNOLOGY-ACTIVE)

Question 1 (14 marks)

a. Let X be the total weight of the five watermelons.

$\text{E}(X) = 5 \times 10 = 50$ A1

$\text{sd}(X) = \sqrt{5} \times 2 = 4.4721$ A1

$\text{Pr}(35 < X < 45) = 0.1317$ A1

b. Let $Y = W - 2P$, where W is the weight of a random watermelon and P the weight of a random pumpkin.   M1

$\text{E}(Y) = 10 - 2 \times 5.5 = -1$ A1

$\text{Var}(Y) = 2^2 + 4 \times 1.5^2 = 13$ A1

$\text{Pr}(Y > 0) = 0.3908$ A1

c. $H_0: \mu = 200$ versus $H_1: \mu \neq 200$ A2

d. If H_0 is true, then $\bar{X} \sim N\left(200, \dfrac{5^2}{15}\right)$.   A1

$p\text{-value} = 2\text{Pr}(\bar{X} \leq 197 \,|\, \mu = 200)$ M1

So $p\text{-value} = 0.0201$.   A1

e. As $0.0201 < 0.05 \,(\alpha)$, we should reject H_0 in favour of H_1.   A1

We have enough evidence to conclude that the mean weights are not 200 grams.   A1