

Self-assessment answers: 24 Continuous distributions

1. Let volume of coffee (ml) dispensed be V . Then $V \sim N(150, 25)$.

(a) $P(V < 142) = 0.0548$ (3SF) (from GDC)

(b) $P(V > a) = 0.2 \Rightarrow a = 154.2$ [5 marks]

2. (a) $\int_0^1 f(x) dx = 1 \Rightarrow \int_0^1 k - x^2 dx = 1$

$$\Rightarrow \left[kx - \frac{x^3}{3} \right]_0^1 = 1 = k - \frac{1}{3}$$

$$\Rightarrow k = \frac{4}{3}$$

(b) $P(X < 0.3) = \int_0^{0.3} f(x) dx = \int_0^{0.3} k - x^2 dx$

$$= \frac{4}{3} \left(\frac{3}{10} \right) - \frac{1}{3} \left(\frac{3}{10} \right)^3 = \frac{4}{10} - \frac{9}{1000} = \frac{391}{1000} \text{ or } 0.391$$
 [5 marks]

3.

4.