

**Question 15** (14 marks)

'Wacky Quackers' is a popular amusement park game in Australia. In this game, a player selects from a very large number of identical-looking plastic ducks that are floating on a pool of water. Each duck has the number 1, 2, 5, or 10 printed on its base. The numbers cannot be seen by the player when making their selection.

The number that is printed on the selected duck will be used to determine the player's prize. These numbers are distributed according to the table below.

$x$	1	2	5	10
$\Pr(X=x)$	0.5	0.2	0.2	0.1



Source: adapted from © Iprintezis | Dreamstime.com

(a) (i) Calculate  $\mu_X$ .

$$\begin{aligned}\mu_X &= 1 \times 0.5 + 2 \times 0.2 + 5 \times 0.2 + 10 \times 0.1 \\ &= 2.9\end{aligned}$$

(2 marks)

(ii) Calculate  $\sigma_X$ .

$$\begin{aligned}\sigma_X &= \sqrt{1^2 \times 0.5 + 2^2 \times 0.2 + 5^2 \times 0.2 + 10^2 \times 0.1 - 2.9^2} \\ &= 2.81 \text{ (3s.f.)}\end{aligned}$$

(2 marks)

**three ducks \$10**

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**five ducks \$16**

PLEASE TURN OVER