Name:
Result:

1. *(5 points)*

In a certain population 20% of people are over 1.8 metres tall. If a person is over 1.8 metres tall, the probability that this person weighs more than 80 kg is 75%. If a person is not over 1.8 metres tall, then the probability that this person weighs more than 80 kg is p.

(a) Represent the above information on a tree diagram. [1]

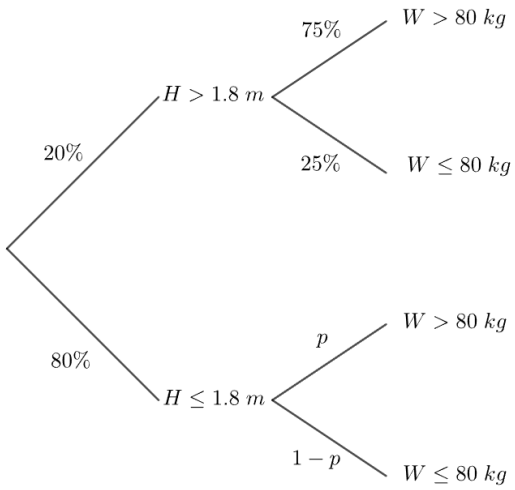
In this population 39% of people weigh more than 80 kg.

(b) Calculate the value of p. [2]

A person is selected at random from this population. This person weighs more than 80 kg.

(c) Find the probability that this person is more than 1.8 metres tall. [2]

(a) Venn diagram:



(b) $0.2 \times 0.75 + 0.8p = 0.39$ gives $p = 0.3$ or 30%.

(c) $P(H > 1.8\ m \mid W > 80\ kg) = \dfrac{P(H > 1.8\ m\ \cap W > 80\ kg)}{P(W > 80\ kg)} = \dfrac{0.2 \times 0.75}{0.39} \approx 0.385$

2. *(5 points)*

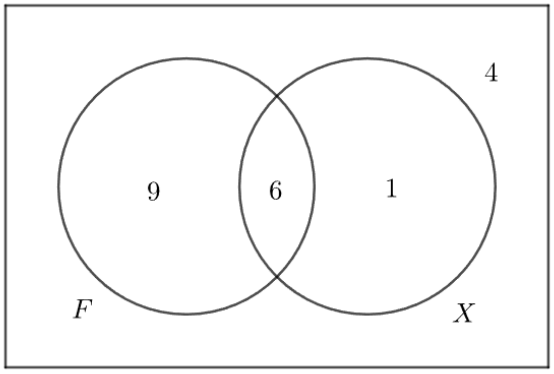
A group of 20 adults took part in a survey about social media. Of these 20 adults: 15 had a Facebook account and 7 had an X (former Twitter) account. 4 had neither Facebook nor X account.

(a) Represent the above information on a Venn diagram. [1]

(b) A person from this group is chosen at random. Find the probability that this person has an X account, given that she has an account on exactly one of the platforms mentioned. [2]

(c) Two people are selected from this group at random. Find the probability that they both have accounts on both platforms. [2]

(a) Venn diagram:



(b) $P(X|\text{exactly one}) = \frac{1}{10}$

(c) $P(\text{both } F \cap H) = \frac{6}{20} \times \frac{5}{19} = \frac{3}{38}$