

Name: \_\_\_\_\_

Date: \_\_\_\_\_

CW # 3-2: Math IB SL - Standard 30 - 33: Chapter 8 Probability

50 points

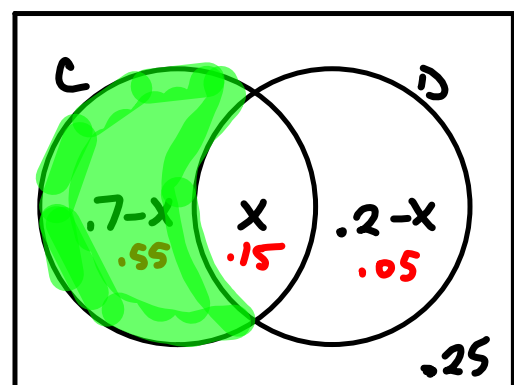
1. A two digit number between 10 and 99 inclusive is written down at random. Find the probability that it is:
- divisible by 5
  - divisible by 3
  - greater than 50
  - a square number.

a)  $\frac{18}{90}$  or  $\frac{1}{5}$       (c)  $\frac{49}{90}$   
 (b)  $\frac{30}{90}$  or  $\frac{1}{3}$       (d)  $\frac{6}{90}$  or  $\frac{1}{15}$

2. For events C and D it is known that:  
 $P(C) = 0.7$      $P(C' \cap D') = 0.25$      $P(D) = 0.2$
- Find  $P(C \cap D')$ .
  - Explain why C and D are not independent events.

~~$.7 - x + x + .2 - x + .25 = 1$~~   
 $1.15 - x = 1$   
 $.15 = x$

(a)  $P(C \cap D') = 0.55$   
 (b)  $P(C \cap D) = P(C) \cdot P(D)$   
 $.15 = (.7)(.2)$   
 $.15 \neq .14$



Name: \_\_\_\_\_

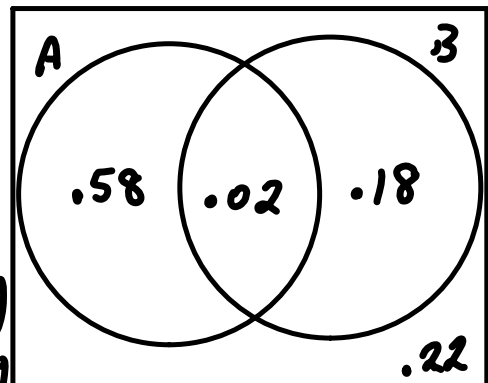
Date: \_\_\_\_\_

CW # 3-2: Math IB SL - Standard 30 - 33: Chapter 8 Probability

50 points

3. The two events A and B are such that  $P(A) = 0.6$ ,  $P(B) = 0.2$  and  $P(A | B) = 0.1$ . Calculate the probabilities that:

- a both of the events occur
- b at least one of the events occur
- c exactly one of the events occur
- d B occurs given that A has occurred



$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$0.1 = \frac{P(A \cap B)}{0.2}$$

$$0.02 = P(A \cap B)$$

a)  $P(A \cap B) = 0.02$

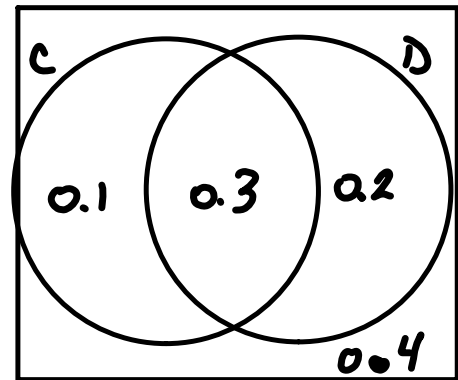
b)  $P(\text{at least one}) = 0.78$

c)  $P(\text{Exact one}) = 0.76$

d)  $P(B|A) = \frac{P(B \cap A)}{P(A)} = \frac{0.02}{0.60} = \frac{2}{60} = \frac{1}{30}$

4. Let  $P(C) = 0.4$ ;  $P(D) = 0.5$ ;  $P(C|D) = 0.6$ .

- a Find  $P(C \text{ and } D)$ .
- b Are C and D mutually exclusive? Give a reason for your answer
- c Are C and D independent events? Give a reason for your answer
- d Find  $P(C \text{ or } D)$ .
- e Find  $P(D|C)$ .



(a)  $P(C|D) = \frac{P(C \cap D)}{P(D)}$

$$0.6 = \frac{P(C \cap D)}{0.5}$$

$$0.3 = P(C \cap D)$$

b) No. There is an overlap in probabilities.

c)  $P(C \cap D) = P(C) \cdot P(D)$

$$0.3 = (0.4)(0.5)$$

$$0.3 \neq 0.2$$

**NO**

(e)  $P(D|C) = \frac{P(D \cap C)}{P(C)}$

$$= \frac{0.3}{0.4} = \frac{3}{4}$$

d)  $P(C \text{ or } D) = 0.6$

Name: \_\_\_\_\_

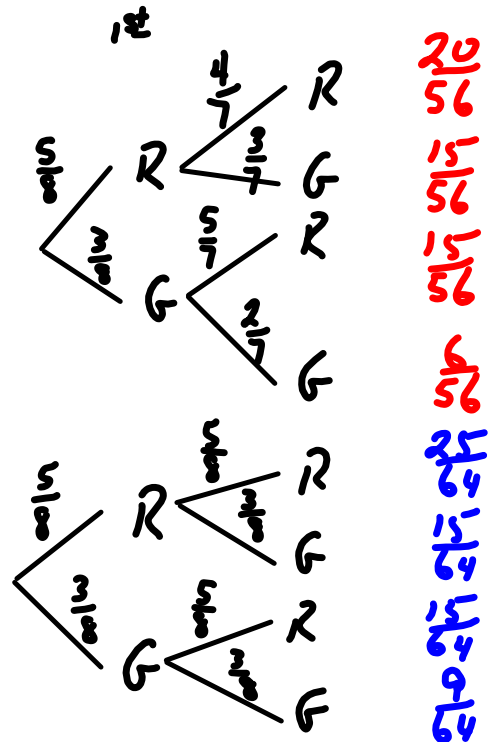
Date: \_\_\_\_\_

CW # 3-2: Math IB SL - Standard 30 - 33: Chapter 8 Probability

50 points

5. Adrian has a box with 5 red and 3 green apples in it. He takes out an apple at random and eats it. He then takes out another apple at random and also eats it.

- a Find the probability that he eats
  - i two red apples
  - ii two apples of different colours.



Sally also has a box with 5 red and 3 green apples in it. Sally is on a diet. She takes out an apple at random and then puts it back in the box. She then takes out another apple at random.

- b Find the probability that she takes
  - i two red apples
  - ii two apples of different colours.

a(i)  $\frac{20}{56}$       (ii)  $\frac{30}{56}$

b(i)  $\frac{25}{64}$       (ii)  $\frac{30}{64}$

Name: \_\_\_\_\_

Date: \_\_\_\_\_

CW # 3-2: Math IB SL - Standard 30 - 33: Chapter 8 Probability

50 points

6. A control tower sends a message to a ship. The probability that the ship hears the message is  $\frac{3}{4}$ . The ship will reply if and only if it receives the message. If the ship replies, the probability that the tower hears the reply is  $\frac{3}{5}$ .

- a Sketch a probability tree to represent this information. (2 marks)
- b Hence find the probability that the tower hears a reply to the message it sends. (2 marks)
- c Write down the probability that it does not hear a reply. (2 marks)
- d Given that the tower did not hear a reply, find the probability that the ship did not hear the original message.

(b)  $\left(\frac{3}{4}\right)\left(\frac{3}{5}\right) = \boxed{\frac{9}{20}}$

(c)  $\frac{6}{20} + \frac{5}{20} = \boxed{\frac{11}{20}}$

(d)  $\left(\frac{1}{4}\right) = \left(\frac{1}{4}\right)\left(\frac{20}{11}\right)$   
 $= \boxed{\frac{5}{11}}$

