

IG - Maths
0580

Probability
Exercise
Paper - 4

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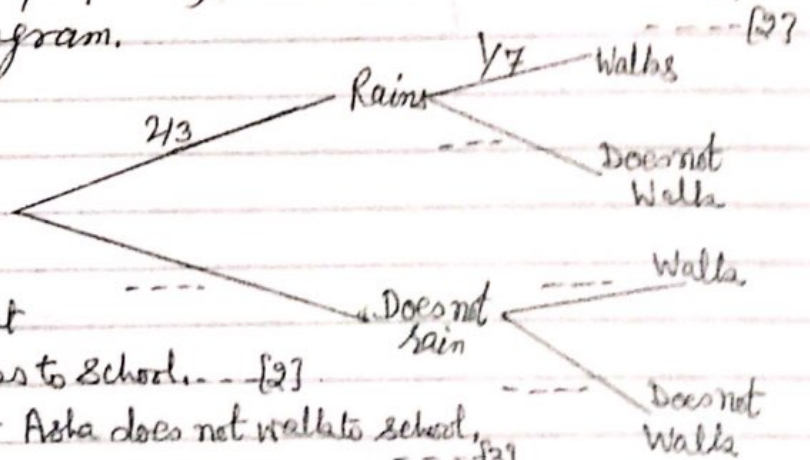
Q1 Ravi spins a biased 5-sided spinner, numbered 1 to 5. The probability of each number is shown in the table:

Number	1	2	3	4	5
Probability	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	x	x

- (a) Find the value of x . --- [3]
- (b) Ravi spins the spinner once. Find the prob. that the number is 2 or 3. --- [2]
- (c) Ravi spins the spinner twice. Find the prob. that,
 (i) the number is 2 both times. --- [2]
 (ii) the sum of numbers is 3. --- [3]
- (d) Ravi spins the spinner 72 times. --- [1]
 Calculate how many times he expects the number 1. M-17/42/Q4

Q2. Each morning the probability that it rains is $\frac{2}{3}$.
 If it rains, the probability that Asha walks to school is $\frac{1}{7}$.
 If it does not rain, the probability that Asha walks to school is $\frac{4}{7}$.

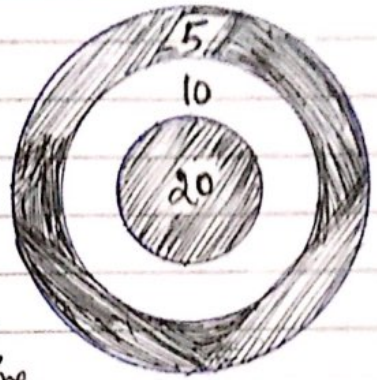
(a) Complete the tree diagram.



- (b) Find the probability that it rains and Asha walks to school. --- [2]
- (c) (i) Find the prob. that Asha does not walk to school. --- [3]
 (ii) Find the expected number of days Asha does not walk to school in a term of 70 days. --- [2]
- (d) Find the prob. that it rains on exactly one morning in a school week of 5 days. --- [2]

S-17/42/Q6

Q3 Kiah play a game. The game involves throwing a coin onto a circular board. Points are scored for where the coin lands on the board. If the coin lands on a part of line or misses the board then 0 points are scored. The table shows the probabilities of Kiah scoring points on the board with one throw.



Points Scored	20	10	5	0
Probability	x	0.2	0.3	0.45

- (a) Find the value of x . ---[2]
- (b) Kiah throws a coin fifty times.
Work out the expected number of times she scores 5 points. --[1]
- (c) Kiah throws a coin two times. Calculate the probability that:
- (i) she scores either 5 or 0 with her first throw. --[2]
 - (ii) she scores 0 with her first throw and 5 with her second throw. [2]
 - (iii) she scores a total of 15 points with her two throws. --[3]
- (d) Kiah throws a coin three times.
Calculate the probability that she scores a total of 10 points with her three throws. 15-16/42/Q5 --[5]

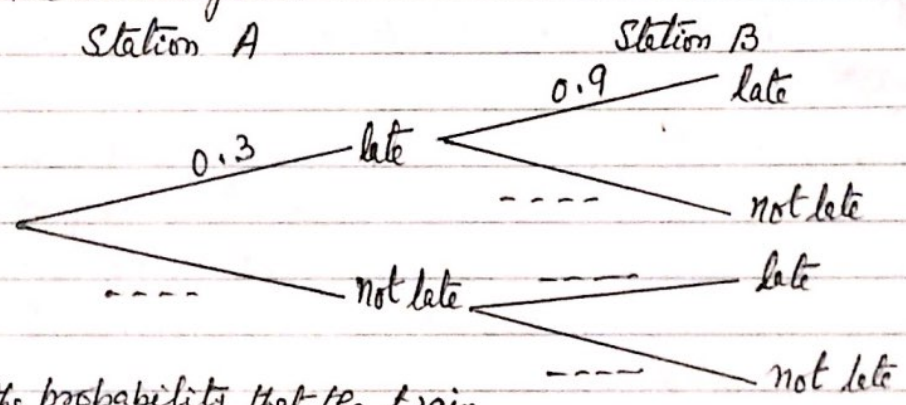
Q4 Coins are put into a machine to pay for parking cars. The probability that the machine rejects a coin is 0.05.

- (a) Adhira puts 2 coins into the machine.
- (i) Calculate the probability that the machine rejects both coins. ---[2]
 - (ii) Calculate the prob. that the machine accepts at least one coin. --[1]
- (b) Raj puts 4 coins into the machine.
Calculate the probability that the machine rejects exactly one coin. --[3]

15-16/43/Q4

Q5 A train stops at station A and then at station B.
 If the train is late at station A, the probability that it is late at station B is 0.9. If the train is not late at station A, the probability that it is late at station B is 0.2.
 The prob. that the train is late at station A is 0.3.

(a) Complete the tree diagram. --- [2]



(b) (i) Find the probability that the train is late at one or both of the stations. --- [2]

(ii) This train makes 250 journeys. Find the number of journeys that the train is expected to be late at one or both of the stations. --- [1]

(c) The train continues to station C.

The probability that it is late at all 3 stations is 0.27

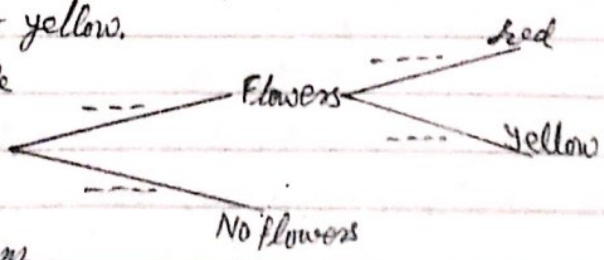
Describe briefly what this probability shows. ---

[W-16/41/27] --- [1]

Q6 The probability that a plant will produce flowers is $\frac{7}{8}$

The flowers are either red or yellow.

If the plant produces flowers, the prob. that the flowers are red is $\frac{3}{4}$.



(a) (i) Complete the tree diagram by writing a probability beside each branch. --- [2]

(ii) Calculate the prob. that a plant, chosen at random, will produce red flowers. --- [2]

(iii) Two plants are chosen at random. Calculate the probability that both will produce red flowers. [continued ->] --- [2]

(Continued →)

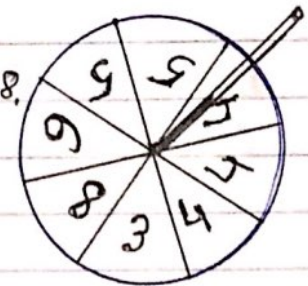
Q 6 (b) Alphonse buys 200 of these plants
Calculate the number of plants that are expected to produce flowers. --- [2]

(c) Gabriel has 1575 plants with red flowers
Estimate the total number of plants that Gabriel has, --- [2]

W-16/42/Q5

Q 7 Sandra has a fair eight sided spinner.

The numbers on the spinner are 3, 4, 4, 4, 5, 5, 6 and 8.
Sandra spins the spinner twice and records
each number it lands on.



Find the probability that:

- (a) both numbers are 8, --- [2]
- (b) the two numbers are not both 8, --- [1]
- (c) one number is odd and one number is even, --- [2]
- (d) the total of the two numbers is at least 13, --- [3]
- (e) the second number is bigger than the first number --- [3]

W-16/43/Q5

Q 8 In this question write any probability as a fraction.

Navpreet has 15 cards with a shape drawn on each card.
5 cards have a square, 6 cards have a triangle and 4 cards
have a circle drawn on them.

(a) Navpreet selects a card at random.

Write down the probability that the card has a circle drawn on it. --- [1]

(b) Navpreet selects a card at random and replaces it.

She does this 300 times. Calculate the number of
times she expects to select a card with a circle drawn on it. --- [1]

(c) Navpreet selects a card at random, replaces it and then selects
another card. Calculate the probability that,

(i) one card has a square drawn on it and other has a
circle drawn on it. --- [3]

(ii) neither card has a circle drawn on it. --- [3]

(Continued →)

(Continued →)

Q 8(d) Navpreet selects two cards at random, with replacement.

Calculate the probability that,

- (i) Only one card has a triangle drawn on it. --- [3]
- (ii) The two cards have different shapes drawn on it. --- [4]

M-15/42/Q6

Q 9(a) A bag contains red beads and green beads.

There are 80 beads altogether.

The probability that a bead chosen at random is green is 0.35 .

- (i) Find the number of red beads in the bag. --- [2]

(ii) Marcos chooses a bead at random and replaces it in the bag.

He does this 240 times.

Find the number of times he would expect to choose a green bead. --- [1]

(b) A different bag contains 2 blue marbles, 3 yellow marbles and 4 white marbles. Huma chooses a marble at random, notes the colour, she replaces it in the bag, she does this three times.

Find the probability that,

- (i) all three marbles are yellow. --- [2]
- (ii) all three marbles different colours. --- [3]
- (c) Another bag contains 2 green counters and 3 pink counters.

Teresa chooses three counters at random without replacement.

Find the probability that she chooses more pink counters than green counters.

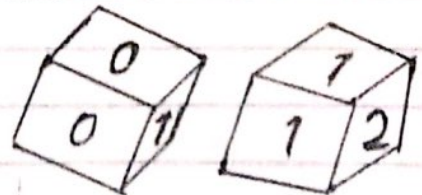
W-17/41/Q9 --- [4]

Q 10. The diagram shows two fair dice.

The numbers on dice A are 0, 0, 1, 1, 1, 3.

The numbers on dice B are 1, 1, 2, 2, 2, 3.

When a dice is rolled, the score is the number on the top face.



(a) Dice A is rolled once.

Find the probability that the score is not 3. --- [1]

(b) Dice A is rolled twice.

Find the probability that the score is 0 both times. --- [2]

(Continued →)

(Continued →)

Q10 (c) Dice A is rolled 60 times.

Calculate an estimate of the number of times the score is 0. --- [1]

(d) Dice A and dice B are each rolled once.

The Product of the scores is recorded.

(i) Complete the possibility diagram, --- [2]

(ii) Find the probability that the product of the scores is.

(a) 2 --- [1]

(b) greater than 3. --- [1]

		3	0	0					
		2	0	0					
Dice B	2	0	0						
	2	0	0						
	1	0	0						
	1	0	0						
			0	0	1	1	1	1	3
			Dice A						

(e) Eva keeps rolling dice B until 1 is scored.

Find the prob. this happens on the 5th roll. --- [2]

$\frac{1}{6} \times \left(\frac{5}{6}\right)^4$

Q11 Gareth has 8 sweets in a bag. 4 sweets are orange flavoured, 3 are lemon flavoured and 1 is strawberry flavoured.

(a) He chooses two of the sweets at random.

Find the probability that the two sweets have different flavours. --- [4]

(b) Gareth now chooses a third sweet.

Find the probability that none of three sweets is lemon flavoured.

$\frac{5}{8} \times \frac{4}{7} \times \frac{3}{6}$

Q12



(a) One of these seven cards is chosen at random.

Write down the probability that the card.

$\frac{1}{7}$

(i) shows the letter A

--- [1]

(ii) shows the letter A or B

--- [1]

(iii) does not show the letter B

--- [1]

(b) Two of the cards are chosen at random, without replacement.

Find the probability that. (i) both show the letter A.

--- [2]

(ii) the two letters are different.

--- [3]

(c) Three of the cards are chosen at random, without replacement.

Find the prob. that the cards do not show the letter C.

--- [2]

Q13(a) A square spinner is biased.

The probabilities of obtaining the scores 1, 2, 3 and 4 when it is spun are given in the table.

Score	1	2	3	4
Prob	0.1	0.2	0.4	0.3

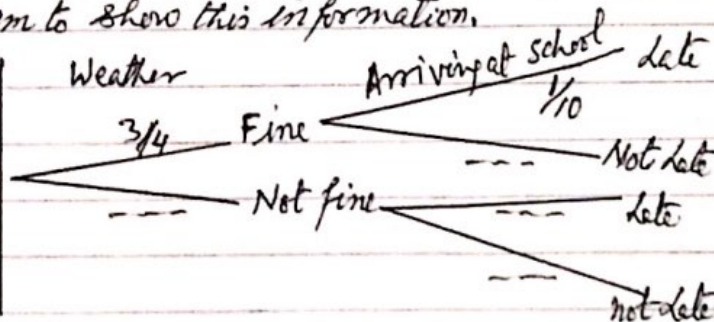
- (i) Work out the prob. that on one spin the score is 2 or 3. --- [2]
- (ii) In 5000 spins, how many times would you expect to score 4. --- [1]
- (iii) Work out the prob. of scoring 1 on the first spin and 4 on the second spin. --- [2]

(b) In a bag there are 7 red discs and 5 blue discs. From the bag a disc is chosen at random and not replaced. A second disc is chosen at random. Work out the prob. that at least one of the discs is red. Give your answer as a fraction. 5-14/41/Q6 --- [3]

Q14 If the weather is fine the prob. that Carlos is late arriving at school is $\frac{1}{10}$. If the weather is not fine the prob. that he is late arriving at school is $\frac{1}{3}$. The prob. that weather is fine on any day is $\frac{3}{4}$.

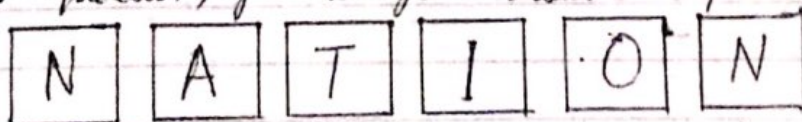
(a) Complete the tree diagram to show this information.

(b) In a school term of 60 days, find the number of days the weather is expected to be fine. --- [1]



- (c) Find the prob. that the weather is fine and Carlos is late arriving at school. --- [2]
- (d) Find the prob. that Carlos is not late arriving at school. --- [3]
- (e) Find the prob. that the weather is not fine on at least one day in a school week of 5 day. 5-14/42/Q9 --- [2]

Q15 In this question, give all your answers as fractions.



The letters of the word NATION are printed on 6 cards.

- (a) A card is chosen at random, write down the probability that:
 - (i) it has the letter T printed on it. (continued →) --- [1]

(Continued →)

- Q 15(a) (ii) It does not have the letter N printed on it. --- [1]
 (iii) the letter printed on it has NO lines of symmetry. --- [1]
 (b) Lara chooses a card at random, replaces it, then chooses a card again, calculate the prob that only one of the cards she chooses has letter N printed on it. --- [3]
 (c) Jacob chooses a card at random and does not replace it. He continues until he chooses a card with the letter N printed on it. Find the prob, that this happens when he chooses the 4th card. --- [3]

5-14/43/Q6

Q16 Kenwyn play a board game. Two cubes (dice) each have faces numbered 1, 2, 3, 4, 5 and 6. In the game, a throw is rolling the two fair 6-sided dice and then adding the numbers on their top faces. This total is the number of spaces to move on the board. For example, if the numbers are 4 and 3, he moves 7 spaces.

- (a) Giving each of your answers as a fraction in its simplest form, Find the probability that he moves.
 (i) two spaces with his next throw. --- [2]
 (ii) ten spaces with his next throw --- [3]
 (b) What is the most likely number of spaces that Kenwyn will move with his next throw? Explain your answer. [2]

(c)

95	96	97	98	99 Go back 3 space	100 Win
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To win the game he must move exactly to the 100th space. Kenwyn is on the 97th space. If his next throw takes him to 99, he has to move back to 96. If his next throw takes him over 100, he stays on 97. Find the prob, that he reaches hundred in either of his next two throws. [5]

W-14/42/Q10

Q17 Young and Asiven compete in a triathlon race. The probability that Young finishes this race is $\frac{3}{5}$. The probability that Asiven finishes this race is $\frac{2}{3}$.

(a) (i) Which of them is more likely to finish this race?

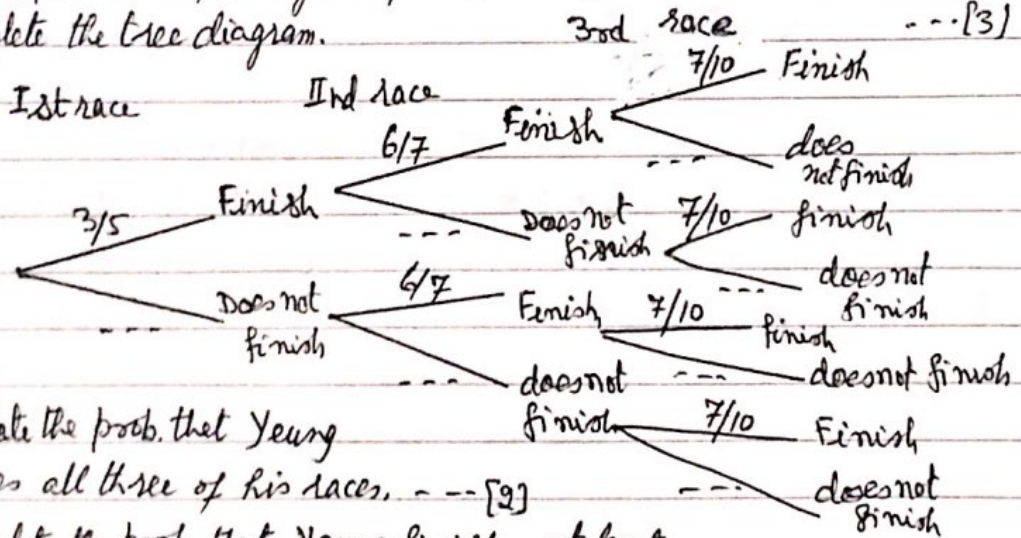
Give a reason for your answer. --- [1]

(ii) Find the prob. that they both finish this race. --- [2]

(iii) Find the prob. that only one of them finishes this race. --- [3]

(b) After the first race, Young competes in two further triathlon races.

(i) Complete the tree diagram. --- [3]



(ii) Calculate the prob. that Young finishes all three of his races. --- [2]

(iii) Calculate the prob. that Young finishes at least one of his races. --- [3]

W-14/43/Q4

Q18. A bag contains 7 white beads and 5 red beads.

(i) The mass of red bead is 2.5 grams more than the mass of a white bead. The total mass of all the 12 beads is 114.5 grams.

Find the mass of a white bead and the mass of a red bead.

(ii) Two beads are taken out of the bag at random, without replacement.

Find the probability that: (a) they are both white. --- [2]

(b) One is white and one is red. --- [3]

S-13/41/Q7(b)

Q19 In this question give all answers a fractions.

When Ivan goes to school in winter, the prob. that he wears a hat is $\frac{5}{8}$.

If he wears a hat, the prob. that he wears a scarf is $\frac{2}{3}$.

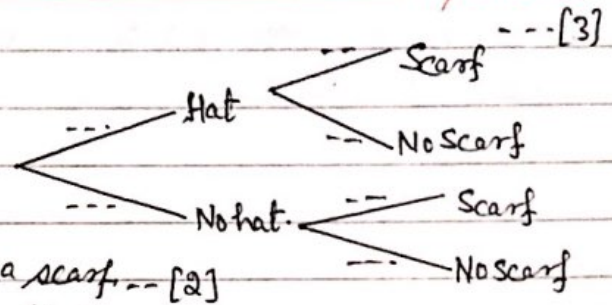
If he does not wear a hat, the prob. that he wears a scarf is $\frac{1}{6}$.

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Q19 (a) Complete the tree diagram.

- (b) Find the prob. that Ivan
 (i) does not wear a hat and does not wear a scarf, --- [2]
 (ii) wears a hat but does not wear a scarf, --- [2]
 (iii) wears a hat or a scarf but not both, --- [2]



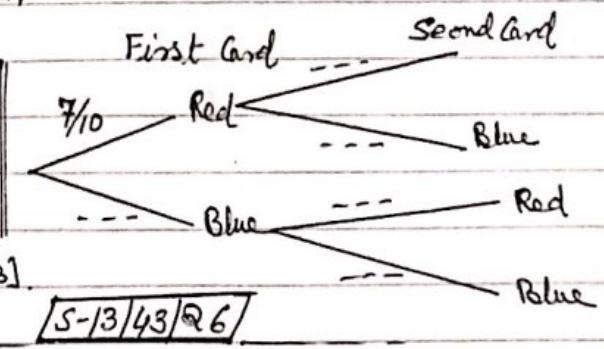
(c) If Ivan wears a hat and a scarf, the prob. that he wears gloves is $\frac{7}{10}$. Calculate the prob. that Ivan does not wear all three of hat, scarf and gloves, S-13/42/Q8 --- [3]

Q20

In a box there are 7 red cards and 3 blue cards.
 A card is drawn at random from the box and is not replaced.
 A second card is then drawn at random from the box.

(a) Complete this tree diagram, --- [3]

- (b) Work out the probability that the two cards are of different colours.
 Give your answer as a fraction. --- [3]



Q21

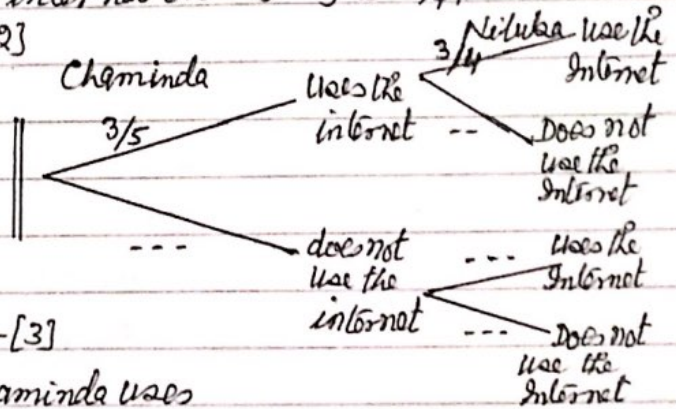
E N L A R G E M E N T

Prettie picks a card at random from the 11 cards above and does not replace it. She then picks a second card at random and does not replace it. W-13/42/Q6

- (a) Find the probability that she picks,
 (i) the letter L and then the letter G, --- [2]
 (ii) the letter E twice, --- [2]
 (iii) two letters that are the same, --- [2]
- (b) Prettie now picks a third card at random.
 Find the prob. that the three letters
 (i) are all the same, --- [2]
 (ii) do not include a letter E, --- [2]
 (iii) include exactly two letters that are same, --- [5]

Q22 The probability that Chaminda uses the internet on any day is $\frac{3}{5}$.
the prob, that Niluka uses the internet on any day is $\frac{3}{4}$.

(i) complete the tree diagram, --- [2]



(ii) Calculate the probability, that on any day, at least one of the two students uses the internet, --- [3]

(iii) Calculate the probability that Chaminda uses the internet on three consecutive days, --- [2]

W-13/43/R5(b)

Q1 (a) $\frac{1}{8}$ (b) $\frac{7}{12}$ (c) (i) $\frac{1}{16}$ (ii) $\frac{1}{24}$ **Answers** Q9 (a) (i) 54 (ii) 84

(d) 12

Q2 (a) $\frac{1}{3}$, $\frac{6}{7}$ and $\frac{4}{3}$, $\frac{3}{7}$
(b) $\frac{2}{21}$ (c) (i) $\frac{15}{21}$ (ii) 50 (d) $\frac{10}{243}$

Q3 (a) 0.05 (b) 15 (c) (i) 0.75
c (ii) 0.135 (ii) 0.12 (d) 0.243

Q4 (a) (i) 0.0025 (ii) 0.9975
(b) 0.171 (or $\frac{6859}{40000}$)

Q5 (a) 0.7; 0.1 & 0.2, 0.8
(b) (i) 0.44 (ii) 110 (c) If late at first two stations then certainly be late at station C.

Q6 (i) $\frac{3}{4}$, $\frac{1}{4}$ and $\frac{7}{8}$, $\frac{1}{8}$ (ii) $\frac{2}{32}$
(iii) $\frac{44}{1024}$ (b) 175 (c) 2400

Q7 (a) $\frac{1}{64}$ (b) $\frac{63}{64}$ (c) $\frac{30}{64}$ (d) $\frac{7}{4}$
(e) $\frac{24}{64}$

Q8 (a) $\frac{4}{15}$ (b) 80 (c) (i) $\frac{40}{225}$ (ii) $\frac{121}{225}$
(d) (i) $\frac{108}{210}$ (ii) $\frac{148}{210}$

(b) (i) $\frac{27}{729}$ (ii) $\frac{144}{729}$ (c) $\frac{42}{60}$

Q10 (a) $\frac{5}{6}$ (b) $\frac{4}{36}$ (c) 20
(d) (i) $\frac{3399}{2226}$ (ii) $\frac{2226}{2226}$ (iii) $\frac{2226}{2226}$ (iv) $\frac{1113}{1113}$ (d) (ii) $\frac{9}{36}$
(b) $\frac{4}{36}$

(e) $\frac{512}{7776}$

Q11 (a) $\frac{38}{56}$ (b) $\frac{60}{336}$

Q12 (a) (i) $\frac{4}{7}$ (ii) $\frac{6}{7}$ (iii) $\frac{5}{7}$
(b) (i) $\frac{12}{42}$ (ii) $\frac{28}{42}$ (c) $\frac{120}{210}$

Q13 (a) (i) 0.6 (ii) 1500 (iii) 0.03
(b) $\frac{112}{132}$ or $\frac{28}{33}$

Q14 (a) $\frac{1}{4}$, $\frac{9}{10}$, $\frac{1}{3}$, $\frac{2}{3}$ (b) 45
(c) $\frac{3}{40}$ (d) $\frac{101}{120}$

Q15 (a) (i) $\frac{1}{6}$ (ii) $\frac{4}{6}$ (iii) $\frac{2}{6}$
(b) $\frac{16}{36}$ (c) $\frac{48}{360}$

Answers

Q16 (a) (i) $\frac{1}{36}$ (ii) $\frac{1}{12}$
 (b) 7 (c) $\frac{141}{1296}$

Q17 (a) (i) Aviren with comparable form for both shown or difference between the two fractions shown,

(ii) $\frac{6}{15}$ (iii) $\frac{7}{15}$

b (i) $\frac{2}{5}$; $\frac{1}{7}$, $\frac{1}{7}$; $\frac{3}{10}$, $\frac{3}{10}$, $\frac{3}{10}$, $\frac{3}{10}$

(ii) $\frac{126}{350}$ (iii) $\frac{344}{350}$

Q18 (i) white = 8.5, red = 11

(ii) (a) $\frac{42}{132}$ (b) $\frac{70}{132}$

Q19 (a) hat $\frac{5}{8}$, $\frac{3}{8}$ Scarf $\frac{2}{3}$, $\frac{1}{3}$
 $\frac{1}{6}$, $\frac{5}{6}$

(b) (i) $\frac{15}{48}$ (ii) $\frac{5}{24}$ (iii) $\frac{13}{48}$

(c) $\frac{170}{240}$

Q20 (a) $\frac{3}{10}$; $\frac{6}{9}$, $\frac{3}{9}$ and $\frac{7}{9}$, $\frac{2}{9}$.

(b) $\frac{42}{90}$

Q21 (a) (i) $\frac{1}{110}$ (ii) $\frac{6}{110}$ (iii) $\frac{8}{110}$

(b) (i) $\frac{6}{990}$ (ii) $\frac{336}{990}$ (iii) $\frac{198}{990}$

Q22 (i) $\frac{2}{5}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{4}$

(ii) $\frac{18}{20}$

(iii) $\frac{27}{225}$

X ————— X ————— X