Year 8 probability worksheet

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Name: _____ Date: _____

Question 1

A bag contains 20 marbles. The probability of picking a red marble at random is 3/20. Find the probability of not picking a red marble.

Answer: _____

Question 2

A bag contains 3 cards numbered 1, 2 and 3. One card is drawn and not replaced, then a second card is drawn. Construct a two-way table of all possible outcomes and find the probability that the sum of the two cards is greater than 4.

Answer: _____

Question 3

A bag contains one red marble (R) and one blue marble (B). A marble is drawn, its colour is recorded, and it is put back. A second marble is then drawn. List all possible outcomes using a tree diagram and find the probability of getting two red marbles.

Answer: _____

Question 4

In a class of 30 students, 18 students play football, 14 students play basketball, and 6 students play both sports. A student is chosen at random. Find the probability that the student plays neither football nor basketball.

Answer: _____

Question 5

The probability that Jack's train is late on any given day is 0.15. Over 200 days, on how many days would Jack expect his train not to be late?

Answer: _____

Question 6

The probabilities of spinning a spinner and landing on each colour are shown below.

Colour	Red	Blue	Green	Yellow
Probability	0.35	0.2	0.3	?

Find the probability of landing on yellow.

Answer: _____

Question 7

A spinner has three equal sections numbered 1, 2 and 3. The spinner is spun twice. Construct a two-way table of all possible outcomes and find the probability that the product of the two numbers is even.

Answer: _____

Question 8

A bag contains one red (R) marble and one blue (B) marble. A marble is drawn, its colour recorded, and it is returned to the bag. A second marble is then drawn. Using the equally likely outcomes, what is the probability of drawing two marbles of the same colour? Give your answer as a fraction in the form p/q,

Answer: _____

Question 9

In a group of 45 students, 27 have been to Sydney, 19 have been to Adelaide and 8 have been to both.

(a) How many students have been to Sydney only?

(b) How many students have been to neither city?

(c) A student is chosen at random. Find the probability that the student has been to exactly one of the two cities.

Answer: _____

Question 10

In a certain suburb, 40% of households own a dog. A street in the suburb has 35 houses. How many of these houses would you expect not to own a dog?

Answer: _____

Year 8 probability: answers and worked solutions

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Question 1

Key idea: Complementary events cover all possible outcomes, so P(not A) = 1 - P(A).

1. Identify the given probability: P(red) = 3/20 2. Apply the complement rule:\ P(not red) = 1 - 3/20 3. Subtract:\ P(not red) = 20/20 - 3/20 = 17/20

Answer: 17/20

Question 2

Key idea: In a two-way table for sampling without replacement, a card cannot appear twice in the same draw, so outcomes where both draws give the same number are impossible and are crossed out.

1. Set up a table with the first draw as rows (1, 2, 3) and the second draw as columns (1, 2, 3).

First \ Second	1	2	3
1	,	(1,2)	(1,3)
2	(2,1)	,	(2,3)
3	(3,1)	(3,2)	,

2. There are 6 equally likely outcomes. 3. Find the sums: (1,2)→ 3, (1,3)→ 4, (2,1)→ 3, (2,3)→ 5, (3,1)→ 4, (3,2)→ 5. 4. Outcomes with sum > 4: (2,3) and (3,2), that is 2 outcomes. 5. P(sum > 4) = 2/6 = ⅓

Answer: P(sum > 4) = ⅓

Question 3

Key idea: Draw a tree diagram by listing every branch for the first draw, then every branch for the second draw from each first-draw branch. Because the marble is replaced, the bag is the same for both draws.

1. First draw has two branches: R and B. 2. From each branch, the second draw also has two branches: R and B. The complete sample space is: RR, RB, BR, BB, 4 equally likely outcomes. 3. Only one outcome is two red marbles: RR. 4. P(RR) = ¼

Answer: P(two red marbles) = ¼

Question 4

Key idea: Draw a Venn diagram with two overlapping circles, one for football (F) and one for basketball (B), inside a rectangle representing all 30 students. Place the overlap count first, then fill in the rest of each circle.

1. The overlap (both sports) contains 6 students. 2. Football only: 18 - 6 = 12 students. Basketball only: 14 - 6 = 8 students. 3. Total accounted for inside the circles: 12 + 6 + 8 = 26 students. 4. Students outside both circles (neither sport): 30 - 26 = 4 students. 5. P(neither) = 4/30 = 2/15

Answer: P(neither football nor basketball) = 2/15

Question 5

Answer: 170 days (0.85 × 200)

Question 6

Key idea: All probabilities in a sample space must sum to 1, so the missing probability equals 1 minus the sum of the rest.

1. Add the known probabilities:\ 0.35 + 0.2 + 0.3 = 0.85 2. Apply the complement rule:\ P(yellow) = 1 - 0.85 3. Subtract:\ P(yellow) = 0.15

Answer: 0.15

Question 7

Key idea: In a two-way table for two spins with replacement, every combination of numbers is possible, including landing on the same number twice.

1. Set up a table with the first spin as rows (1, 2, 3) and the second spin as columns (1, 2, 3).

First \ Second	1	2	3
1	(1,1)	(1,2)	(1,3)
2	(2,1)	(2,2)	(2,3)
3	(3,1)	(3,2)	(3,3)

2. There are 9 equally likely outcomes. 3. A product is even when at least one number is even (i.e. a 2 appears). Outcomes with an even product: (1,2), (2,1), (2,2), (2,3), (3,2), that is 5 outcomes. 4. P(even product) = 5/9

Question 8

Key idea: When sampling with replacement, each draw is independent. List all outcomes systematically using a tree diagram or two-way table.

1. First draw can be R or B. Second draw can also be R or B (marble is replaced). 2. All outcome pairs: RR, RB, BR, BB, four equally likely outcomes. 3. Outcomes where both marbles are the same colour: RR and BB, two outcomes. 4. P(same colour) = 2/4 = ½

Answer: ½ = 0.5

Question 9

Key idea: Fill the overlap of the Venn diagram first, then work outwards.

1. (a) 27 - 8 = 19. 2. Adelaide only: 19 - 8 = 11. 3. (b) 45 - 19 - 8 - 11 = 7. 4. (c) Exactly one: 19 + 11 = 30, so 30/45 = ⅔.

Answer: (a) 19 (b) 7 (c) 30/45 = ⅔

Question 10

Answer: 21 houses (0.6 × 35)