PROBABILITY PROBLEMS

SOLUTIONS

1 Probability can be recorded in words or using fractions, decimals or percentages.

a There is only **one** card showing a 6. P(the number 6) = 1 in 20 $= \frac{1}{20}$ = 0.05 = 5%	**b** There are 6 multiples of 3: {3, 6, 9, 12, 15, 18} P(multiple of 3) = 6 in 20 or 3 in 10 $= \frac{6}{20}$ or $\frac{3}{10}$ = 0.3 = 30%
c The prime numbers are: {2, 3, 5, 7, 11, 13, 17, 19} P(prime number) = 8 in 20 or 2 in 5 $= \frac{8}{20}$ or $\frac{2}{5}$ = 0.4 = 40%	**d** This is the **complement** of selecting a prime. Use the probability of selecting a prime number. The probabilities add to 1. P(not prime) = 1 – P(prime) $= \frac{3}{5}$ = 0.6 = 60%

2 The favourable outcomes are {3, 13, 23, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 43}

P(at least one 3) = 14 out of 45

$= \frac{14}{45}$

$= 0.3\dot{1}$ (Note the repeater sign meaning 0.311111111111…)

$= 31\frac{1}{9}\%$ or $31.\dot{1}\%$

3 The three probabilities must add to 1.

$\frac{1}{2}+\frac{1}{3}=\frac{3}{6}+\frac{2}{6}$

$=\frac{5}{6}$

$1-\frac{5}{6}=\frac{1}{6}$

P(yellow) = $\frac{1}{6}$

4 If there is a 75% chance of selecting a red beetle then there is a 25% chance of selecting a blue beetle.

75% = 24 red beetles

25% = 8 blue beetles

100% = 32 beetles

There are 32 beetles altogether.

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5 Arun's favourable outcomes are {1, 2, 3, 4, 5, 6, 7}.

Sally's favourable outcomes are {1, 2, 3, 4, 5}.

P(Arun winning) = $\frac{7}{9}$ P(Sally winning) = $\frac{5}{6}$

To compare the two fractions, you can convert them to decimals, percentages or fractions with common denominators.

Decimals	Percentages	Fractions
$\frac{7}{9} = 0.\dot{7}$	$\frac{7}{9} = 77.\dot{7}\%$	$\frac{7}{9} = \frac{14}{18}$
$\frac{5}{6} = 0.8\dot{3}$	$\frac{5}{6} = 83.\dot{3}\%$	$\frac{5}{6} = \frac{15}{18}$

Sally has the greater chance of winning.

6 One in five means there were originally 5 dark chocolates out of 25.

After one dark chocolate is eaten, there are 4 dark chocolates out of 24.

P(dark) = $\frac{4}{24}$ or $\frac{1}{6}$

$= 0.1\dot{6}$

$= 16.\dot{6}\%$

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