Solutions

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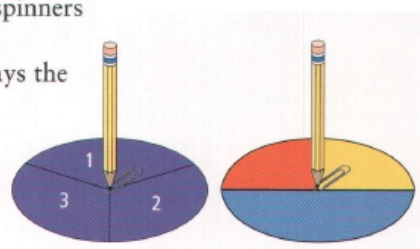
3. a) Is the predicted probability of spinning 2 and blue for the spinners in question 2 always the same? Explain.
b) Is the experimental probability of spinning 2 and blue always the same? Justify your reasoning.



a) Yes, predicted probability is the same, because they have no "memory" and nothing changes.

b) No, it won't. Multiple trials will produce different results. Again, the spinners have no "memory" of previous spins.

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4. Find the probability of each roll for a cube that is labelled A, A, B, C, D, D.

a) rolling a B
b) rolling an A
c) rolling an A or a C
d) rolling an A or a D

a) $P(B) = \frac{1}{6}$

b) $P(A) = \frac{2}{6} \left(= \frac{1}{3}\right)$

c) $P(A \text{ or } C) = \frac{3}{6} \left(= \frac{1}{2}\right)$

d) $P(A \text{ or } D) = \frac{4}{6} \left(= \frac{2}{3}\right)$

5. Find the probability of each selection for a piggy bank that contains 5 quarters, 7 dimes, and 12 nickels.

a) a quarter **b)** a dime
c) a nickel **d)** a penny
e) a quarter or a dime

a) $\frac{5}{24}$

b) $\frac{7}{24}$

c) $\frac{12}{24} \left(= \frac{1}{2}\right)$

d) $\frac{0}{24} \left(= 0\right)$

e) $\frac{12}{24} \left(= \frac{1}{2}\right)$

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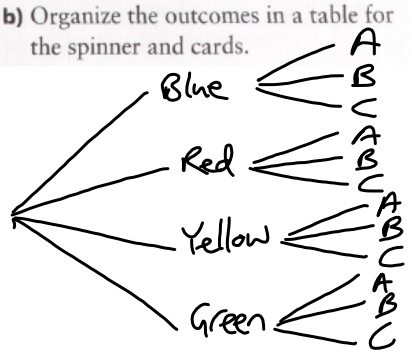
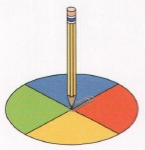
6. a) Draw a tree diagram for the spinner and cards.
b) Organize the outcomes in a table for the spinner and cards.





	A	B	C
Blue	Blue A	Blue B	Blue C
Red	Red A	Red B	Red C
Yellow	Yell A	Yell B	Yell C
Green	Green A	Green B	Green C

7. Use an organizer from question 6 to find the predicted probability for each situation.
a) blue and an A
b) yellow and a B
c) green and a C

a) $\frac{1}{12}$

b) $\frac{1}{12}$

c) $\frac{1}{12}$

8. Use an organizer from question 6 to find the predicted probability for each situation.
a) green, and an A or a B
b) yellow or red, and a C
c) any colour and a B
d) blue and any letter

a) $\frac{2}{12} = \frac{1}{6}$

b) $\frac{2}{12} = \frac{1}{6}$

c) $\frac{4}{12} = \frac{1}{3}$

d) $\frac{3}{12} = \frac{1}{4}$

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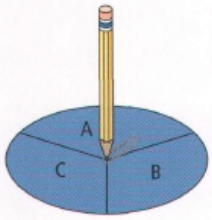
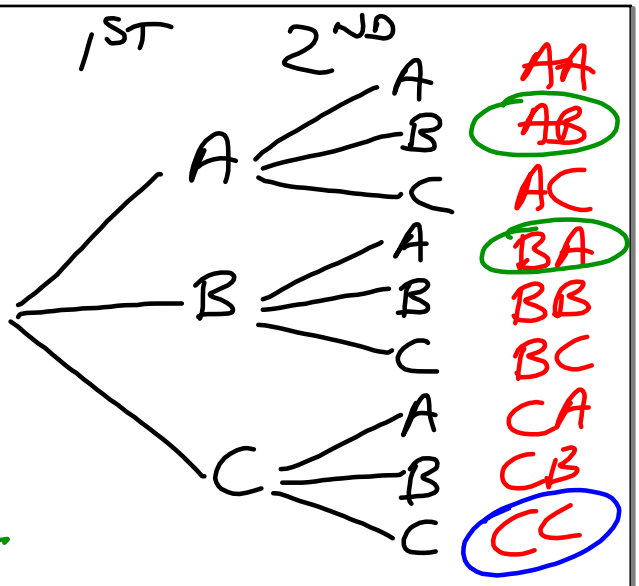
9. a) Draw a tree diagram for spinning the spinner twice.

b) What is the predicted probability of spinning two Cs?

c) What is the predicted probability of spinning an A and a B?





b) $P(CC) = \frac{1}{9}$

c) $P(A \text{ and } B) = \frac{2}{9}$

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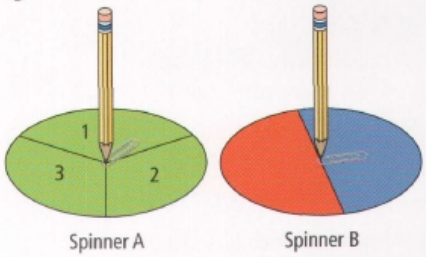
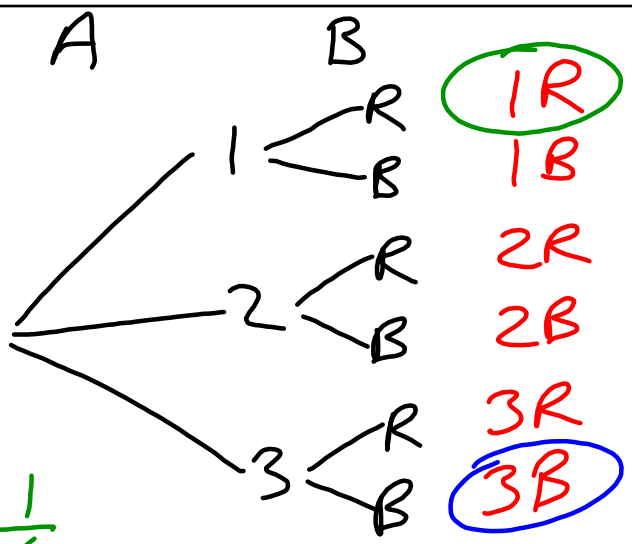
10. a) Draw a tree diagram for spinning both spinners.



b) What is the predicted probability of spinning a 1 and red?

c) What is the predicted probability of spinning a 3 and blue?



b) $P(1 \text{ and Red}) = \frac{1}{6}$

c) $P(3 \text{ and Blue}) = \frac{1}{6}$

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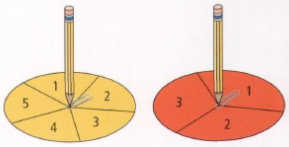
11. Pina and Paul play a spinner game. First, Pina chooses a spinner combination. If Paul spins that combination, he gets a point. Otherwise, Pina gets the point. State each predicted probability.



a) a 5 and a 1
b) a 2 and a 3
c) a number less than 3 and a 1
d) a prime number and a 2

5 x 3 = 15 outcomes

a) $\frac{1}{15}$ c) $\frac{3}{15}$

b) $\frac{2}{15}$ d) $\frac{4}{15}$

[(1,1)(2,1)(1,2)]

[(2,2)(3,2)(5,2)(2,3)]

Prime #s only have 2 factors: themselves and one.

12. It is Paul's turn to choose the spinner combination for the game in question 11. He chooses the sums of the spins. State each predicted probability.

a) a sum of 2
b) a sum of 7
c) a sum of 4
d) a sum greater than 5

	1	2	3	4	5
1	2	3	4	5	6
2	3	4	5	6	7
3	4	5	6	7	8

a) $\frac{1}{15}$ b) $\frac{2}{15}$

c) $\frac{3}{15} = \frac{1}{5}$ d) $\frac{6}{15} = \frac{2}{5}$

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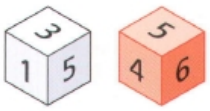
13. Two number cubes are rolled.



a) What is the probability of rolling a 6 on the white number cube? on the red number cube?

b) The predicted probability of rolling a 6 on both number cubes is $\frac{1}{36}$. Show why this is correct.

a) $P(\text{White 6}) = \frac{1}{6}$

$P(\text{Red 6}) = \frac{1}{6}$

b) Each white number pairs with the 6 red numbers, giving 36 possible outcomes (6x6). Only one way to roll a double 6 $\Rightarrow P(6,6) = \frac{1}{36}$.

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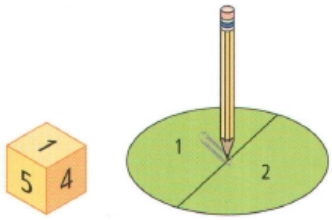
14. A version of *Into the Pond* uses a number cube and a spinner. Roll the number cube. Then, spin the spinner. Multiply.



a) What are the possible products when you multiply the results of the spinner and the number cube?

b) What is the predicted probability of getting each product?

X	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12

$P(1) = \frac{1}{12}$ $P(2) = \frac{2}{12}$

$P(3) = \frac{1}{12}$ $P(4) = \frac{2}{12}$

$P(5) = \frac{1}{12}$ $P(6) = \frac{2}{12}$

$P(8) = \frac{1}{12}$ $P(10) = \frac{1}{12}$

$P(12) = \frac{1}{12}$

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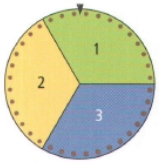
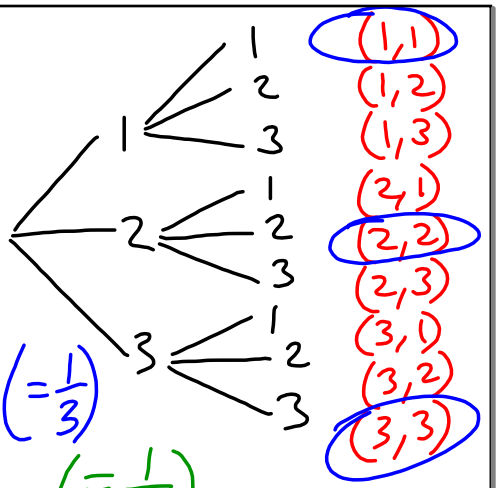
15. A carnival game uses a spinner. A player must spin the same number more than once to win.



a) What is the predicted probability of spinning the same number twice in a row?

b) What is the predicted probability of spinning the same number three times in a row?

c) Which option from parts a) and b) do you think the game operator would use? Explain.



a) $P(\text{Double}) = \frac{3}{9}$ $(= \frac{1}{3})$

b) $P(\text{Treble}) = \frac{3}{27}$ $(= \frac{1}{9})$

c) Part (b) because it is 3 times less likely to happen.

[Spinning 3 times gives $3 \times 3 \times 3 = 27$ outcomes
Still only 3 ways to win (1,1,1)(2,2,2)(3,3,3)]

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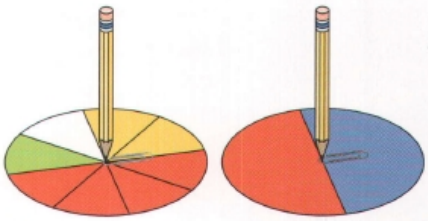
Try This!

16. Fred spins the spinners and creates a new colour from the result of the spins.



a) What is the predicted probability that you will spin purple? Hint: Red and blue mix together to make purple.

b) Make the spinners and carry out the experiment. What is the experimental probability of spinning purple?

c) Explain why there is a difference between the experimental and predicted probabilities.

$8 \times 2 = 16$ outcomes

a) 4 ways to get red and blue

$= \frac{4}{16} \left(= \frac{1}{4}\right)$

c) Predicted is what should happen if we do the experiment millions of times. In reality we don't get that value, but we do get something close.

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