

Name: _____

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Score: _____

Directions You must show your work to get full credit. This test is closed-book and closed-notes. No calculators or other electronic devices are allowed. Simplify your answers if it is easy to do so, but you may leave complex answers unsimplified. All you will need is something to write with.

1. (10 points) You have two fair 6-sided dice, a black one and a white one. You toss them both. Write out the sample space S , and indicate the event $E \subseteq S$ of the two dice adding to 6. Find $p(E)$.

2. (10 points) Toss a fair 6-sided dice 10 times in a row. What are the chances that at least one of the tosses is even?

3. (10 points) A 7-card hand is dealt off a shuffled standard 52-card deck.
What is the probability that not all of the cards are hearts?

4. (10 points) A 7-card hand is dealt off a shuffled standard 52-card deck.
What is the probability that the hand consists entirely of club cards, or has no hearts?

5. (10 points) A box contains 7 red balls, 5 green balls and 1 blue ball. You reach in and remove two balls, one after the other. What is the probability that the two balls have the same color?

6. (10 points) Suppose $A, B \subseteq S$ are two events in the sample space S of some experiment. Suppose $p(A) = 50\%$, $p(B) = 60\%$ and $p(A|B) = 50\%$.

(a) $p(A \cap B) =$

(b) $p(A \cup B) =$

(c) $p(B|A) =$

(d) $p(\overline{B}) =$

7. (10 points) A woman has four children (no twins). Consider the following events:

A: She has two girls and two boys.

B: Her oldest child is a boy.

Are events *A* and *B* independent, dependent, or is there not enough information to say for sure?

8. (10 points) Give the output for the following chunk of pseudocode.

```
y := 5
output y
for n := 1 to 3 do
  | y := 10 · y
  | output y
end
```

9. (10 points) What does the following algorithm do?

Algorithm

Input: A natural number $n \in \mathbb{N}$

Output: ?

begin

while ($n > 1$) **do**
 | $n := n - 2$

end

if ($n = 0$) **then**
 | **output** "Yes"

else

 | **output** "No"

end

end

10. (10 points) Write an algorithm whose input is a positive integer n and whose output is the first n terms of the sequence 5, 11, 17, 23, 29, 35, 41 ...