Review Session, June 23

For problems 1–4 consider the following sets:
The universal set $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$, and the sets $A = \{0, 2, 4, 6, 8\}$, $B = \{4, 6, 8\}$, $C = \{1, 3, 6, 7\}$.

1. List the elements in C'.
$\boxed{(a)}$ $\{0, 2, 4, 5, 8, 9\}$; (b) $\{1, 3, 6, 7\}$; (c) $\{4, 6, 8\}$; (d) $\emptyset$; (e) None of these.

2. List the elements in $A \cup B$.
$\boxed{(a)}$ $\{0, 2, 4, 6, 8\}$; (b) $\{4, 6, 8\}$; (c) $\{1, 3, 5, 7, 9\}$; (d) $\emptyset$; (e) None of these.

3. List the elements in $B \cap C$.
(a) $\{1, 3, 6, 7\}$; (b) $\{1, 3, 4, 6, 7, 8\}$; (c) $\{4, 6, 8\}$; $\boxed{(d)}$ $\{6\}$; (e) None of these.

4. True or False: The set B is a subset of A?
$\boxed{(a)}$ TRUE; (b) FALSE.

5. Given that $n(S) = 7$, $n(T) = 5$, and $n(S \cup T) = 10$, what is $n(S \cap T)$?
(a) 7; (b) 5; $\boxed{(c)}$ 2; (d) 12; (e) None of these.

For problems 6–7 consider the following situation:
Suppose that you create a secret 4-digit code for your ATM card using digits 0–9.
6. If you are not allowed to use the same digit twice in the same code, how many different codes can be made?
$\boxed{(a)}$ 5040; (b) 210; (c) 10,000; (d) 256; (e) None of these.

7. If you can re-use digits in the code how many different codes can be made?
(a) 5040; $\boxed{(b)}$ 10,000; (c) 256; (d) 210; (e) None of these.

8. How many ways can myself and 5 of my friends line up for a photograph if I insist on standing at one of the ends?
(a) 360; (b) 120; $\boxed{(c)}$ 240; (d) 10; (e) None of these.

9. If it is reported that the odds of snow on New Year's Eve are 7 to 10, what is the probability that it will snow on New Year's Eve?
(a) 7/10; $\boxed{(b)}$ 7/17; (c) 10/17; (d) 10/7; (e) None of these.

For problems 10–12 consider the experiment of drawing a sample of 5 chips, without replacement, from a bucket. The bucket contains 12 numbered chips of which 6 are red and 6 are blue.

10. How many samples contain at least 4 blue chips?
(a) 540; (b) 396; (c) 696; (d) 21; $\boxed{(e)}$ None of these. `Answer: 96`

11. What is the probability that the sample contains exactly 3 red and 2 blue chips?
(a) 87.88%; (b)50%; (c) 63.12%; $\boxed{(d)}$ 37.88%; (e) None of these.

12. What is the probability that the sample contains at most 3 blue chips?
$\boxed{(a)}$ 87.88%; (b)50%; (c) 63.12%; (d) 37.88%; (e) None of these.

13. The probability that Sarah will order chocolate ice-cream is 65%. If the probability that Joe and Sarah both order chocolate ice-cream is 20%, what is the probability that Joe orders choclate ice-cream given that Sarah does?
(a) 7/10; (b)13/4; (c) 7/20; $\boxed{(d)}$ 4/13; (e) None of these.

14. Three ordinary quarters and a fake quarter with two heads are placed in a hat. One quarter is selected at random and tossed twice. If the outcome is "HH", what is the probability that the fake quarter was selected?
(a) 1/4; $\boxed{(b)}$ 4/7; (c) 1/2; (d) 3/16; (e) None of these.

15. Consider the experiment of rolling a four sided die two times. Let E be the event that 3 is rolled on the first roll, and let F be the event that 3 is rolled on the second roll.
(a) What is the probability of F happening given that E has occurred? `Answer: 1/4`
(b) Are E and F independent? Why? `Answer: Yes, since` $Pr(E \cap F) = Pr(E) \cdot Pr(F)$

16. A survey of 2000 students at a small west-coast college showed that 900 students swim, 850 jog, and 250 do both.
(a) How many students participate in at least one activity? `Answer: 1500`
(b) How many students only jog? `Answer: 600`