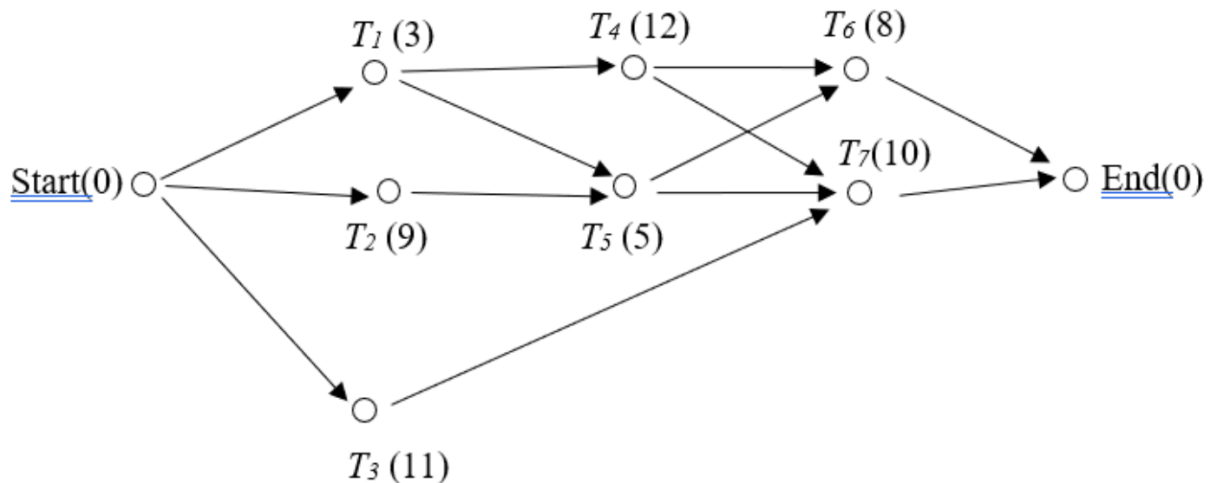


Name: _____

1. (8 points) Consider the following digraph. Use the **critical path algorithm** to create a priority list.



Priority list:

2. (5 points) Suppose that A, B are not mutually exclusive events, with $P(A) = 0.2$ and $P(B) = 0.7$ and $P(A \text{ and } B) = 0.1$. Find $P(A \text{ or } B)$.
- 0.9
 - 0.8
 - 0.6
 - 0.1

-
- ```

graph LR
 Start((Start(0))) --> T1((T1(3)))
 Start --> T2((T2(9)))
 Start --> T3((T3(11)))
 T1 --> T4((T4(12)))
 T1 --> T5((T5(5)))
 T2 --> T5
 T3 --> T7((T7(10)))
 T4 --> T6((T6(8)))
 T4 --> T7
 T5 --> T6
 T5 --> T7
 T6 --> End((End(0)))
 T7 --> End

```

Schedule:

|     |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Day | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| P1  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| P2  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Day | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

4. (5 points) A basketball player hits three-point shots 64% of the time. If she takes 4 shots during a game, what is the probability that she hits the first shot and misses the last three shots?
- a. 0.03
  - b. 0.05
  - c. 0.5
  - d. 0.04
5. (5 points) If two cards are drawn at random without replacement from a standard deck, find the probability that the second card is red, given that the first card was a heart.
- a.  $1/13$
  - b.  $25/52$
  - c.  $24/51$
  - d.  $25/51$

6. (10 points) A test is given to a group of students; the grades and gender of the students is summarized in the table below:

|        | A  | B  | C  | Total |
|--------|----|----|----|-------|
| Male   | 8  | 17 | 10 | 35    |
| Female | 8  | 13 | 13 | 34    |
| Total  | 16 | 30 | 23 | 69    |

If one student is chosen at random, determine the following probabilities.

**Write your answer as fractions.**

- (a) What is the probability that the chosen student is a male?
- (b) What is the probability that the chosen student is a student who is female and got a C grade.
- (c) What is the probability that the chosen student is a male given the student got an A.
- (d) What is the probability that the chosen student is a female given the student got an A.

7. (10 points) A card is selected at random from a standard deck. **Write your answer as fractions.**

(a) Find probability of selecting a heart.

(b) Find probability of selecting the Queen of hearts.

(c) Find the probability of selecting a club **or** an Ace.

Standard deck

|     |     |     |     |
|-----|-----|-----|-----|
| 2♥  | 2♦  | 2♣  | 2♠  |
| 3♥  | 3♦  | 3♣  | 3♠  |
| 4♥  | 4♦  | 4♣  | 4♠  |
| 5♥  | 5♦  | 5♣  | 5♠  |
| 6♥  | 6♦  | 6♣  | 6♠  |
| 7♥  | 7♦  | 7♣  | 7♠  |
| 8♥  | 8♦  | 8♣  | 8♠  |
| 9♥  | 9♦  | 9♣  | 9♠  |
| 10♥ | 10♦ | 10♣ | 10♠ |
| J♥  | J♦  | J♣  | J♠  |
| Q♥  | Q♦  | Q♣  | Q♠  |
| K♥  | K♦  | K♣  | K♠  |
| A♥  | A♦  | A♣  | A♠  |

(a) Find the probability of selecting a face card **or** a 2.

(b) Find the probability of selecting a Jack **or** a high card.

8. (13 points) Let A, B be events, with  $P(A) = 0.4$ ,  $P(B) = 0.6$ , and  $P(A|B) = 0.20$ .

Calculate the following probabilities for parts a through d, and give your answer as a decimal rounded to two decimal places.

(a)  $P(B') =$

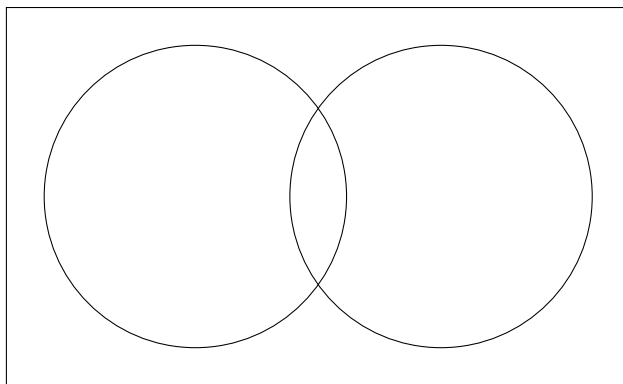
(b)  $P(A \text{ and } B) =$

(c)  $P(A \text{ or } B) =$

(d)  $P(B|A) =$

(e) Are events A and B independent? Justify your answer by showing what formula you used to decide on the answer.

9. (12 points) Our survey found that 56% of college students live on campus, 62% have a campus meal program, and 42% do both.



- (a) What is the probability of picking a student who lives on campus but does not have a campus meal plan?
- (b) What's the probability that a chosen student lives off campus and does not have a campus meal?
- (c) What's the probability of picking a student who lives on campus or has a campus meal plan?
- (d) If you randomly select 3 students, what is the probability that all 3 live on campus?
- (e) If you randomly select 3 students what is the probability that none have campus meal.
- (f) *Bonus*: If you randomly select 4 students what is the probability that at least one lives on campus.

10. (12 points) A jar contains 8 red marbles, 10 blue marbles, and 4 white marbles. If two marbles are drawn randomly from the jar without replacement, find the probability of the given event, and write your answers as fractions.

(a) First, create a tree diagram with probabilities on each possible outcome.

(b) The second ball is red, given that the first ball is white:

(c) The second ball is white, given that the first ball is red:

(d) Both balls are white: