

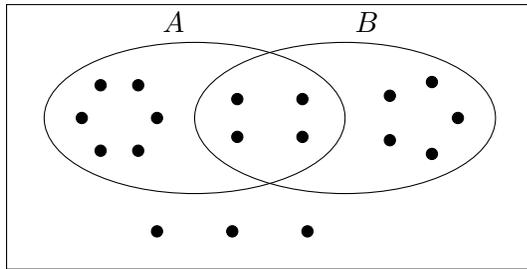
Midterm 2

Show all your work

Name: _____
 Number: _____
 Signature: _____
 Score: ____/46

A TI-83/84 calculator allowed. You must use proper notation.

Problem 1: Each dot in the Venn diagram represents an equally likely event in the sample space S . Suppose one of them is randomly selected. Find each probability below in simplified fraction.

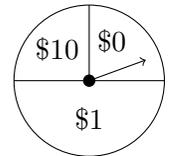


- a. $P(A) =$
- b. $P(A \text{ or } B) =$
- c. $P(B | A) =$

- d. $P(A | \bar{B}) =$
- e. $P(\bar{A} \text{ and } \bar{B}) =$
- f. Find actual odds in favour of event B .
- g. Are A and B disjoint (or mutually exclusive)? Explain.

Score: /7

Problem 2: Suppose you randomly spin the spinner shown two times. Let X be the total number of dollars accumulated after two spins. Find the probability distribution of X and present it in properly labeled tabular form.



Score: /4

Problem 3: In Burnaby, 15% of elementary school students are in the French Immersion program. Students in French Immersion meet expectations in the Foundation Skills Assessment (FSA) test 92% of the time whereas students not in French Immersion meet expectations 70% of the time. Draw a probability tree to help you find the probability that a randomly selected student that has met expectations in the FSA test is in French Immersion.

Score: /3

Problem 4: Drivers in the Lower Mainland that receive a traffic ticket for speeding usually have received previous tickets for speeding. The number of previous tickets received by a driver caught speeding is a random variable X with the following distribution:

x	0	1	2	3	4	5
$P(X = x)$	0.32	0.19	0.29	0.12	0.07	0.01

- Find the probability that a person receiving a ticket for speeding has had at most two previous tickets.
- Compute the mean and standard deviation for the distribution. Use appropriate symbols and state units.
- Find the probability that from among the next 5 persons receiving tickets, none has had a previous ticket.

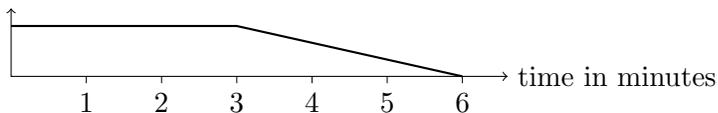
Score: /6

Problem 5: Lily crossed two types of beans: scarlet runner and lima. It is known that each bean plant grown after this cross has a 65% probability of having marbled pods while the rest have green pods.

- Suppose 20 plants are grown from this cross. Find the probability that exactly half of them have marbled pods.
- Suppose 30 plants are grown from this cross. Find the probability that at least 10 of them have green pods.
- Suppose this spring, Lily planted 2000 plants from this cross. Determine the mean and standard deviation of the random variable X that counts the number of plants with marbled pods.
- If 2000 plants are grown from this cross, would it be unusual for 1000 of the plants to have green pods? Justify your answer.

Score: /8

Problem 6: Shown is the probability density function of random variable X , denoting the number of extra minutes that Lily goes beyond the official end of class time in Stat 101.

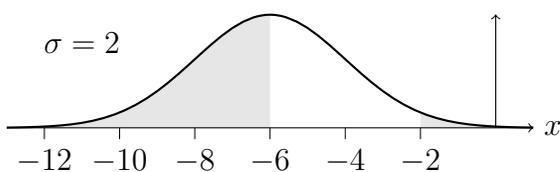


Find the probability that Lily goes over 3 minutes beyond the official end of class time.

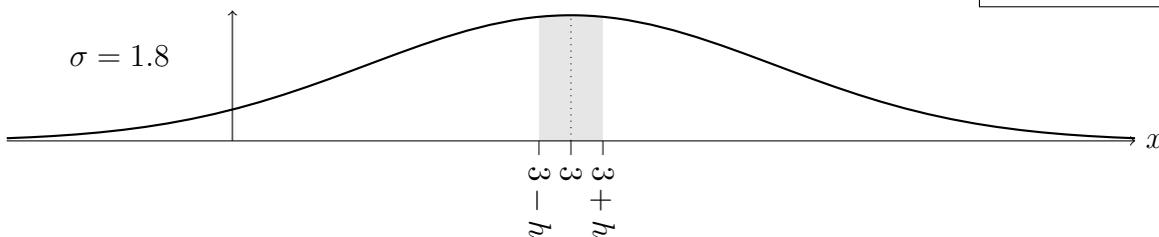
Score: /3

Problem 7: For the normal probability distributions of X with their corresponding mean and standard deviation, find the value of the variable indicated in each. State calculator command and entries for each part. Round to 4 decimal places.

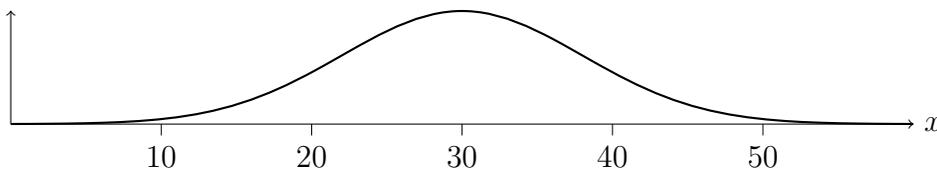
a. Find $P(X \leq -6 \text{ or } X > -2)$.



b. Find h if the shaded region has area 0.125.



c. Find the 75th percentile for a normal distribution with a mean of 30 and a standard deviation of 8. Shade on the normal curve with the mean marked.



Score: /6

Problem 8: The times of the Sun Run participants are normally distributed with a mean of 71 minutes and a standard deviation of 26 minutes. Round answers to 4 decimal places.

a. Find the probability that a randomly chosen runner will finish the run in under 45 minutes.

b. The fastest 10% of the runners complete the race in under how many minutes?

c. CapU entered a team of 8 runners for April's Sun Run Corporate Team Challenge event. Answer the following questions regarding this team of 8 runners.

(1) Find the probability that the average run time for CapU's team will not exceed 75 minutes.

(2) State your assumption in order to justify your calculation above.

(3) Of all the 8-member teams entered into the Corporate Team Challenge, 15% of them finished with an average run time of more than how many minutes? Draw the normal curve with corresponding shading as part of your steps.

Score: /9