Assignment 2.2 AP Statistics Name:

1. What is a Normal distributions? What does it mean that the distribution of something is normally distributed? Explain:

2. What is a Standard Normal distribution? How is it different from a Normal distribution? Explain:

3. What is the 68-95-99.7 rule (empirical rule)? How can it be applied? Explain:

4. What is a Normal probability plot? What is it used for? Explain:

5. Which of the following below is likely to be normally distributed? Explain:

a) The distribution of height of grade 3 boys

b) The grade levels of students in a high school

c) The time it takes a light to turn green when a pedestrian pushes a button at a crosswalk

d) The weight of an orange purchased at a grocery store

e) The value of an Iphone over time from the date of purchase

f) The number of cereals in a cereal box

g) The annual salaries of Canadians that are working full time

h) The time it takes a flower to bloom from the day that the seed is planted

i) The number of days for a refrigerator to break down from the first day of use

j) The life expectancy of a male with hereditary diabetes

k) The longevity of a marriage between two lawyers

6. Assume that the distribution of time for grade 10 students to run 10km is normally distributed. A time of 0.88 hours is at the 10^{th} percentile. If the standard deviation is 0.21hours, approximately what is the average time for grade 10 students to run 10km?

7. **U**se Table A to find the proportion of observations from a standard Normal distribution that satisfies $-1.51 < Z < 0.84$. Sketch the Normal curve and shade the area under the curve that is the answer to the question.

8. A study of elite distance runners found a mean body weight of 63.1 kilograms (kg), with a standard deviation of 4.8 kg.

(a) Assuming that the distribution of weights is Normal, make an accurate sketch of the weight distribution with the horizontal axis marked in kilograms.

(b) Use the 68–95–99.7 rule to find the proportion of runners whose body weight is between 48.7 and 67.9 kg. Show your method.

(c) Calculate and interpret the 45th percentile of the runners' body weight distribution.

9. Give an example of a quantitative variable that does *not* have a Normal distribution. Justify your answer.

10. For women age 25-34 with full time jobs, the average income in 2005 was $32,000. The SD was $26,000, and 0.025% had incomes above $150,000. Was the percentage with incomes in the range from $32,000 to $150,000 about 40%, 50%, or 60%? Choose one option and explain briefly.

11. One term, about 700 Statistics students at UBC were asked how many university math course they had taken. The average number of courses was 1.1; the SD was 1.5. How would the histogram for the data look like? I) Skewed right II) Symmetrical or iii) Skewed left?

12. The heights of high school volleyball players are approximately normally distributed with $\mu = 5'10"$ and $\sigma = 1.8"$. For each of the following, illustrate with a picture and evaluate the percentages:

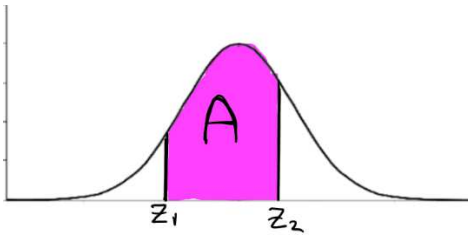
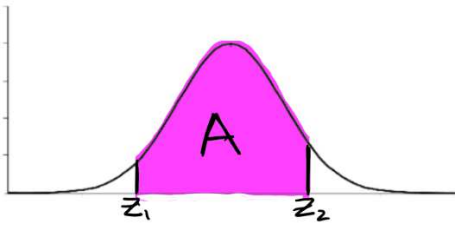
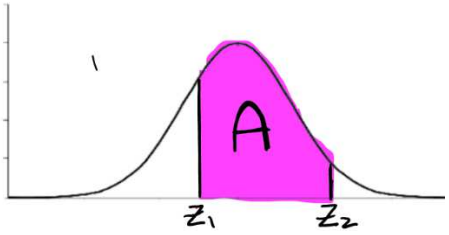
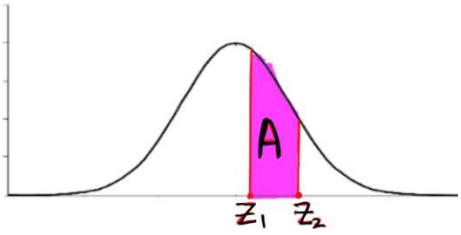
(a) P (Height > 5'8")

b) P (5'9" ≤ Height ≤ 6')

(c) P (Height < 6'1")

(d) The value of X if P (Height > X) = 0.306.

13. Given each diagram, along with the Area and Z-scores, find the missing value:

$Area = 0.4122,\ Z_1 = -0.65,\ Z_2 = ?$ 	$Area = 0.8428,\ Z_1 = ?,\ Z_2 = 1.85$ 
$Area = ?,\ Z_1 = -0.43,\ Z_2 = 2.85$ 	$Area = 0.339,\ Z_1 = ?,\ Z_2 = Z_1 + 1.21$ 

14. The Graduate Record Examinations are widely used to help predict the performance of applicants to graduate schools. The range of possible scores on a GRE is 200 to 900. The psychology department at a university finds that the scores of its applicants on the quantitative GRE are approximately Normal with mean = 544 and standard deviation = 103.

(a) Use Table A to find the proportion of applicants whose score X satisfies $500 < X < 700$. (As part of your answer, draw a standard Normal curve and shade the area under the curve that represents the answer to the question.)

(b) What minimum score would a student need in order to score better than 77% of those taking the test? Show your work.

(c) What percentage of students scored less than 600 points?

15. The scores of a reference population on the Wechsler Intelligence Scale for Children (WISC) are normally distributed with $\mu = 100$ and $\sigma = 15$.

(a) What score would represent the 50th percentile? Explain.

(b) A score in what range would represent the top 1% of the scores? Show your method.

c) What percentage of children score between 88 to 110?

16. Given each normal probability, please indicate whether if it is skewed right or left. Justify your answer.