Math 153 - Quiz 9

April 11, 2019

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) Toward the end of 2018, the average price of a used car in the United States rose to \$20,050. Suppose that in a certain area of the U.S., used car prices are normally distributed with mean \$20,050 and standard deviation \$5,645.

   (a) What is the probability that a randomly selected used car sells for between \$15,000 and \$20,000?

   $P(15000 \le x \le 20000) = \text{normalcdf}(15000, 20000, 20050, 5645)$

   ≈ 0.3110

   (b) In a used car lot with 500 cars, about how many sell for less than \$9,000?

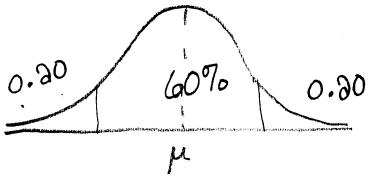
   $500 \times P(x \le 9000) = 500 \times \text{normalcdf}(-999999, 9000, 20050, 5645)$

   ≈ 12.57 About 13 cars

   (c) What is the probability that a randomly selected used car sells for exactly \$21,000?

   $P(x = 21000) = 0$

   (d) A used car salesman will only price his used cars in the middle 60% of the market. What are the highest and lowest prices that he will ask for his cars?



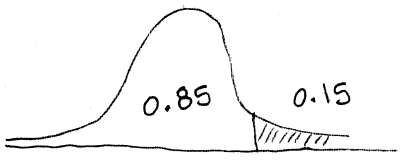
   Lowest = $\text{invNorm}(0.20, 20050, 5645)$

   $\approx \$15,299.05$

   Highest = $\text{invNorm}(0.80, 20050, 5645)$

   $\approx \$24,800.95$

2. (2 points) In a certain community, new home prices are normally distributed with mean \$224,000 and standard deviation \$14,000. A developer wishes to build and sell "affordable" homes, so he pledges to only price his homes at a level below that of the most expensive 15% of homes. What is the highest priced home the developer will list?

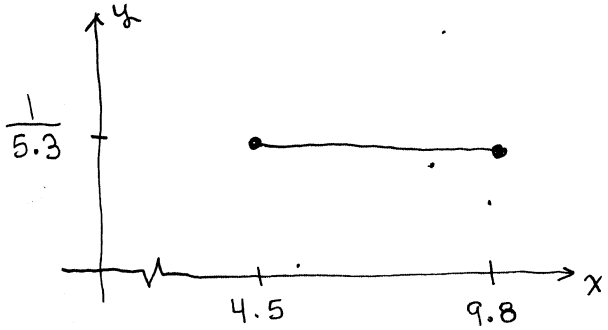


   $\text{invNorm}(0.85, 224000, 14000)$

   $\approx \$238,510.07$

3. (3 points) In order to test a new program, a computer generates a random collection of real numbers that are uniformly distributed between 4.5 and 9.8.

(a) Sketch the density curve for the distribution of real numbers.



$9.8 - 4.5 = 5.3$

(b) What is the probability that a randomly generated number is greater than 9?

$$P(x \geq 9) = (9.8 - 9)\left(\frac{1}{5.3}\right) = \frac{0.8}{5.3} \approx 0.1509$$

(c) What random number is at the 75th percentile?

$$(x - 4.5)\left(\frac{1}{5.3}\right) = 0.75$$

$$x = (5.3)(0.75) + 4.5 = 8.475$$