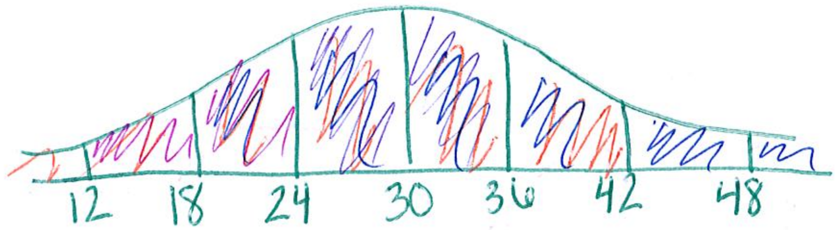
Adv. Algebra | Unit 5 – Statistics | Day 2 – Normal Distribution - Practice

Name Key | Date: ______________

1. A Normal Distribution has a mean of 30 and a standard deviation of 6.

a) Draw and label the Normal model.



On Curve

b) What is the probability that the selected x value falls between 24 and 36?

$P(24 \le x \le 36) = .34 + .34 = \boxed{.68}$

c) What is the probability that the selected x value falls between 12 and 24?

$P(12 \le x \le 24) = .0235 + .135 = \boxed{.1585}$

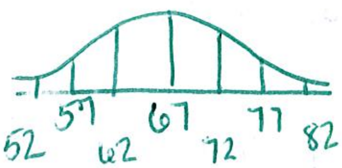
d) What is the probability that the x value is at least 18?

$P(x \ge 18) = .135 + .34 + .34 + .135 + .0235 + .0015 = \boxed{.975}$

e) What is the probability that the x value is at most 42?

$P(x \le 42) = \boxed{.975}$

2. **Airport Temperatures.** The temperature is recorded at 60 airports in a region. The average temperature is 67 degrees Fahrenheit with standard deviation of 5 degrees. What is the probability that the temperate at a randomly selected airport is no more than 68 degrees?



$P(x \le 68) = \text{normcdf}(-1E99, 68, 67, 5)$

$= \boxed{.5793}$

3. **Pregnancy Durations.** Data from the *National Vital Statistics System* reveal that the distribution of the duration of human pregnancies is approximately Normal with a mean of 270 days and a standard deviation of 17 days. Use this Normal model to determine the proportion of all pregnancies that come to term (have a duration of) in

$\bar{x} = 270$

$\sigma = 17$

a) Less than 244 days (approximately 8 months)

$P(x \le 244) = \text{normcdf}(-1E99, 244, 270, 17)$

$= \boxed{.063}$

b) More than 275 days (approximately 9 months)

$P(x \ge 275) = \text{normcdf}(275, 1E99, 270, 17) = \boxed{.3843}$

c) More than 300 days

$P(x \ge 300) = \text{normcdf}(300, 1E99, 270, 17) = \boxed{.0388}$

d) Between 260 and 280 days

$P(260 \le x \le 280) = \text{normcdf}(260, 280, 270, 17) = \boxed{.4436}$

4. **Library Books.** Books in the library are found to have average length of 350 pages with standard deviation of 100 pages. What is the probability that a randomly selected book will be 80 pages or less?

$\bar{x} = 350$

$\sigma = 100$

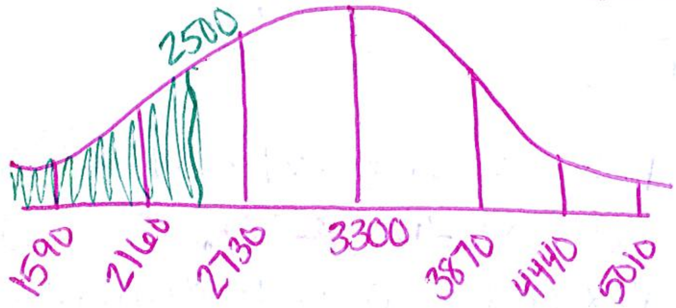
$P(x \le 80) = \text{normcdf}(-1E99, 80, 350, 100) = \boxed{.0035}$

5. **Birth Weights.** Birth weights of babies in the U.S. can be modeled by a normal distribution with mean of 3300 grams (about 7.3 pounds) and standard deviation of 570 grams (about 1.3 pounds). Babies weighing less than 2500 grams (about 5.5 pounds) are considered to be of low birth weight.

$\bar{X} = 3300$
$\sigma = 570$

a) Sketch a normal distribution curve for the birth weights of U.S. babies and shade the area under the curve that corresponds to the probability that a baby will have a low birth weight.

2500 grams



b) What is the probability that a baby will have a low birth weight.

$P(x \le 2500) = \text{normcdf}(-1E99, 2500, 3300, 570) = \boxed{.0802}$

c) What proportion of babies will weigh more than 10 pounds (4536 grams)?

$P(x \ge 4536) = \text{normcdf}(4536, 1E99, 3300, 570) = \boxed{.0151}$

d) Determine the probability that a randomly selected baby will weigh between 3000 and 4000 grams.

$P(3000 \le x \le 4000) = \text{normcdf}(3000, 4000, 3300, 570) = \boxed{.591}$

e) In 2004, there were 4,112,052 live births in the U.S. Use your answer to part (d), to predict the number of babies with a birth weight between 3000 and 4000 grams.

$.591(4{,}112{,}052) = \boxed{2{,}430{,}223 \text{ babies}}$

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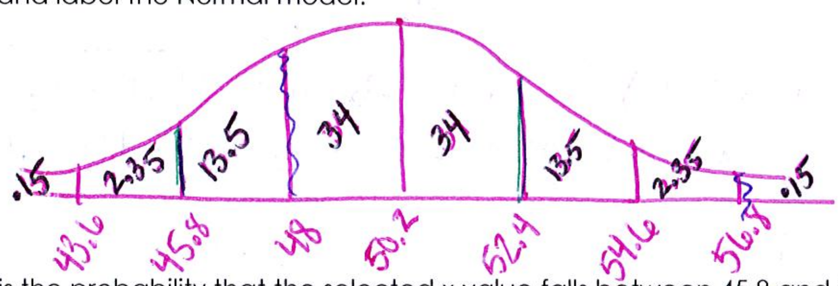
6. A Normal Distribution has a mean of 50.2 and a standard deviation of 2.2.

a) Draw and label the Normal model.

$\bar{X} = 50.2$
$\sigma = 2.2$



On Curve

b) What is the probability that the selected x value falls between 45.8 and 52.4?

$P(45.8 \le x \le 52.4) = .135 + .34 + .34 = \boxed{.815}$

c) What is the probability that the selected x value falls between 48 and 56.8?

$P(48 \le x \le 56.8) = .34 + .34 + .135 + .0235 = \boxed{.8385}$

d) What is the probability that the x value is at most 54.6?

$P(x \le 54.6) = 1 - (.0235 + .0015) = \boxed{.975}$

e) What is the probability that the x value is at least 52.4?

$P(x \ge 52.4) = .135 + .0235 + .0015 = \boxed{.16}$