Lesson 5.2.3

5-43. a. $P(70 < X < 79)$ = normalcdf(70, 79, 74, 5) = 0.629. About 63% would be considered average.

b. $P(X < 66)$ = normalcdf(–10^99, 66, 74, 5) = 0.055. Between 5 and 6% of would be in excellent shape.

c. $P(X < 66)$ = normalcdf(–10^99, 66, 70, 5) – 0.0548 = 0.157. There would be a nearly 16% increase in young women classified as being in excellent shape.

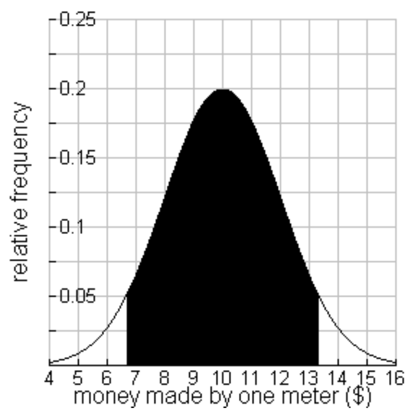
5-44. For David: normalcdf(122, 10^99, 149, 13.6) = 0.976; For Regina: normalcdf(130, 10^99, 145, 8.2) = 0.966; For now David is relatively faster.

5-45. a. $P(X < 59)$ = normalcdf(–10^99, 59, 63.8, 2.7) = 0.0377; 3.77%

b. (0.0377)(324)($\frac{1}{2}$) = 6 girls

c. $P(X > 72)$ = normalcdf(72, 10^99, 63.8, 2.7) = 0.00119.
(0.00119)(324)($\frac{1}{2}$) = 0.19 girls.
Students should not expect to see any girls over 6 ft tall.

5-46. a.



b. Answers will vary. See graph above. Using statistical computations, we find that the boundaries are $6.71 and $13.29.

c. Answers will vary; normalcdf(6.71, 13.29, 10, 2) = 0.9000

5-47. a. $P(X < 0.1)$ = normalcdf(–10^99, 0.1, 0.12, 0.04) = 0.309. About 31% would meet the standard.

b. $P(X < 0.065)$ = normalcdf(–10^99, 0.065, 0.12, 0.04) = 0.0846. Only about 8% would meet the standard.

c. $P(X > 0.03)$ = normalcdf(0.03, 10^99, 0.12, 0.04) = 0.988. About 99% would not meet the standard.

5-48. a. Using the normal model here is not a good idea because the data is not symmetric, single-peaked, and bell-shaped. A different model would represent the data better.

b. Using the histogram: $\frac{7.5}{48} = 15^{\text{th}}$ percentile. In 15% of the hours over the two-day period the coffee shop was not profitable. If you use original data: $\frac{9}{48} = 18.75\%$

c. Using the histogram: $\frac{40}{48} = 83^{\text{rd}}$ percentile. In 83% of the hours over the two-day period, the coffee shop would not have been profitable. If this data represents a typical 48-hour period, now would not be the time to expand. Original data gives $\frac{41}{48} = 0.854$

5-49. a. 0.025

b. 0.160

c. 0.815

5-50. a. F = 2%, D = 16 – 2 = 14%, C = 84 – 16 = 68%, B = 98 – 84 = 14%, A = 100 – 98 = 2%

b. F = 0 points, D = 76.5 – (2)17.4 = 41.7 points, C = 76.5 – (1)17.4 = 59.1 points, B = 76.5 + (1)17.4 = 93.9 points, A = 76.5 + (2)17.4 = 111.3 points

c. The normal model is not a good idea because the distribution of scores is strongly skewed left. Also, the minimum grade required for an A would be 111.3 points, which is probably not possible.

