1. **Correct Answer**
(a) The girl with 22 pairs of shoes is the 6th smallest. Her percentile is 0.25. 25% of girls have fewer pairs of shoes. **(b)** The boy with 22 pairs has more shoes than 17 people. His percentile is 0.85. 85% of boys have fewer pairs of shoes. **(c)** The boy is more unusual because only 15% of the boys have as many or more than he has, while the girl has a value that is more centered in the distribution. 25% have fewer and 75% have as many or more.

3. **Correct Answer**
According to the *Los Angeles Times,* the speed limits on California highways are such that 85% of the vehicle speeds on those stretches of road are less than the speed limit.

5. **Correct Answer**
The girl in question weighs more than 48% of girls her age, but is taller than 78% of the girls her age. Since she is taller than 78% of girls, but only weighs more than 48% of girls, she is probably fairly skinny.

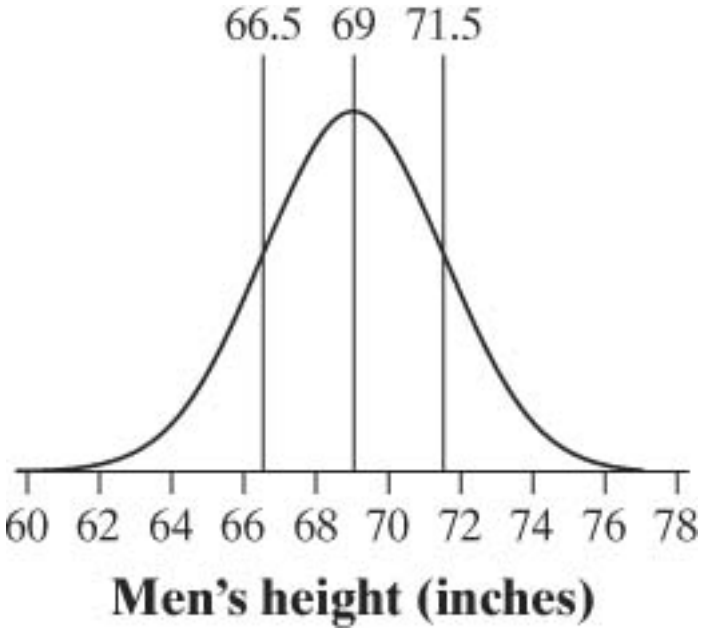
11. **Correct Answer**
Eleanor's standardized score, $z = 1.8$, is higher than Gerald's standardized score, $z = 1.5$.

13. **Correct Answer**
(a) Judy's bone density score is about one and a half standard deviations below the average score for all women her age. The fact that your standardized score is negative indicates that your bone density is below the average for your peer group. The magnitude of the standardized score tells us how many standard deviations you are below the average (about 1.5). **(b)** $\sigma = 5.52$ grams/cm^2.

33. **Correct Answer**
c

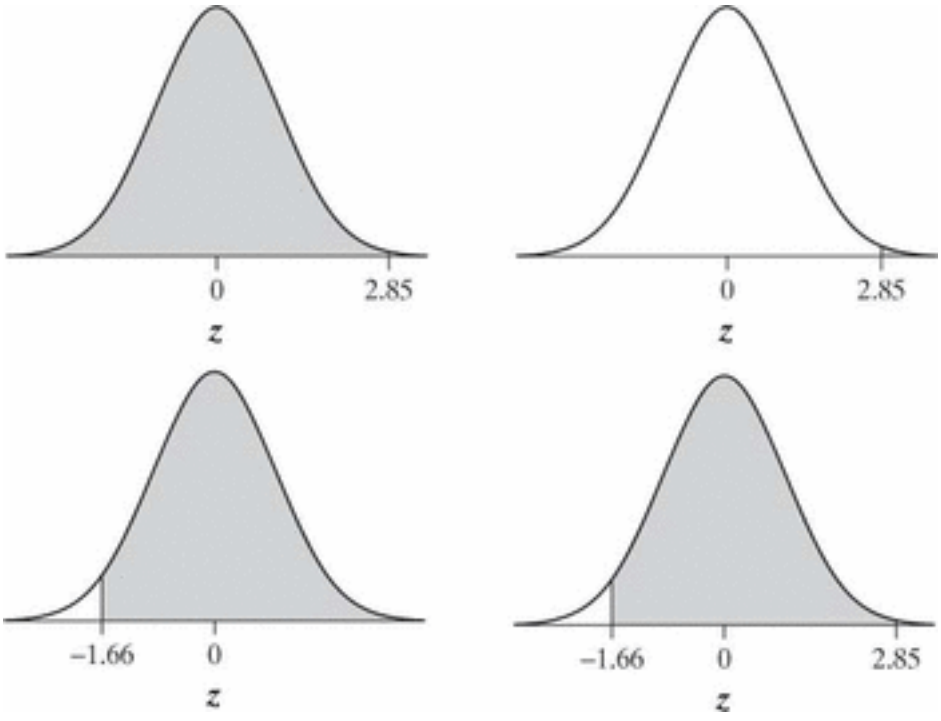
37. **Correct Answer**
d

41.



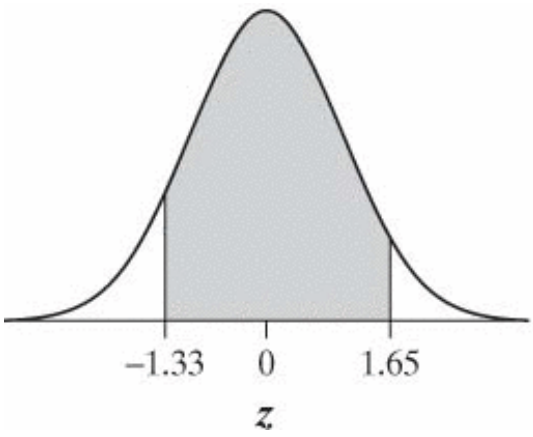
43. **Correct Answer**
(a) Approximately 2.5% **(b)** 64 and 74 inches **(c)** Approximately 13.5% (d) 84th percentile.

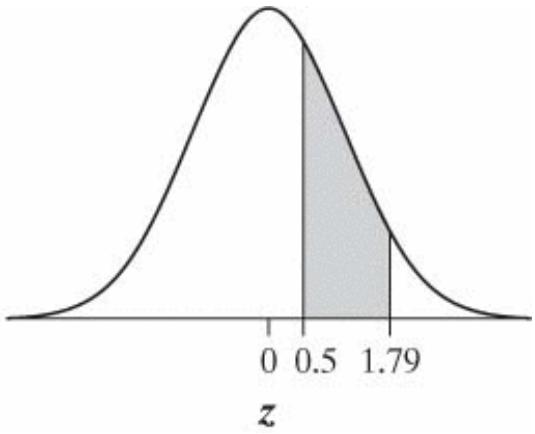
47.



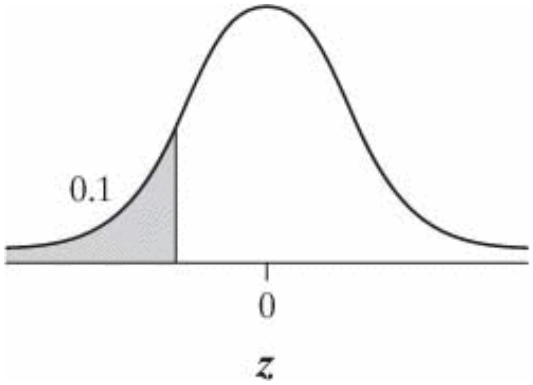
Solutions for chapter 2 problems assigned (selected answers) – AP Statistics – Normal Models

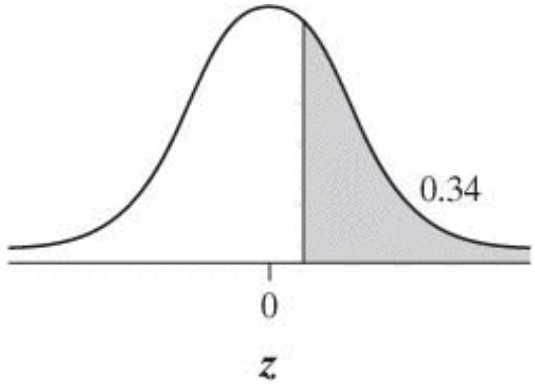
49.



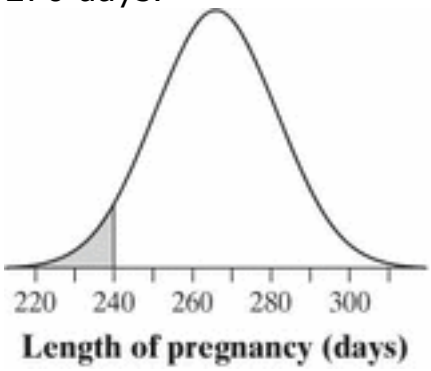


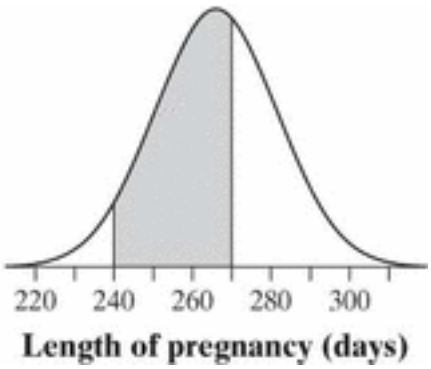
51.



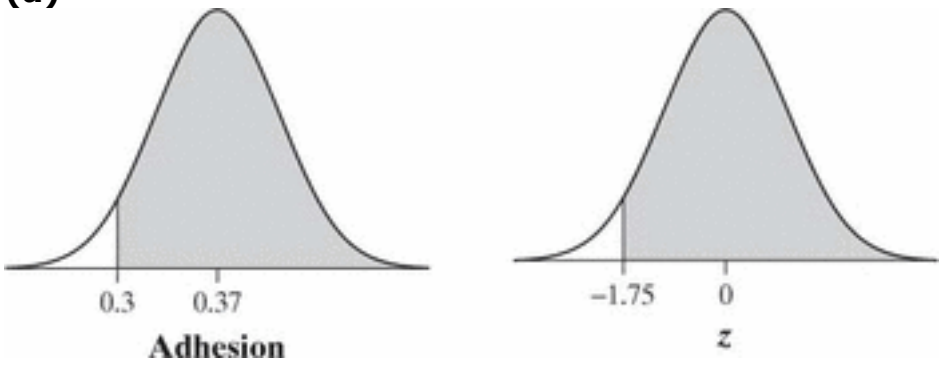


53. **Correct Answer**
(a) State: Let x = the length of pregnancies. The variable x has a Normal distribution with μ = 266 days and σ = 16 days. We want the proportion of pregnancies that last less than 240 days. **Plan:** The proportion of pregnancies lasting less than 240 days is shown in the graph. **Do:** For x = 240 we have $z = -1.63$, so $x < 240$ corresponds to $z < -1.63$. Using **Table A**, we see that the proportion of observations less than −1.63 is 0.0516 or about 5.2%. **Conclude:** About 5.2% of pregnancies last less than 240 days which means that 240 is approximately the 5th percentile. **(b) Do:** From part (a) we have that for x = 240, $z = -1.63$. For x = 270, we have z = 0.25. Using **Table A** we see that the proportion of observations less than 0.25 is 0.5987. So the proportion of observations between −1.63 and 0.25 is about 55%. **Conclude:** Approximately 55% of pregnancies last between 240 and 270 days.

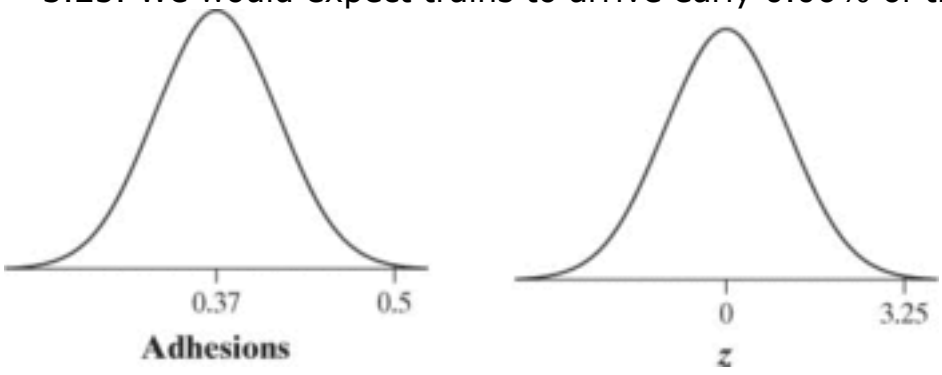




55. **Correct Answer**
(a)



We would expect trains to arrive on time about 96% of the time. **(b)** $z = 3.25$. We would expect trains to arrive early 0.06% of the time.



57. **Correct Answer**
(a) Solve $z = \frac{0.30 - \mu}{0.04} = -2.05$ for μ. The mean adhesion should be 0.382.
(b) Solve $z = \frac{0.30 - 0.37}{\sigma} = -2.05$ for σ. The standard deviation of the adhesions values should be 0.034. **(c)** To compare the options, we want to find the area under the Normal distribution to the right of 0.50. Under option (a), $z = 2.95$ and the area is $1 - 0.9984 = 0.0016$. Under option (b), $z = 3.82$ and the area is $1 - 0.9999 = 0.0001$. Therefore, we prefer option (b).

59. **Correct Answer**
(a) ±1.28 **(b)** −1.28(2.5) + 64.5 = 61.3 inches and 1.28(2.5) + 64.5 = 67.7 inches