B

Name Key

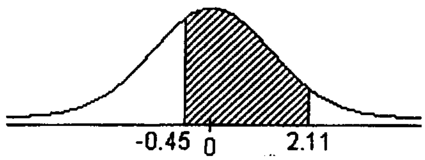
Date __/__/__

Illowsky – Chapt. 6 & 7
Larson – Chapt. 5

Please show all work neatly and orderly for credit. **Each question is worth 4 points.**

Provide an appropriate response.

1) Find the area of the indicated region under the standard normal curve.



$.9826 - .3264 = \boxed{.6562}$

2) Find the area under the standard normal curve to the right of z = 1.

$1 - .8413 = \boxed{.1587}$

3) The SAT is an exam used by colleges and universities to evaluate undergraduate applicants. The test scores are normally distributed. In a recent year, the mean test score was 1475 and the standard deviation was 308. The test scores of four students selected at random are 1930, 1340, 2150, and 1450.

a) Find the z-scores that correspond to each value

b) Determine whether any of the values are unusual.

a) $\frac{1930 - 1475}{308} = \boxed{1.48}$ $\frac{2150 - 1475}{308} = \boxed{2.195}$

$\frac{1340 - 1475}{308} = \boxed{-.439}$ $\frac{1450 - 1475}{308} = \boxed{-.081}$

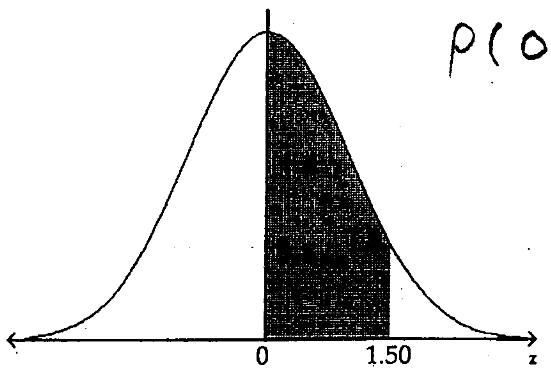
b) X= 2150 is unusual because it is outside of 2 SD's.

4) Use the standard normal distribution to find P(z < -2.33 or z > 2.33).

$P(z < -2.33 \text{ or } z > 2.33) = .0099 + (1 - .9901) = \boxed{.0198}$

Find the probability of z occurring in the indicated region.

5)



$P(0 < Z < 1.50) = .9332$

$- .5000$

$\boxed{.4332}$

Provide an appropriate response.

6) Assume that the random variable X is normally distributed, with mean $\mu = 80$ and standard deviation $\sigma = 15$. Compute the probability $P(X > 92)$.

$P(X > 92) = P(Z > .08) = 1 - .7881 = \boxed{.2119}$

Provide an appropriate response. Use the Standard Normal Table to find the probability.

7) IQ test scores are normally distributed with a mean of 100 and a standard deviation of 15. An individual's IQ score is found to be 90. Find the z-score corresponding to this value.

$Z = \dfrac{90 - 100}{15} = \boxed{-.667}$

8) An airline knows from experience that the distribution of the number of suitcases that get lost each week on a certain route is approximately normal with $\mu = 15.5$ and $\sigma = 3.6$. What is the probability that during a given week the airline will lose between 10 and 20 suitcases?

$P(10 < X < 20) = P(-1.53 < Z < 1.25) = .8944 - .0630 = \boxed{.8314}$

9) The distribution of cholesterol levels in teenage boys is approximately normal with $\mu = 170$ and $\sigma = 30$. Levels above 200 warrant attention. If 95 teenage boys are examined, how many would you expect to have cholesterol levels greater than 225?

$P(X > 225) = P(Z > 1.83) = 1 - .9664 = .0336(95)$

$= 3.192$

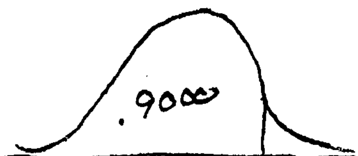
$\Rightarrow \boxed{3 \text{ boys}}$

Provide an appropriate response.

10) Find the z-score that corresponds to the given area under the standard normal curve.

$1 - .9564 = .0436 \Rightarrow \boxed{z = -1.71}$

11) For the standard normal curve, find the z-score that corresponds to the 90^{th} percentile.



$\boxed{z = 1.28}$

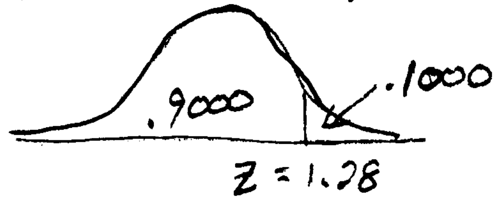
12) The scores on a mathematics exam have a mean of 70 and a standard deviation of 5. Find the x-value that corresponds to the z-score 2.33.

$X = \mu + z\sigma = 70 + (2.33)(5) = \boxed{81.65}$

13) Assume that the salaries of elementary school teachers in the United States are normally distributed with a mean of \$29,000 and a standard deviation of \$2000. What is the cutoff salary for teachers in the top 10%?

$\mu = 29{,}000$

$\sigma = 2{,}000$



$X = (29{,}000) + 1.28(2{,}000)$

$= \boxed{31{,}560}$