WEEK 14A REVIEW (8.5 and 8.6)

Many natural and social phenomena produce a continuous distribution with a bell-shaped curve.

Every bell-shaped (NORMAL) curve has the following properties:

- Its peak occurs directly above the mean, $\mu$.
- The curve is symmetric about a vertical line through $\mu$.
- The curve never touches the x-axis. It extends indefinitely in both directions.
- The area between the curve and the x-axis is always 1 (total probability is 1).

The probability that a data value will fall between $x = a$ and $x = b$ is given by the area under the curve between $x = a$ and $x = b$.

The standard normal curve has $\mu = 0$ and $\sigma = 1$ and uses $Z$ calculator commands are

- `normalcdf(a, b, \mu, \sigma)` to get $P(a \leq x \leq b)$
- `invNorm(p, \mu, \sigma)` to get the $c$ value for $p = P(x \leq c)$
Example: Given that $Z$ is the standard normal variable, find

(a) $P(Z > 0.65)$

(b) $P(Z < 1)$

(c) $P(-1.2 < Z < 0)$

(d) a value of $d$ such that $P(Z \leq d) = 0.25$

(e) a value of $e$ such that $P(Z \geq e) = 0.35$

(f) a value of $f$ such that $P(-f \leq Z \leq f) = 0.6$
Example: Suppose that the course scores are normally distributed with a mean of 73 and a standard deviation of 12.

(a) What is the probability that a student earns a C by scoring between 70 and 80?

(b) What is the minimum exam grade required for a student to score in the 90th percentile?

(c) What grades bracket the middle 50% of the students?