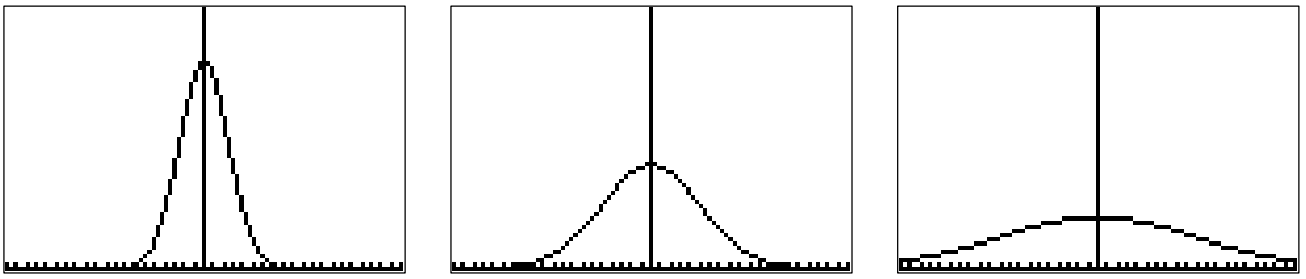
WEEK 14A REVIEW (8.5 and 8.6)

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, μ
- The curve is symmetric about a vertical line through μThe 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, μ, σ) to get $P(a \le x \le b)$
- invNorm(p, μ, σ) to get the c value for $p = P(x \le c)$

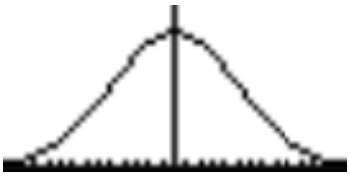
Example: Given that Z is the standard normal variable, find

(a) $P(Z > 0.65)$ 

(b) $P(Z<1)$ 

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

(d) a value of d such that $P\left(Z \le d\right) = 0.25$



(e) a value of e such that $P\left(Z \ge e\right) = 0.35$

(f) a value of f such that $P\left(-f \le Z \le f\right) = 0.72$

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 90^{th} percentile?

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