Solutions to Lesson 11 problems:

Problem 1

$n = 100,\ \bar{x} = 16.0,\ s = 3.0$

$$SE = \frac{s}{\sqrt{n}} = \frac{3.0}{10} = 0.30$$

$$MOE = 1.96 \times 0.30 = 0.588$$

Problem 2

$n = 120,\ \bar{x} = 16.2,\ s = 3.6$

$$SE = \frac{3.6}{\sqrt{120}} = 0.329$$

$$MOE = 1.96 \times 0.329 = 0.645$$

Problem 3

$n = 64,\ \bar{x} = 42,\ s = 5$

$$SE = \frac{5}{\sqrt{64}} = 0.625$$

$$MOE = 1.96 \times 0.625 = 1.225$$

Problem 4

$n = 49,\ \bar{x} = 21.55,\ s = 5.21$

$$SE = \frac{5.21}{\sqrt{49}} = 0.744$$

$$MOE = 1.96 \times 0.744 = 1.458$$

Problem 5 — NFL "Over–Under" (45.5 points)

Given:

Population mean $\mu = 52.9$, standard deviation $\sigma = 20.2$.

We want $P(X < 45.5)$.

$$Z = \frac{45.5 - 52.9}{20.2} = -0.366$$

From standard normal table:

$$P(Z < -0.366) = 0.357$$

✅ **Probability total < 45.5: 0.357 (35.7%)**