Act #6

32. Suppose the force acting on a column that helps to support a building is a normally distributed random variable X with mean value 15.0 kips and standard deviation 1.25 kips. Compute the following probabilities by standardizing and then using Table A.3.

a. $P(X \geq 10)$

$$P(X \geq 10) = P\left(\frac{X-15}{1.25} \geq \frac{10-15}{1.25}\right)$$

$$= P(Z \geq -4.0)$$

$$= 1 - \Phi(-4.0)$$

$$\approx 1 - 0 = \boxed{1}$$

b) $P(14 \leq x \leq 18)$

$$P(14 \leq x \leq 18) = P\left(\frac{14-15}{1.25} \leq \frac{x-15}{1.25} \leq \frac{18-15}{1.25}\right)$$

$$= P(-0.8 \leq z \leq 2.4)$$

$$= \Phi(2.4) - \Phi(-0.8)$$

$$= 0.9918 - 0.2119$$

$$= 0.7799$$