1. We have \( P(-1.5 < Z < 1.5) = P(Z < 1.5) - P(Z < -1.5) \). From the Normal distribution table, we have \( P(Z < 1.5) = 0.9332 \) and \( P(Z < -1.5) = P(Z > 1.5) = 1 - P(Z < 1.5) = 1 - 0.9332 = 0.0668 \). Thus \( P(-1.5 < Z < 1.5) = 0.9332 - 0.0668 = 0.8664 \).

2. We have \( P(Z < 2.5) = P(Z < 2.5) - P(Z < -2.5) \). From the table, we know \( P(Z < 2.5) = 0.9938 \) and \( P(Z < -2.5) = P(Z > 2.5) = 1 - P(Z < 2.5) = 1 - 0.9938 = 0.0062 \). Thus \( P(-2.5 < Z < 2.5) = 0.9938 - 0.0062 = 0.9876 \).

3. We have \( P(X > a) = P(\frac{X-a}{\sigma} > \frac{0-a}{\sigma}) = P(Z > -\frac{a}{\sigma}) = P(Z < \frac{a}{\sigma}) \). Thus \( 0.95 = P(Z < \frac{a}{\sigma}) \), so \( \frac{a}{\sigma} = 1.65 \), so \( a = 2.4 \).

4. Since \( X \) is Normal, then \( Y = 5X + 1 \) is Normal too, with \( \mu(Y) = \mu(5X + 1) = 5\mu(X) + 1 = 5(3) + 1 = 16 \) and \( \text{Var}(Y) = \text{Var}(5X + 1) = 5^2 \text{Var}(X) = 25(4) = 100 \). Thus \( P(10 < Y < 20) = P(\frac{10-16}{10} < Y-16 < \frac{20-16}{10}) = P(-0.6 < Z < 0.4) = P(Z < 0.4) - P(Z < -0.6) \). We have \( P(Z < 0.4) = 0.6554 \) and \( P(Z < -0.6) = P(Z > 0.6) = 1 - P(Z < 0.6) = 1 - 0.7257 = 0.2743 \). Thus \( P(10 < Y < 20) = 0.6554 - 0.2743 = 0.3811 \).

5. We have \( P(Y < 10) = P(\frac{Y-16}{10} < \frac{0-16}{10}) = P(Z < -1.6) = P(Z > 1.6) = 1 - P(Z < 1.6) = 1 - 0.9452 = 0.0548 \).

6. a. The probability a blade of grass, with height \( X \), is 5 inches or taller, is \( P(X > 5) = P(\frac{X-5}{\sigma} > \frac{5-5}{\sigma}) = P(Z > 1.33) = 1 - P(Z < 1.33) = 1 - 0.9082 = 0.0918 \).

b. The number of blades of grass picked until the first blade of grass has height 5 inches or taller is Geometric with expected value \( 1/0.0918 = 10.89 \).

c. The number of blades of grass, with height 5 inches or taller, among the 10 blades of grass, is Binomial with parameters \( n = 10 \) and \( p = 0.0918 \), and therefore has expected value \( np = (10)(0.0918) = 0.918 \).

7. a. The probability that a college female with height \( V \) is 67 inches tall or taller is \( P(V > 67) = P(\frac{V-64}{4.8} > \frac{67-64}{4.8}) = P(Z > 0.63) = 1 - P(Z < 0.63) = 1 - 0.7357 = 0.2643 \).

b. Since \( X \) is Binomial with \( n = 40 \) and \( p = 0.2643 \), then \( \text{Var}(X) = npq = (40)(0.2643)(1-0.2643) = 7.78 \).

c. The probability that a college female with height \( V \) is 60 inches or shorter is \( P(V < 60) = P(\frac{V-64}{4.8} < \frac{60-64}{4.8}) = P(Z < -0.83) = P(Z > 0.83) = 1 - P(Z < 0.83) = 1 - 0.7967 = 0.2033 \).

d. Since \( Y \) is Geometric with \( p = 0.2033 \), then \( \text{Var}(Y) = q/p^2 = (1 - 0.2033)/(0.2033)^2 = 19.28 \).