Workbook, page 6:

avg = 64.3
SD = 2.6

(i) below 65:

\[
65 - 64.3 \over 2.6 = 0.27 \text{ s.u.}
\]

area between -0.25 to 0.25: 19.74%
area outside: 80.26% (on both sides)
area of interest: 19.74% + \frac{1}{2} \cdot 80.26% = 59.87% \text{ i.e., about 60%}

(ii) between 61 and 66:

\[
61 - 64.3 \over 2.6 = -1.27 \text{ s.u.}
\]

\[
66 - 64.3 \over 2.6 = 0.65 \text{ s.u.}
\]

area between -1.25 and 1.25: 78.87%
area between -0.65 and 0.65: 48.43%
area of interest: \frac{1}{2} \cdot 78.87% + \frac{1}{2} \cdot 48.43% = 63.65% \text{ i.e., about 64%}

(iii) above 62:

\[
62 - 64.3 \over 2.6 = -0.88 \text{ s.u.}
\]

area between -0.90 and 0.90: 63.19%
area outside: 36.81% (on both sides)
area of interest: 63.19% + \frac{1}{2} \cdot 36.81% = 81.595% \text{ i.e., about 82%}
(iv) above 72:

\[
\frac{72 - 64.3}{2.6} = 2.96 \text{ s.u.}
\]

area between -2.95 and 2.95: 99.68%
area outside: 0.32% (on both sides)
area of interest: \[\frac{1}{2} \times 0.32\% = 0.16\%\], i.e., almost 0%

Workbook, page 7: (bottom)

30th percentile:

Find a value \( z \) in the table such that the area between -2 and \( z \) is about 40%:

0.55 gives 41.77% (0.50 gives 38.29%)

transformation from S.D. to original units (note that we have to use \(-0.55\) or \(-0.50\)):

\[-0.55 \times 2.6 + 64.3 = 62.87\]
\[-0.50 \times 2.6 + 64.3 = 63.00\]

i.e., the 30th percentile is somewhere around 62.87" to 63.00"
avg = 65
SD = 15

(i) Between 50 and 60:
\[
\frac{50-65}{15} = -1 \text{ s.u.}
\]
\[
\frac{60-65}{15} = -0.33 \text{ s.u.}
\]
Area between -1.00 and 1.00: 68.27%
Area between -0.33 and 0.33: 27.37%
Area of interest: \[
\frac{68.27\% - 27.37\%}{2} = 20.45\%, \text{ i.e., almost 20}\%
\]

(ii) Above 80:
\[
\frac{80-65}{15} = 1 \text{ s.u.}
\]
Area between -1.00 and 1.00: 68.27%
Area outside: 31.73% (on both sides)
Area of interest: \[
\frac{1}{2} \times 31.73\% = 15.86\%, \text{ i.e., almost 16}\%
\]

(iii) Assumption: Histogram looks like the normal curve
\[ \text{avg}_x = 70 \quad \text{avg}_y = 162 \quad \text{SD}_x = 3 \quad \text{SD}_y = 30 \quad r = 0.47 \]

\( (i) \) \( x = 76^\circ \):
\[
\text{S.u.}_x = \frac{x - \text{avg}_x}{\text{SD}_x} = \frac{76 - 70}{3} = 2
\]
\[
\text{S.u.}_y = r \cdot \text{S.u.}_x = 0.47 \cdot 2 = 0.94
\]
\[
y = \text{avg}_y + \text{S.u.}_y \cdot \text{SD}_y = 162 + 0.94 \cdot 30 = 190.2 \text{ lb}
\]

\( (ii) \) \( x = 64^\circ \):
\[
\text{S.u.}_x = \frac{64 - 70}{3} = -2
\]
\[
\text{S.u.}_y = 0.47 \cdot (-2) = -0.94
\]
\[
y = 162 - 0.94 \cdot 30 = 133.8 \text{ lb}
\]

\( (iii) \) \( x = 69^\circ \):
\[
\text{S.u.}_x = \frac{69 - 70}{3} = -0.33
\]
\[
\text{S.u.}_y = 0.47 \cdot (-0.33) = -0.1551
\]
\[
y = 162 - 0.1551 \cdot 30 = 157.347 \text{ lb} \approx 157.3 \text{ lb}
\]

\( (iv) \) \( x = 73^\circ \):
\[
\text{S.u.}_x = \frac{73 - 70}{3} = 1
\]
\[
\text{S.u.}_y = 0.47 \cdot 1 = 0.47
\]
\[
y = 162 + 0.47 \cdot 30 = 176.1 \text{ lb}
\]