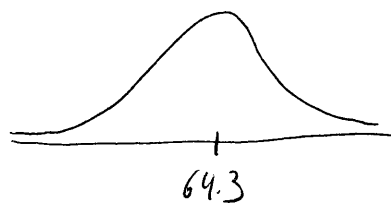


Worksheet, page 6:

①

$$\text{avg} = 64.3$$

$$\text{SD} = 2.6$$



(i) below 65:



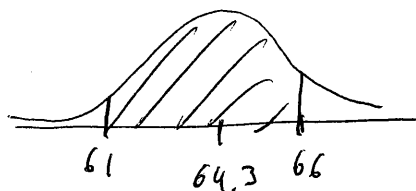
$$\frac{65 - 64.3}{2.6} = 0.27 \text{ s.u.}$$

area between -0.25 to 0.25 : 19.74%

area outside: 80.26% (on both sides)

area of interest: $19.74\% + \frac{1}{2} \cdot 80.26\% = 59.87\%$, i.e., about 60%

(ii) between 61 and 66:



$$\frac{61 - 64.3}{2.6} = -1.27 \text{ s.u.}$$

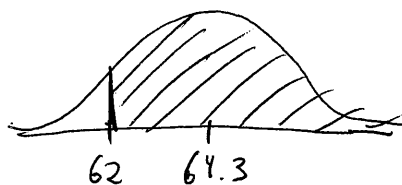
area between -1.25 and 1.25 : 78.87%

$$\frac{66 - 64.3}{2.6} = 0.65 \text{ s.u.}$$

area between -0.65 and 0.65 : 48.43%

area of interest: $\frac{1}{2} \cdot 78.87\% + \frac{1}{2} \cdot 48.43\% = 63.65\%$, i.e., about 64%

(iii) above 62:



$$\frac{62 - 64.3}{2.6} = -0.88 \text{ s.u.}$$

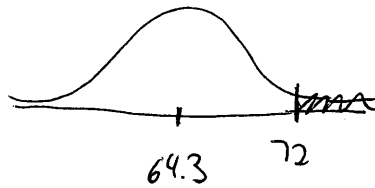
area between -0.90 and 0.90 : 63.19%

area outside: 36.81% (on both sides)

area of interest: $63.19\% + \frac{1}{2} \cdot 36.81\% = 81.595\%$ i.e., about 82%

(iv) above 72:

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



(2)

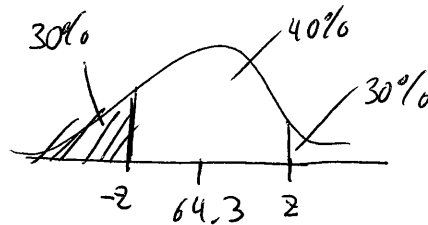
area between -2.95 and 2.95 : 99.68%

area outside: 0.32% (on both sides)

area of interest: $\frac{1}{2} \cdot 0.32\% = 0.16\%$, i.e., almost 0%

workbook, page 7: (bottom)

30th percentile:



Find a value z in the table such that the area between $-z$ and z is about 40% :

0.55 gives 41.77% (0.50 gives 38.29%)

transform from s.u. to original units (note that we have to use -0.55 !):
 $\sigma = 0.50$

$$-0.55 \cdot 2.6 + 64.3 = 62.87''$$

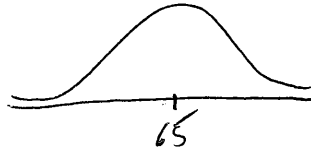
$$-0.50 \cdot 2.6 + 64.3 = 63.00''$$

i.e., the 30th percentile is somewhere around $62.87''$ to $63.00''$

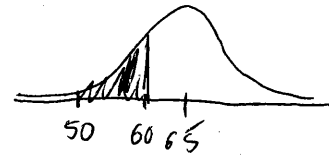
workbook, page 7 (top):

3

$$\begin{aligned} \text{avg} &= 65 \\ \text{SD} &= 15 \end{aligned}$$



(i) between 50 and 60:



$$\frac{50-65}{15} = -1 \text{ s.u.}$$

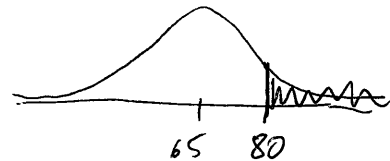
$$\frac{60-65}{15} = -0.33 \text{ s.u.}$$

area between -1.00 and 1.00: 68.27%

area between -0.35 and 0.35 = 27.37%

area of interest: $\frac{68.27\% - 27.37\%}{2} = 20.45\%$, i.e., about 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: $\frac{1}{2} \cdot 31.73\% = 15.865\%$, i.e., about 16%

(iii) assumption: histogram looks like the normal curve

Worksheet, page 10:

$$\begin{aligned} \text{avg } x &= 70 & \text{SD}_x &= 3 & r &= 0.47 \\ \text{avg } y &= 162 & \text{SD}_y &= 30 & & \end{aligned}$$

(i) $x = 76$ ":

$$\text{s.u.}_x = \frac{x - \text{avg}_x}{\text{SD}_x} = \frac{76 - 70}{3} = 2$$

$$\text{s.u.}_y = r \cdot \text{s.u.}_x = 0.47 \cdot 2 = 0.94$$

$$y = \text{avg}_y + \text{s.u.}_y \cdot \text{SD}_y = 162 + 0.94 \cdot 30 = 190.2 \text{ lb}$$

(ii) $x = 64$ ":

$$\text{s.u.}_x = \frac{64 - 70}{3} = -2$$

$$\text{s.u.}_y = 0.47 \cdot (-2) = -0.94$$

$$y = 162 - 0.94 \cdot 30 = 133.8 \text{ lb}$$

(iii) $x = 69$ ":

$$\text{s.u.}_x = \frac{69 - 70}{3} = -0.33$$

$$\text{s.u.}_y = 0.47 \cdot (-0.33) = -0.1551$$

$$y = 162 - 0.1551 \cdot 30 = 157.347 \text{ lb} \approx 157.3 \text{ lb}$$

(iv) $x = 73$ ":

$$\text{s.u.}_x = \frac{73 - 70}{3} = 1$$

$$\text{s.u.}_y = 0.47 \cdot 1 = 0.47$$

$$y = 162 + 0.47 \cdot 30 = 176.1 \text{ lb}$$