10pts

(7) Among the pairs where the father was 66" tall, estimate the percent of sons that were shorter than their fathers, i.e. shorter than 66". (Use the normal approximation in the "vertical strip" of pairs with $x = 66$". Be sure to use an RMS error for the standard deviation.)

- Use for Average: $68" = A(y \mid x=66")$
- Use for SD: $(\sqrt{1-0.5^2})(SD_y) = (\sqrt{.75})(2.7)$ (RMS error for y)
  $\approx 2.34"$
- Standardize: $z = \frac{66-68}{2.34} = -.85$
- From table: 19.77% to the left i.e. shorter.

10pts

(8) Using the normal approximation for the entire set of y data, estimate the percent of sons (overall) that were shorter than 66".

- Use for average: $69" = A_y$
- for SD: $2.7" = SD_y$
- Standardize $z = \frac{66-69}{2.7} \approx -1.11$
- From table: 13.35% to the left, i.e. shorter

10 pts

(3) Here are predicted high temperatures (x) and low temperatures (y), in degrees Farenheit, for five days:

x (°F)	y (°F)
85	60
86	64
82	60
82	58
81	57

The 5 statistic summary is $A_x = 83.2°F$, $SD_x = 1.94°F$, $A_y = 59.8°F$, $SD_y = 2.40°F$, and $r = .868$.

Now here are the same temperatures in degrees Celcius:

x (°C)	y (°C)
29.4	15.6
30.0	17.8
27.8	15.6
27.8	14.4
27.2	13.9

Find the 5 statistic summary for this new data set. You may recalculate it from scratch, or you may use the fact that degrees Celcius is a change of scale from degrees Farenheit, given by the formula $°C = \left(\frac{5}{9}\right)(°F) - \frac{160}{9}$.

$°C: A_x = \left(\frac{5}{9}\right)(83.2) - \frac{160}{9} \approx 28.4°C$

$SD_x = \left(\frac{5}{9}\right)(1.94) \approx 1.08°C$

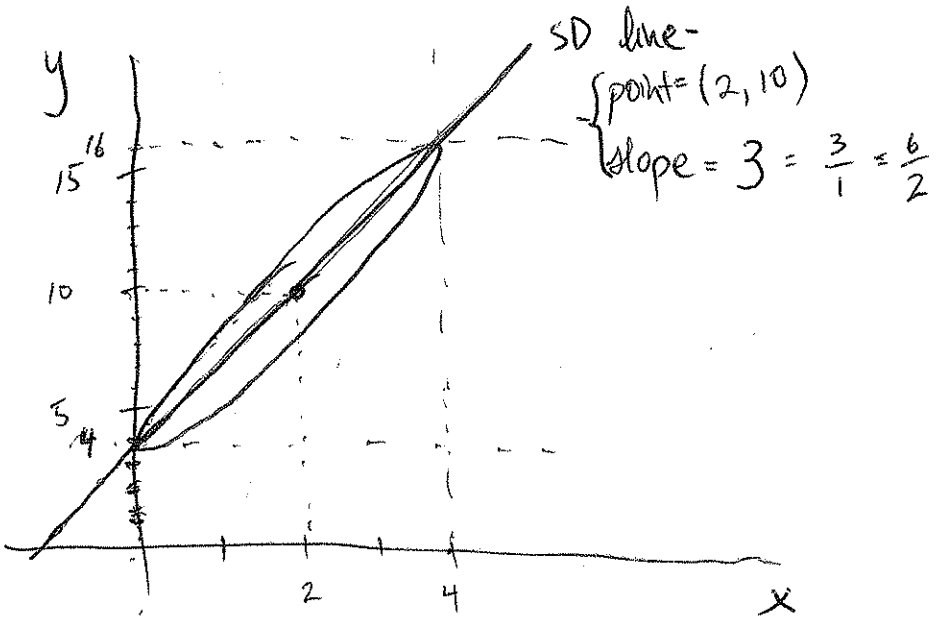
$A_y = \left(\frac{5}{9}\right)(59.8) - \frac{160}{9} \approx 15.4°C$

$SD_y = \left(\frac{5}{9}\right)(2.40) \approx 1.33°C$

$r = .868$

15 pts

(1) Sketch an oval scatterplot for two variables x and y with the 5 statistic summary $A_x = 2$, $SD_x = 1$, $A_y = 10$, $SD_y = 3$, $r = 0.95$. In your sketch, include the SD line with its slope and a point on it clearly labeled/shown.



Oval is tight & narrow

because $r = 0.95$ is close to 1

5 points - cloud centered at point of averages

5 points - oval on correct slant; i.e. SD line

5 points - correct horizontal & vertical extent, (2 SD's of Average)
tightness (high correlation, strong positive association)