ANSWERS => AVERAGE RATE OF CHANGE

1. AVERAGE SPEED = $\dfrac{13\,100\,Km - 12\,345\,Km}{6h - 0h}$

$= \dfrac{755\,Km}{6\,h}$

$= 125.8\ Km/h$

2. AVERAGE RATE OF CHANGE => AROC

$= \dfrac{140\ beats/min - 80\ beats/min}{7\,min - 0\,min}$

$= \dfrac{60\ beats/min}{7\,min}$

$= 8.57\ beats/min/min$

3. If the cost is \$20 per shirt, they sell 60 shirts. For every \$5 per shirt increase, they sell 10 less shirts.

a) If they raise the price from \$20 to \$25, they will sell 50 shirts.

b) AROC $= \dfrac{60\,shirts - 50\,shirts}{\$20 - \$25}$
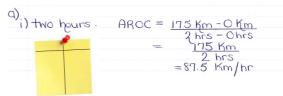
$= \dfrac{10\ shirts}{-\$5}$

$= -2\ shirts/\$1$

For every \$1 increase in price, they will sell 2 fewer shirts.

c) If the shirts are \$25, they will sell 50 shirts. If the shirts are \$30, they will sell 40 shirts.

AROC $= \dfrac{50\,shirts - 40\,shirts}{\$25 - \$30}$

$= \dfrac{10\ shirts}{-\$5}$

$= -2\ shirts/\$1$

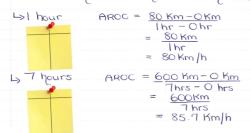When the price is increased from \$25 to \$30, for every \$1 increase in price, they will still sell 2 fewer shirts.

4. At the beginning of the trip => time = 0 hr
distance = 0 Km

a)
i) two hours. AROC $= \dfrac{175\,Km - 0\,Km}{2\,hrs - 0\,hrs}$

$= \dfrac{175\ Km}{2\ hrs}$

$= 87.5\ Km/hr$

ii) four hours. AROC $= \dfrac{325\ Km - 0\ Km}{4\ hrs - 0\ hrs}$

$= \dfrac{325\ Km}{4\ hrs}$

$= 81.25\ Km/h.$

iii) ten hours.   AROC $= \dfrac{850\ Km - 0\ Km}{10\ hrs - 0\ hrs}$

$= \dfrac{850\ Km}{10\ hrs}$

$= 85\ Km/h$

b) It is difficult to find the average speed during the first 5 hours as we only have specific information regarding 4 hours after the start of the trip and 7 hours after the start of the trip.
You could only estimate using the values given as a guide!

c) We have already found the average speed during the first 2 hours, 4 hours, and 10 hours in Part (a).
Let's find the average speed during the first hour and the first 7 hours:

↳ 1 hour   AROC $= \dfrac{80\ Km - 0\ Km}{1\ hr - 0\ hr}$

$= \dfrac{80\ Km}{1\ hr}$

$= 80\ Km/h$

↳ 7 hours   AROC $= \dfrac{600\ Km - 0\ Km}{7\ hrs - 0\ hrs}$

$= \dfrac{600\ Km}{7\ hrs}$

$= 85.7\ Km/h$

Therefore, using all of the available information, we know that from:

Hour 1 to Hour 2, the speed increased from 80 Km/h to 87.5 Km/h.

Hour 2 to Hour 4, the speed decreased from 87.5 Km/h to 81.25 Km/h.

Hour 4 to Hour 7, the speed increased from 81.25 Km/h to 85.7 Km/h.

Hour 7 to Hour 10, the speed decreased from 85.7 Km/h to 85 Km/h.

d) The distance-time relationship is not linear since the increase during the first hour is 80 Km but it is not 160 Km during the next two hours.

To find out if the distance-time relationship is quadratic you could input the two "lists" into the graphing calculator and "check".
Once you determine the "quadratic" equation and graph it, a parabola is not formed.

The distance-time relationship is therefore not quadratic either.