

1. The 2015 male winner was Stanely Biwott, his time was 2 hours and 10 minutes. **Round your answers to the hundredths place**

TCS NEW YORK CITY MARATHON
TATA CONSULTANCY SERVICES

NYRR RUN FOR LIFE

THE BRONX

QUEENS

MANHATTAN

BROOKLYN

NEW YORK HARBOR

STATEN ISLAND

START

FINISH

Key Landmarks and Streets:

- Staten Island:** Key Ridge Ave., 77th St., 96th St., 98th St., 102nd St.
- Brooklyn:** Bay Ridge Ave., 77th St., 96th St., 98th St., 102nd St., 104th St., 106th St., 108th St., 110th St., 112th St., 114th St., 116th St., 118th St., 120th St., 122nd St., 124th St., 126th St., 128th St., 130th St., 132nd St., 134th St., 136th St., 138th St., 140th St., 142nd St., 144th St., 146th St., 148th St., 150th St., 152nd St., 154th St., 156th St., 158th St., 160th St., 162nd St., 164th St., 166th St., 168th St., 170th St., 172nd St., 174th St., 176th St., 178th St., 180th St., 182nd St., 184th St., 186th St., 188th St., 190th St., 192nd St., 194th St., 196th St., 198th St., 200th St.
- Manhattan:** 1st St., 2nd St., 3rd St., 4th St., 5th St., 6th St., 7th St., 8th St., 9th St., 10th St., 11th St., 12th St., 13th St., 14th St., 15th St., 16th St., 17th St., 18th St., 19th St., 20th St., 21st St., 22nd St., 23rd St., 24th St., 25th St., 26th St., 27th St., 28th St., 29th St., 30th St., 31st St., 32nd St., 33rd St., 34th St., 35th St., 36th St., 37th St., 38th St., 39th St., 40th St., 41st St., 42nd St., 43rd St., 44th St., 45th St., 46th St., 47th St., 48th St., 49th St., 50th St., 51st St., 52nd St., 53rd St., 54th St., 55th St., 56th St., 57th St., 58th St., 59th St., 60th St., 61st St., 62nd St., 63rd St., 64th St., 65th St., 66th St., 67th St., 68th St., 69th St., 70th St., 71st St., 72nd St., 73rd St., 74th St., 75th St., 76th St., 77th St., 78th St., 79th St., 80th St., 81st St., 82nd St., 83rd St., 84th St., 85th St., 86th St., 87th St., 88th St., 89th St., 90th St., 91st St., 92nd St., 93rd St., 94th St., 95th St., 96th St., 97th St., 98th St., 99th St., 100th St.
- Queens:** 1st St., 2nd St., 3rd St., 4th St., 5th St., 6th St., 7th St., 8th St., 9th St., 10th St., 11th St., 12th St., 13th St., 14th St., 15th St., 16th St., 17th St., 18th St., 19th St., 20th St., 21st St., 22nd St., 23rd St., 24th St., 25th St., 26th St., 27th St., 28th St., 29th St., 30th St., 31st St., 32nd St., 33rd St., 34th St., 35th St., 36th St., 37th St., 38th St., 39th St., 40th St., 41st St., 42nd St., 43rd St., 44th St., 45th St., 46th St., 47th St., 48th St., 49th St., 50th St., 51st St., 52nd St., 53rd St., 54th St., 55th St., 56th St., 57th St., 58th St., 59th St., 60th St., 61st St., 62nd St., 63rd St., 64th St., 65th St., 66th St., 67th St., 68th St., 69th St., 70th St., 71st St., 72nd St., 73rd St., 74th St., 75th St., 76th St., 77th St., 78th St., 79th St., 80th St., 81st St., 82nd St., 83rd St., 84th St., 85th St., 86th St., 87th St., 88th St., 89th St., 90th St., 91st St., 92nd St., 93rd St., 94th St., 95th St., 96th St., 97th St., 98th St., 99th St., 100th St.

Total Time in Minutes	Average Rate in <i>MINUTES PER MILE</i>
Total Time in Hours	Average Rate in <i>MILES PER HOUR</i>

3. Use the information in the table below using the given information; remember the course distance is 26.2 miles. (show your work) **Round your answers to the tenths place**

	Time	Total Minutes	Pace (minutes per mile)
Male course record	2hs 5 minutes		
Average Male time	4 hours 16 mins		
Last Place Finisher Time 2014	9 hours 46 mins		

4. What is the difference between the male course record pace and the average male pace?

What is the percent increase from the course record pace to the average pace?

5. Estimate how long it would take you to jog one mile (keep in mind that an average pace for someone who doesn't run regularly is approximately 10-12 minutes per mile). _____

Use your pace to estimate how long it would take you to run the entire course.

_____hrs and _____ mins

Is your total time closer to the first place finisher, average or last place?

6. The following table shows the number of wins between 1970 and 2014 (79 races in total with the males and female wins separate) for the top five countries. Find the percent of total wins each country has. (show your work) **Round your answers to the nearest tenth of a percent**

Country	Number of Wins	Percent of Wins
United States	21	
Kenya	20	
Norway	10	
Britain	11	
Italy	5	

7. In 2013 there were 58,456 entrants in the marathon.
- 60.74% of the entrants were men. Determine the total number of male and female entrants in the 2013 race.
 - 7,670 of the entrants were in their twenties. Determine the percentage of the total runners.
Round your answers to the tenths place

8. In 1975 only $\frac{1}{10}$ of the total entrants were women and in 2013 $\frac{2}{5}$ of the entrants were women. In 1975 there were 2,021 entrants and in 2014 there were 59,130.
- Determine the total number of women that entered the race in each year.
 - Find the percent increase in the number of women who participated from 1975 to 2014.

9. The graph to the right shows one runner's speed over the course of the race.



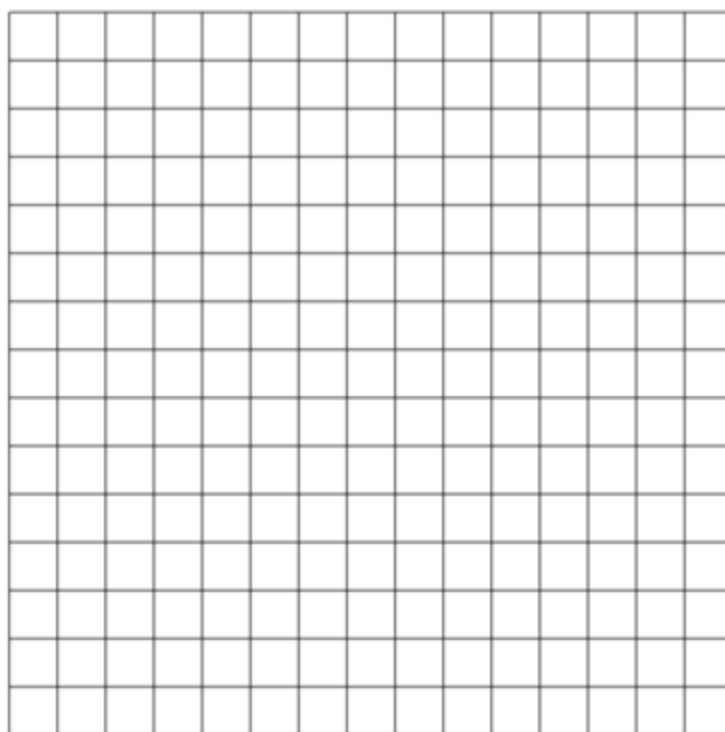
- Write a full sentence to describe what this graph tells you about this runner's race.
- Using the information in the graph, make an estimate of the runner's average speed in miles per hour.
- Use your estimate to determine an approximate total marathon time for the runner.

10. Christopher is running the marathon next year and is starting to train. He has decided to run 30 minutes flat and add 5 minutes each day for the month.

a. Fill in this chart for Christopher's training:

Day	1		5	10		20	30
Minutes Ran		45			105		

b. Graph your points on the chart provided. Be sure to label each axis with an appropriate scale (you cannot go up by 1s)



c. Write a function $r(x)$ that represents how many minutes Christopher will run on any given day of the month.

- d. Use your function to determine an approximate number of minutes Christopher will run over the course of an entire month (30 days)

If Christopher's average pace is 9 minutes per mile, determine the total number of miles Christopher will run in a month.

Use your previous answer to figure out how many minutes and miles Chris will run over the course of his one year training period.

- e. On Sunday Christopher decides to do a special training session at the gym. He only has a certain amount of time to work out. He figured he can either spend 10 minutes stretching, do 10 sprints and lift weights for 30 minutes, OR he can spend 11 minutes stretching do 18 sprints and lift weights for 25 minutes.

If $s = \text{minutes per sprint}$, write an equation with the variable on each side that represents this situation.

Solve your equation to determine the amount of time it takes Christopher to complete one sprint.

Use your answer to figure out how much time Christopher has to spend at the gym.