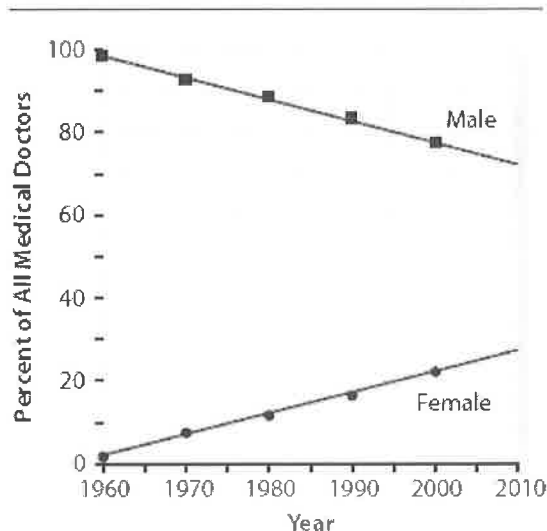


Learning Goal:

- I can solve and interpret linear inequalities.

For most of the twentieth century, the vast majority of American medical doctors were men. However, during the past 40 years there has been a significant increase in the number of women graduating from medical schools. As a result, the percent of doctors who are women has grown steadily to nearly 25% in 2000. The graph below shows this trend.

Male and Female Medical Doctors



Source: www.ama-assn.org/ama/pub/article/171-195.html

1. Using the graph above, answer the following questions.

- a. How would you describe the trends shown in the graphs for males and females?

% of Male doctors is decreasing fairly steadily

% of female docs is increasing pretty steadily.

- b. Why do you suppose the percentage of women doctors has been increasing over the past 40 years?

More women are interested in science/the medical fields.

- c. Would you expect the trend in the graph to continue 10 or 20 years beyond 2000?

There's a good chance that it will, yes.

The increase/decrease since 1960 has been pretty steady

- d. What would you need to know in order to create a function that models the data trends? so far,

Slope + y-intercept
or a point + the slope.

The trends in percent of male and female medical doctors can be modeled by the following functions.

t is years since 1960

Percentage of male doctors: $m(t) = 98 - 0.54t$

Percentage of female doctors: $f(t) = 2 + 0.54t$

2. Write equations or inequalities that can be used to estimate answers for each of the following questions. Do not solve.

a. In 1985, what percent of U.S. medical doctors were male?
→ 25 years after 1960, so $t = 25$

$$m(25) = 98 - 0.54(25)$$

b. When will the percent of male doctors fall to 40%?

$$40 = 98 - 0.54t \quad \text{or} \quad 98 - 0.54t = 40$$

c. How long will the percent of female doctors remain below 60%?

$$2 + 0.54t < 60$$

d. When will the percent of male doctors decline to only double the percent of female doctors?

$$m(t) = 2f(t)$$
$$98 - 0.54t = 2(2 + 0.54t)$$

3. Write questions about trends in percent of male and female medical doctors that can be answered by solving these equations and inequalities.

a. $98 - 0.54t = 65$

When will the percent of male doctors be 65?

b. $f(t) = 2 + 0.54(50)$

What was the percent of female doctors in 2010?

"For how long was"

c. $2 + 0.54t < 30$

When was the percent of female doctors below 30?

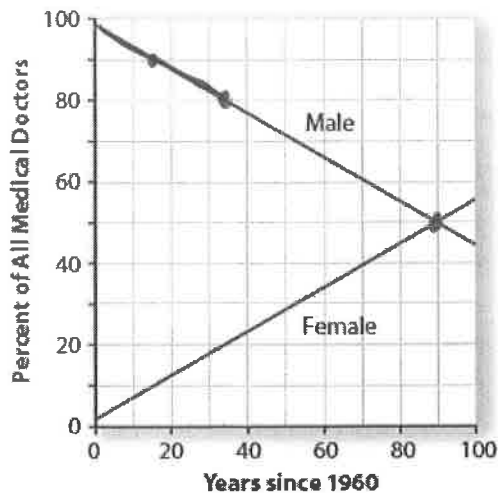
d. $98 - 0.54t > 2 + 0.54t$

How long will the percent of male doctors be greater than the percent of female doctors.

e. $98 - 0.54t = 4(2 + 0.54t)$

When was the percent of male doctors 4 times the percent of female doctors?

Trends in Gender



| t | $m(t)$ | $f(t)$ |
|-----|--------|--------|
| 0 | 98 | 2 |
| 10 | 92.6 | 7.4 |
| 20 | 87.2 | 12.8 |
| 30 | 81.8 | 18.2 |
| 40 | 76.4 | 23.6 |
| 50 | 71 | 29 |
| 60 | 65.6 | 34.4 |
| 70 | 60.2 | 39.8 |
| 80 | 54.8 | 45.2 |
| 90 | 49.4 | 50.6 |

4. For each equation or inequality below, write what the question you are trying to solve, use the table or graph above to estimate the value or range of values that satisfy the given condition. Then explain what each solution tells you.

a. $f(x) = 2 + 0.54(40)$

$t = 40$

$f(t) = 23.6$

In 2000, the % of female docs was 23.6%.

b. $98 - 0.54t = 90$

$m(t) = 90$

$t \approx 15$

In the year 1975, 90% of docs were male.

c. $98 - 0.54t = 2 + 0.54t$

$t \approx 90$

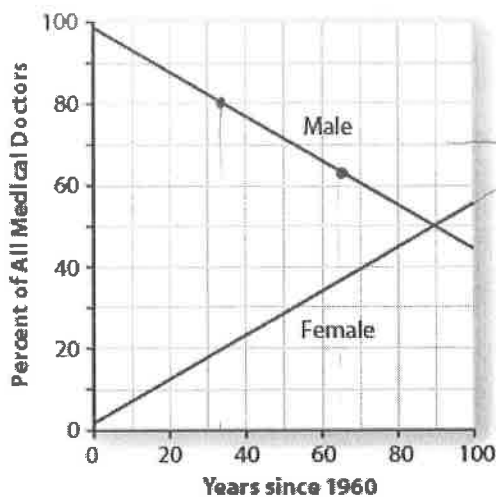
In 2050, the % of female & male docs will be the same.

d. $98 - 0.54t > 80$

$t < 33$

Prior to 1993, the % of male docs was more than 80.

Trends in Gender



| t | $m(x)$ | $f(x)$ |
|-----|--------|--------|
| 0 | 98 | 2 |
| 10 | 92.6 | 7.4 |
| 20 | 87.2 | 12.8 |
| 30 | 81.8 | 18.2 |
| 40 | 76.4 | 23.6 |
| 50 | 71 | 29 |
| 60 | 65.6 | 34.4 |
| 70 | 60.2 | 39.8 |
| 80 | 54.8 | 45.2 |
| 90 | 49.4 | 50.6 |

e. $m(x) = 98 - 0.54(65)$

$t = 65$

$M(t) \approx 64$

In the year 2025, the % of docs that are male will be about 64%.

f. $2 + 0.54t < 29$

$f(t) < 29$

$t < 50$

The % of female docs was less than 29 until the year 2010.

% male = 80 % female = 20

$80 = 4 \cdot 20$

g. $98 - 0.54t = 4(2 + 0.54t)$

$t \approx 33$

In the year 1993, the % of male docs was quadruple the % of female docs.

h. $70 = 2 + 0.54t$

$f(t) = 70$ $t \approx 120 \rightarrow$ extrapolation

The % of female docs will be 70 in approximately the year 2080.

Put equations on this page again ($m(t) + f(t)$).

5. Write equations and inequalities to represent the following questions. Then use tables and graphs on your calculator to estimate the solutions for the equations and inequalities and explain what your solutions mean in the context of the situation. *Do not solve algebraically.*

- a. When will the percent of male doctors decline to 15%?

$$98 - 0.54t = 15$$

$$t \approx 153$$

The % of male docs will be 15 in 2113.

- b. When will the percent of female doctors reach 63%?

$$2 + 0.54t = 63$$

$$t \approx 113$$

In the year 2073, the % of female docs will be 63.

- c. How long will the percent of male doctors be above 40%?

$$98 - 0.54t > 40$$

$$t < 108$$

Until the year 2068, the % of male docs will be more than 40.

- d. What percent of U.S. medical doctors will be female in 2020?

$$f(t) = 34.4\%$$

$$t = 60$$

The % of docs that are female will be 34.4 in 2020.

- e. Assuming that the trends continue, when will the percentage of male doctors be less than the percent of female doctors?

$$98 - 0.54t < 2 + 0.54t$$

$$t > 90$$

Beyond the year 2050, the % of male docs will be less than the % of female docs.