

The percentage of male and female teachers in Ohio starting in the year 1970 are approximated by the equations below.

Percentage of male teachers: $m(t) = 22 + 0.25t$

Percentage of female teachers: $f(t) = 78 - 0.25t$

1. Write equations or inequalities that would help you answer the questions below. **Do not solve the equation or inequality.**

- a. In 1986, what percent of teachers would be male? How many female?

$$t=16 \quad m(16) = 22 + 0.25(16)$$

$$f(16) = 78 - 0.25(16)$$

- b. When will the percent of female teachers fall to 60%?

$$78 - 0.25t = 60$$

- c. When will half of the teachers be male?

$$22 + 0.25t = 50 \quad \text{or} \quad 78 - 0.25t = 50$$

2. Write questions about trends in percent of male and female teachers that can be answered by solving the following equations and inequalities:

a. $78 - 0.25t = 20$

When will the % of female teachers be 20%?

b. $78 - 0.25(24) = f(24)$

1970 + 24 = 1994 What was the % of female teachers in 1994?

c. $m(90) = 22 + 0.25(90)$

What will be the % of male teachers in 2060?

d. $56 > 22 + 0.25t$

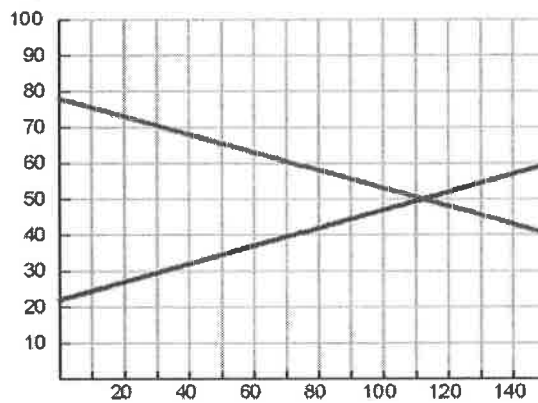
In what years is/was the % of male teachers less than 56%?

e. $78 - 0.25t > 22 + 0.25t$

When is/was the % of female teachers greater than the % of male teachers?

t	$f(t) = 78 - 0.25t$	$m(t) = 22 + 0.25t$
0	78	22
4	77	23
8	76	24
12	75	25
16	74	26
20	73	27
24	72	28
28	71	29
32	70	30
36	69	31
40	68	32
44	67	33
48	66	34
52	65	35
56	64	36
60	63	37
64	62	38
68	61	39
72	60	40

t	$f(t) = 78 - 0.25t$	$m(t) = 22 + 0.25t$
76	59	41
80	58	42
84	57	43
88	56	44
92	55	45
96	54	46
100	53	47
104	52	48
108	51	49
112	50	50
116	49	51
120	48	52
124	47	53
128	46	54
132	45	55
136	44	56



3. Use the table and graph to find the solutions to the equations and inequalities below then write a sentence explaining what each solution means.

a. $29 = 22 + 0.25t$

$t = 28$ In 1998, the % of male teachers was 29%.

b. $62 < 78 - 0.25t$

$t < 64$ Until the year 2034, the % of female teachers will be greater than 62%.
 $1970 + 64 = 2034$

c. $m(t) = 22 + 0.25(116)$

In 2086, the % of teachers that are male will be 51%.

d. $78 - 0.25t = 22 + 0.25t$

$t = 112$

The % of male & female teachers will be the same in 2082.

Solve the following systems by using substitution and elimination at least once each.

$$4. \begin{cases} 3x + y = -6 \\ 30x + 3y = -60 \end{cases} \rightarrow \begin{cases} -4x - 3y = 18 \\ 30x + 3y = -60 \end{cases}$$

$$21x = -42$$

$$x = -2$$

$$3(-2) + y = -6$$

$$-6 + y = -6$$

$$y = 0$$

$$\boxed{(-2, 0)}$$

$$6. \begin{cases} y = -x + 16 \\ y = -7x - 8 \end{cases}$$

$$\begin{array}{r} -x + 16 = -7x - 8 \\ +7x \quad -16 \quad +7x \quad -16 \end{array}$$

$$6x = -24$$

$$x = -4$$

$$y = -(-4) + 16$$

$$y = 4 + 16$$

$$y = 20$$

$$\boxed{(-4, 20)}$$

$$5. \begin{cases} y = 4x - 8 \\ 2x + 3y = -3 \end{cases}$$

$$2x + 3(4x - 8) = -3$$

$$2x + 12x - 24 = -3$$

$$14x = 21$$

$$x = \frac{21}{14} = \frac{3}{2}$$

$$y = 4\left(\frac{3}{2}\right) - 8$$

$$y = -2$$

$$\boxed{\left(\frac{3}{2}, -2\right)}$$

$$7. \begin{cases} 4(3x - 5y = -18.4) \rightarrow 12x - 20y = -73.6 \\ 3(-4x + 2y = -24) \rightarrow -12x + 6y = -72 \end{cases}$$

$$-14y = -145.6$$

$$y = 10.4$$

$$3x - 5(10.4) = -18.4$$

$$3x - 52 = -18.4$$

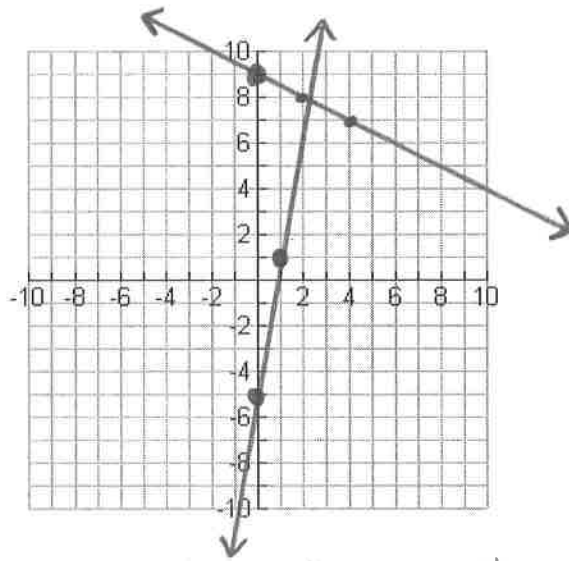
$$3x = 33.6$$

$$x = 11.2$$

$$\boxed{(11.2, 10.4)}$$

Solve the systems below by graphing.

8.
$$\begin{cases} v(x) = 6x - 5 \\ -\frac{1}{2}x + 9 = w(x) \end{cases}$$



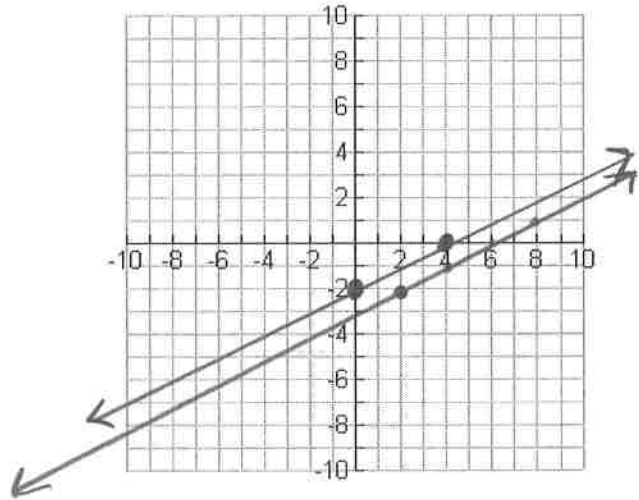
Solution: About (2.2, 7.9)
(Estimate)

9.
$$\begin{cases} 6x - 12y = 24 \\ y + 2 = \frac{1}{2}(x - 2) \end{cases}$$

x-int: $6x = 24$
 $x = 4$
 $(4, 0)$

y-int: $-12y = 24$
 $y = -2$
 $(0, -2)$

$(2, -2), m = \frac{1}{2}$



Solution: No solution

The lines are parallel!
(never intersect)