SCORE

Algebra
With Classified
answer book

8

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17- Simultaneous Linear Equations

1. (a) The line $y = 5$ crosses $y = 2x - 3$ at P.
   Write down the coordinates of P.

   Answer (.................. , ...)

   (b) Solve these simultaneous equations.

   $$x + y = 7$$
   $$x - y = {}^-3$$

   (b) $x =$ _____ $y =$ _____

2. Solve, algebraically, these simultaneous euations...

$x + y = 7$
$2x - y = 2$

x ....

y ....

3. Solve the simultaneous equations

   Show clear algebraic working.

   $4x + 5y = 13$
   $x + y = 3$

$x =$ ....

$y =$ ....

4. Lina wants to solve this pair of simultaneous equations.

$$4t - r = 13 \quad \text{and} \quad 2t + r = 2$$

This is her working. Part of the working is covered.

$$4t - r = 13 \quad \text{and} \quad 2t + r = 2$$

?

$$6t = 15$$

$$t = 2\frac{1}{2}$$

Which of these is most likely to be the covered part of Lina's working?

Put a ring around your answer.

$(4t - r) = 13$	$(4t - r) = 13$	$(2t + r) = 13$
$-(2t + r) = 2$	$+(2t + r) = 2$	$-(4t - r) = 2$

$$2(2t + r) = 2 \times 2 \qquad\qquad 2(4t - r) = 2 \times 13$$

5. Solve these simultaneous equations using an algebraic method.

You **must** show your working. $3x + 7y = 18$

$$x + 2y = 5$$

$x =$ _____ $y =$ _____

6. Solve these simultaneous equations using an algebraic method.

You **must** show your working. $4x + 3y = 21$

$$2x + y = 8$$

$x =$ .... $y =$ ....

7. (a) Here are the equations of four straight lines.

| $y = 6$ | $y = 2$ | $x = 3$ | $x = 4$ |

The intersections of these straight lines form the vertices of a rectangle.

What is the **perimeter** of this rectangle?

_____ units

(b) The diagonals of the rectangle have these equations:
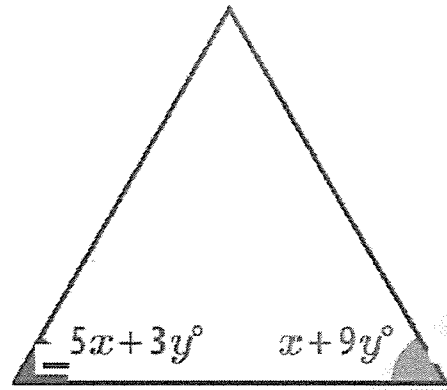
$$y = 4x - 10$$
$$y = -4x + 18$$

Find where these lines intersect.

(_____ , _____)

8. An equilateral triangle is shown below.

Work out the values of x and y.

not drawn accurately

$5x + 3y°$ $x + 9y°$

Answer: $x =$ _____ ° $y =$ _____ °

9. Solve these simultaneous equations using an algebraic method.

$y = 3x$ and $y = x + 4$

$x =$ _____ $y =$ _____

10. Solve these simultaneous equations using an algebraic method.

$2x + y = 28$ and $4y = x + 22$

$x =$ _____ $y =$ _____

11. Solve these simultaneous equations using an algebraic method.

$$x + y = 7$$
$$y = 2x - 8$$

$x = \underline{\hspace{2cm}}$ $\qquad$ $y = \underline{\hspace{2cm}}$

12. The line $y = 2$ crosses $y = 2x - 3$ at P. Write down the coordinates of P.

Answer (.................. , ...)

13. Hana and Sara solve the simultaneous equations $y = 3(x + 5)$ and $2x + y = 0$.
Read what they say.

Hana — I think the answers are $x = -3$ and $y = 6$.

I think the answers are $x = 3$ and $y = -6$. Sara

Is either of them correct? Explain your answer and show your working.

....

14. Here are six equation cards.

$6(e-2)=f+7$ $2a-b=15$ $3c+2d=32$ $a=3b$ $3c-d=2$ $3f-6e=3$

Show that

a)   the mean value of a, b, c, d, e and f is 7

b)   the range in the values of a, b, c, d, e and f is 8.

15. Look at these equations.

$$11 = 6 + a$$

$$a + 7 = 10 + b$$

Use **both** equations to work out the value of b

$b =$ ....

16. a) The difference between two positive numbers is 40
The second number is twice the first number.
What are the two numbers?

Answer ....and...............................

b) Two numbers add up to 30

The second number is 50% bigger than the

first number. What are the **two** numbers?

18- Solving Simultaneous Equations Graphically

1. The graphs of the straight lines with equations $3y + 2x = 12$ and $y = x - 1$ have been drawn on the grid.
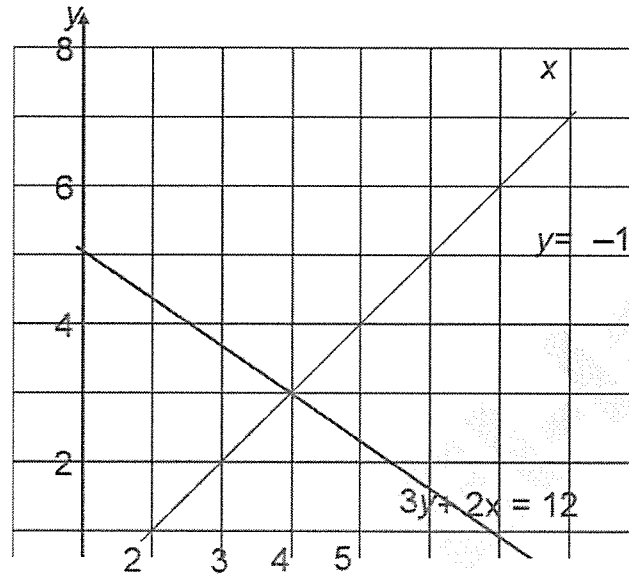
Use the graphs to solve the simultaneous equations

$3y + 2x = 12$
$y = x - 1$

$x =$ ....

$y =$ ....

2. The straight line $y + 2x = 5$ has been drawn on the grid.
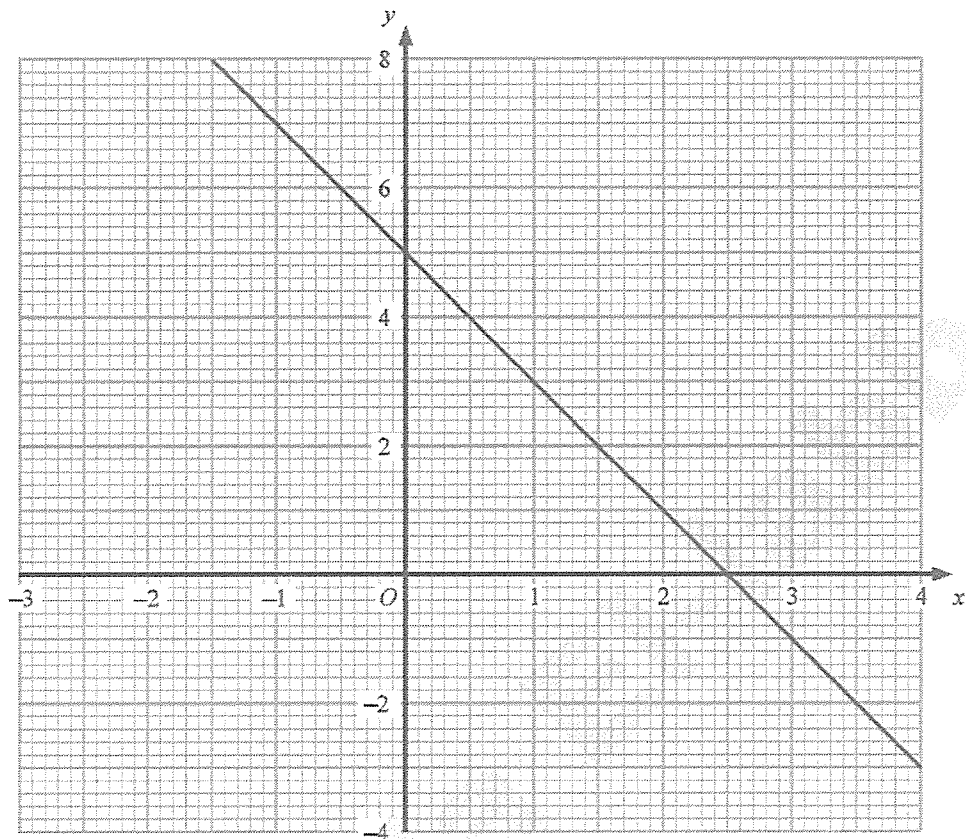
(a) Complete this table of values for $y = 2x - 1$

x	−1	0	1	2	3	4
y		−1		3	5	

(b) On the grid, draw the graph of $y = 2x - 1$

(c) Use your diagram to solve the simultaneous equations

$y + 2x = 5$

$y = 2x - 1$

$x = $ ....

$y = $ ....

3.
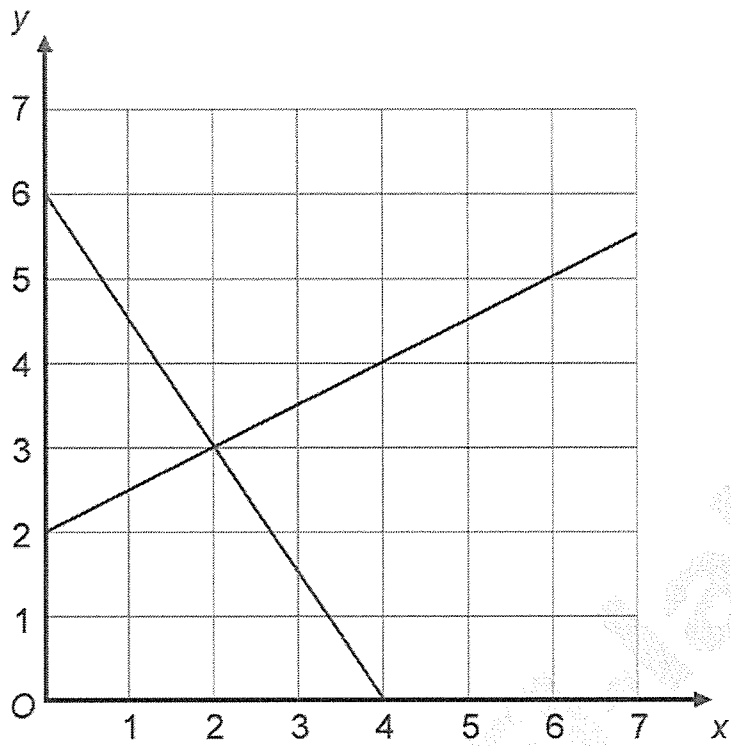
The diagram shows graphs of $y = \frac{1}{2} x + 2$

and

$$2y + 3x = 12$$

Use the diagram to solve the simultaneous equations

$$y = \frac{1}{2} x + 2$$

$$2y + 3x = 12$$

x = ... y = ...

4. The graphs of the straight lines with equations $y + x = 6$ and $y = x$ have been drawn on the grid.

Use the graphs to solve the simultaneous equations
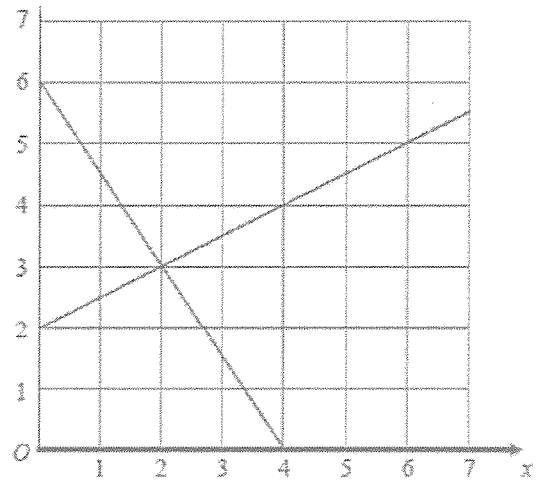
a) $y + x = 6$

b) $y = x$

$x = $ ....

$y = $ ....
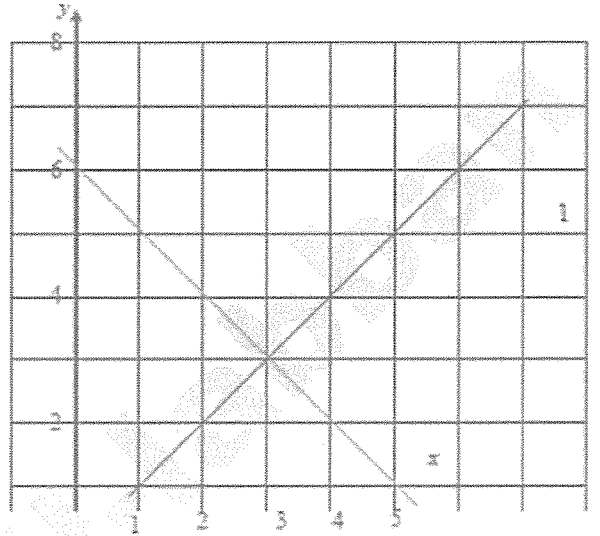
5. The diagram shows graphs of $by = \frac{1}{2}x + 2$

and

$$ay + 3x = 12$$

Find the value of a and b

b-.............................

a=.............................

6. Use the diagram to work out the solution to these simultaneous equations

$y = 2x + 1$
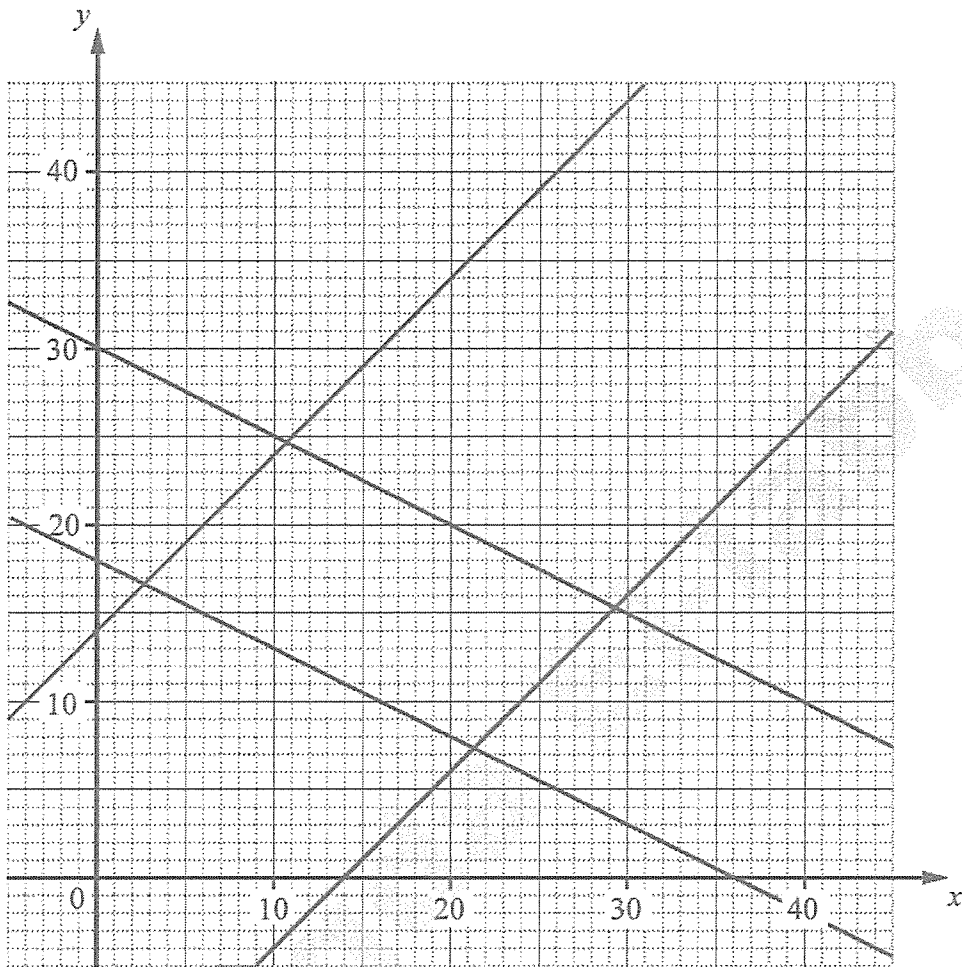
$y = -x + 7$
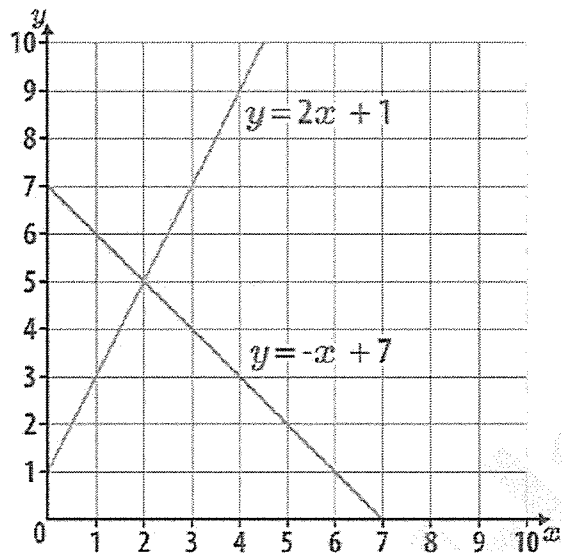
Answer: x =_____ y =_____

7. The graph of $2x + y = 8$ is plotted on the grid below.

Use the graph to find the solution to the simultaneous equations
$2x + y = 8$ and $y = x - 1$
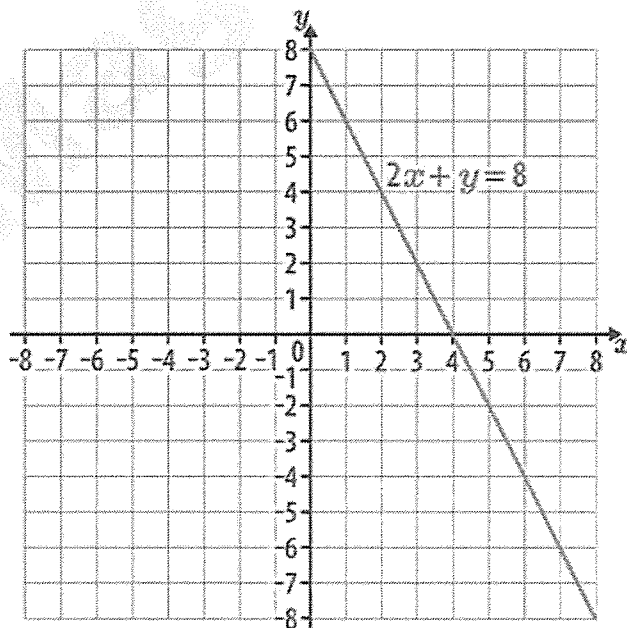
Answer: x =_____ y =_____

8. Here is a graph of four lines.

The equations of the lines are

$$y = x + 14$$
$$y = x - 14$$
$$x + 2y = 36$$
$$x + 2y = 60$$

Use the graph to find an approximate solution to these simultaneous equations.

$y = x + 14$ and $x + 2y = 36$

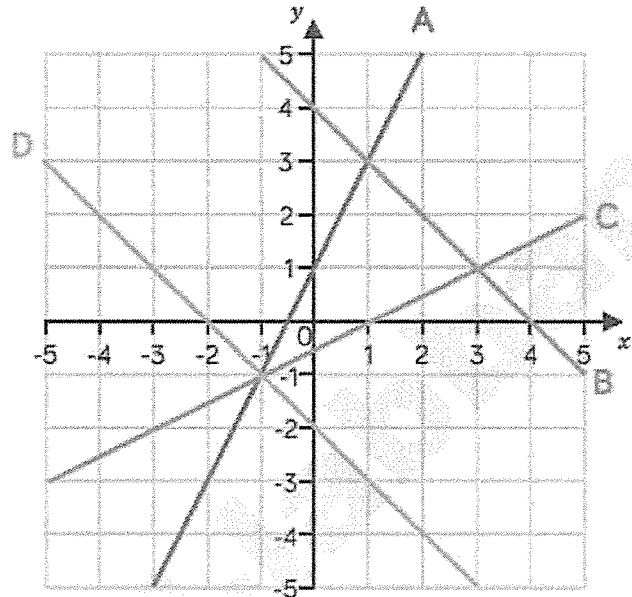$x =$ .... and $y =$ ....

9. Which equation belongs to which line?

$y = 2x + 1$

$2y = x - 1$

$x + y = 4$

$x + y + 2 = 0$

How many pairs of simultaneous equations can you solve using the graphs?

....

10. Which equation belongs to which line?

$y = 2x + 1$

$x + y = 4$

....
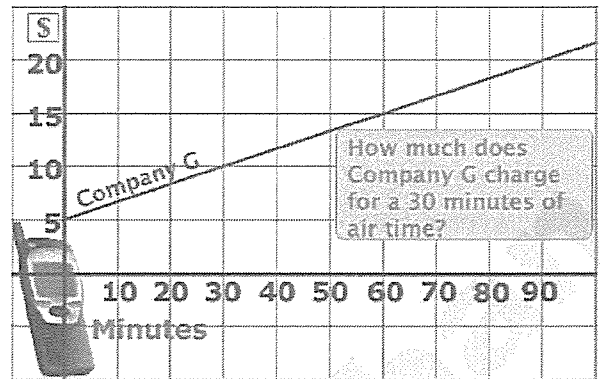
$2y = x - 1$

$x + y + 2 = 0$

....
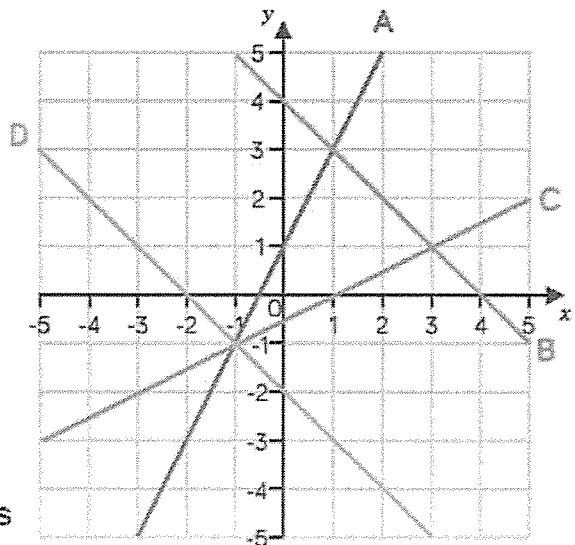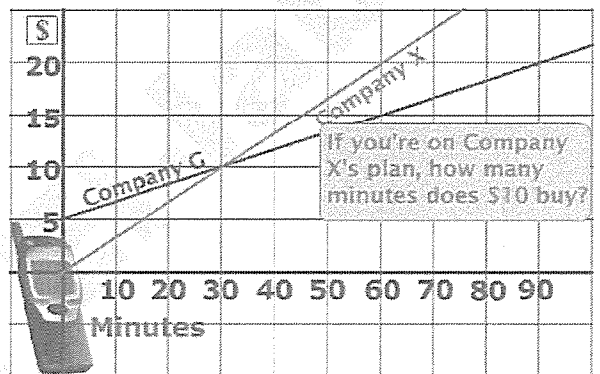

How many pairs of simultaneous equations can you solve using the graphs?

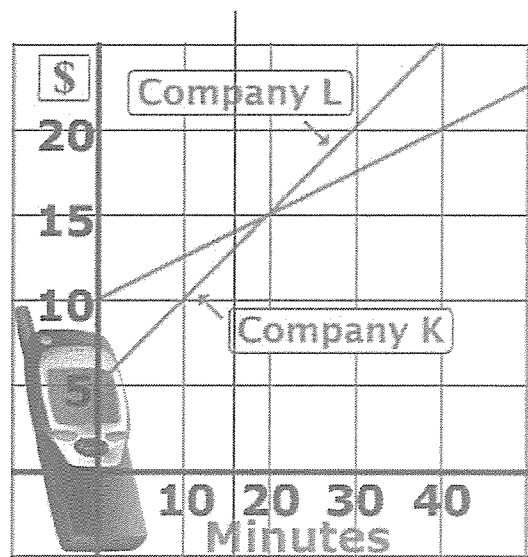11. a. How much does Cell Phone Company G charge for 30 minutes of usage?

How much does Company G charge for a 30 minutes of air time?

b. If you're on Company X's plan, how many minutes does $10 buy?

c. How much does Company G charge at 0 minutes?

If you're on Company X's plan, how many minutes does $10 buy?

d. At how many minutes do both companies charge the same amount?

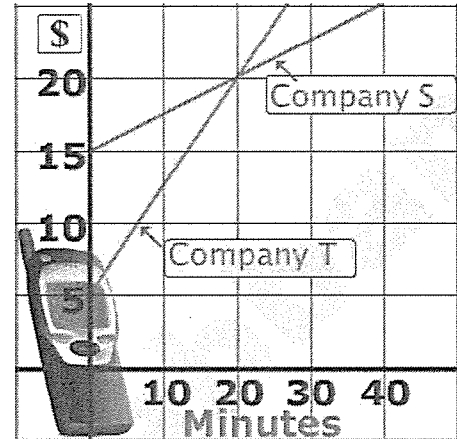e. What is the solution to this system of linear equations?

(g) The table below represents the <u>monthly</u> rate of two cell-phone companies.

At how many minutes, do these companies charge the same amount?

Think-Pair-Share:

When does company T offer a better value?

When does company S offer a better value?

_____

_____

_____

If you chose a plan for yourself, which one would you use and why?

_____

_____

_____

_____

_____