

## Inequalities and Graphs Revision

1) Solve for  $x$  and represent your solution on a number line

a)  $2x - 1 > 7$

b)  $-1 \leq x + 7 < 10$

c)  $5 - 2x < 8$

d)  $x^2 > 25$

e)  $3x^2 \leq 48$

f)  $3x - 1 < 5x + 7 \leq 10$

g)  $x^2 - x - 12 > 0$

h)  $x^2 + 6x + 8 \leq 0$

2) Show by shading the region that satisfies these sets of inequalities:  
Label the region R

a)  $-2 \leq x \leq 4$        $-3 \leq y \leq -1$

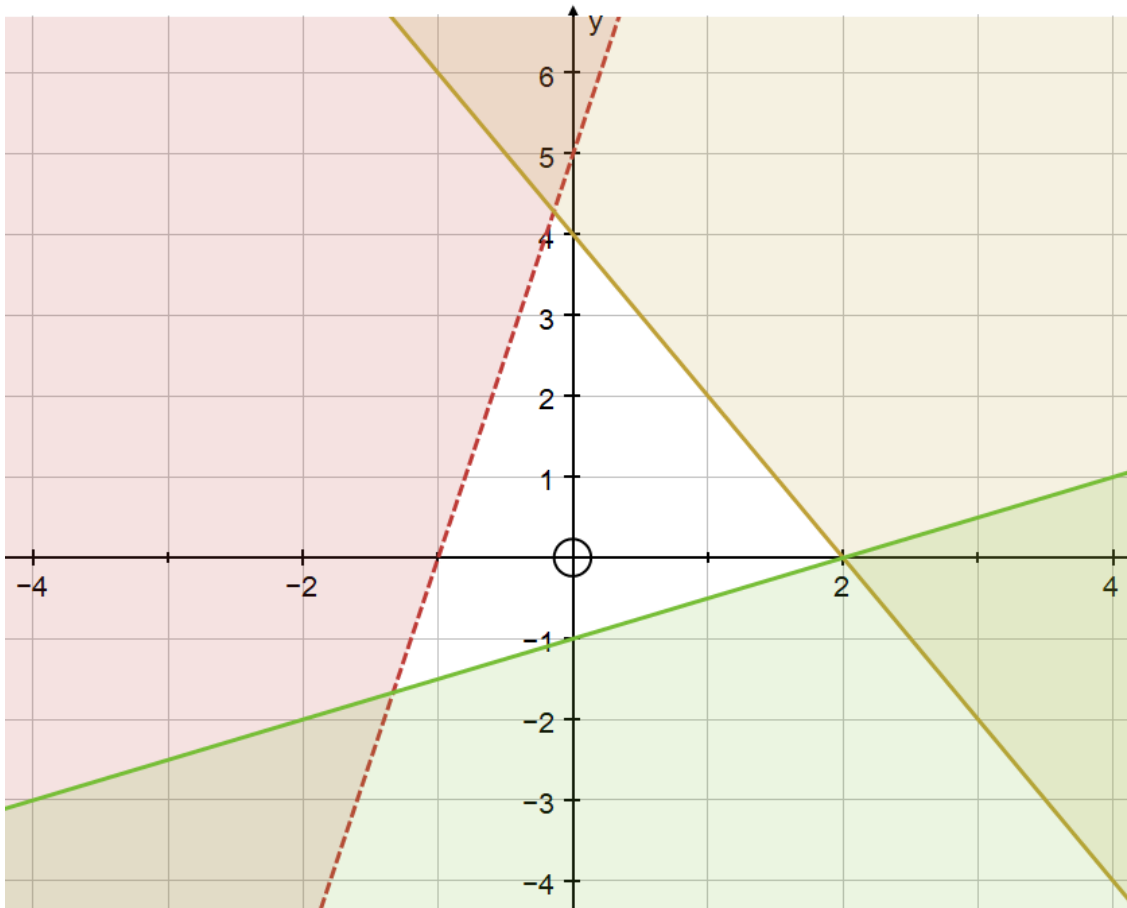
b)  $y \leq 4$                $y \leq 4x - 2$                $y \geq 2x$

c)  $y \geq 1$                $y \geq -2x$                $y + 2x \leq 4$

3) Write down the inequalities to describe the **unshaded** region



b)



- 4) The number of live yeast in a flask after pitching,  $N$  in millions, is related to the time,  $t$  in hours by the formula:

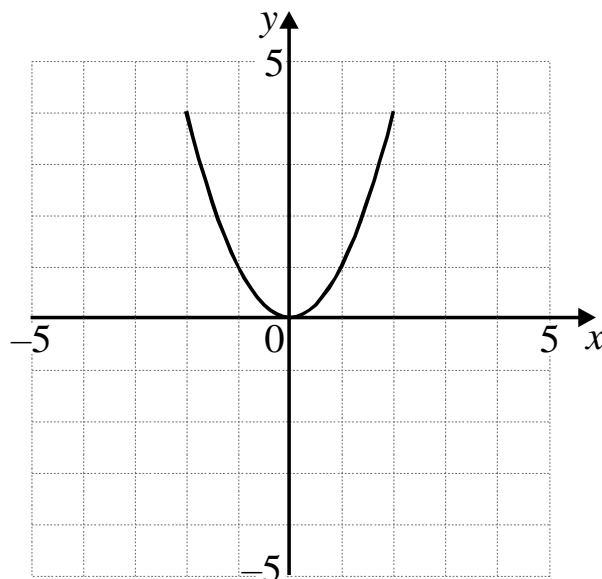
$$N = 3 + 2^{0.3t}$$

- What is the initial number of yeast?
- Plot a graph of the number of live yeast cells against time for the first 10 hours after pitching.
- Use your graph to estimate how long it would take to have 6 million live yeast cells
- By drawing a tangent, find the average growth rate of the yeast after 2 hours

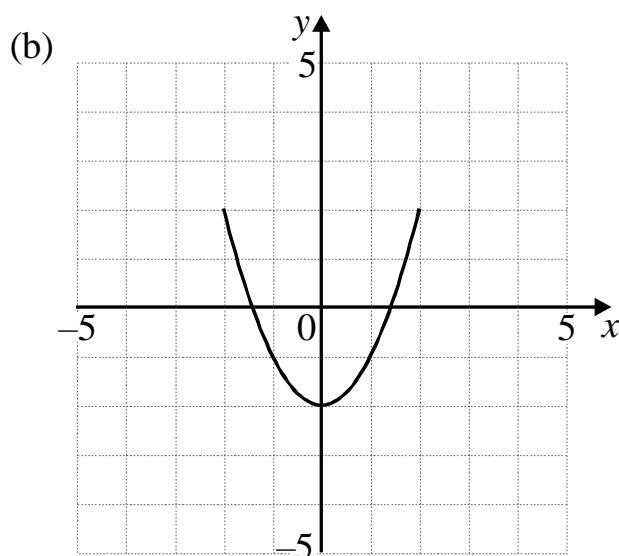
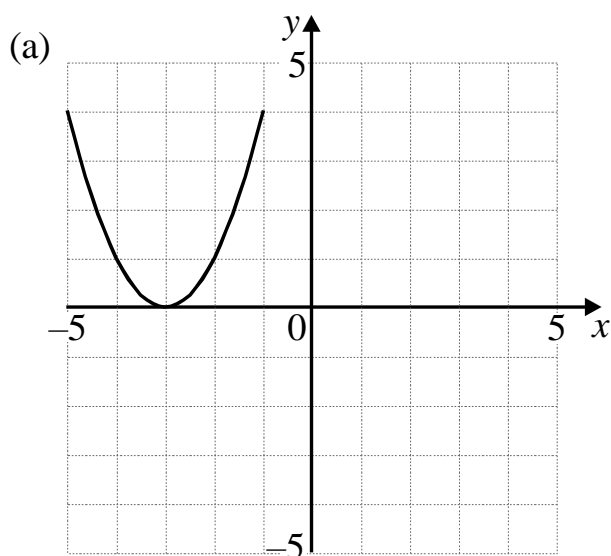
- 5) Draw a sketch of the following graphs:

- |                  |                    |                      |
|------------------|--------------------|----------------------|
| a) $y = \sin(x)$ | b) $y = -\sin(x)$  | c) $y = \sin(x) + 1$ |
| d) $y = x^2$     | e) $y = (x - 2)^2$ | f) $y = x^2 + 3$     |

6) The diagram below shows  $y = x^2$

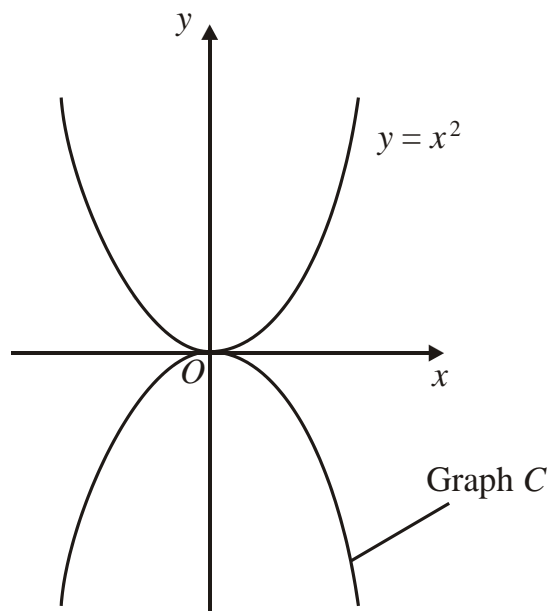


Write down the equation of these two translations of  $y = x^2$



7) The diagram to the right shows  $y = x^2$  and Graph C.

Find the equation of Graph C



8) Draw the graph of  $y = x^2 - 4x$  for  $-4 \leq x \leq 4$  using the table below

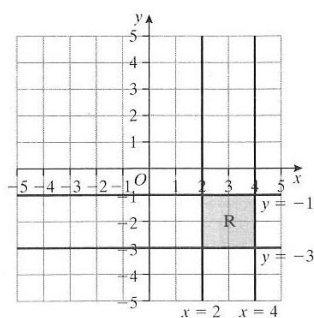
| x | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
|---|----|----|----|----|---|---|---|---|---|
| y |    |    |    |    |   |   |   |   |   |

- a) Use your graph to find approximate solutions to  $x^2 - 4x = -1$   
 b) What line would you draw on your graph to solve  $x^2 - 5x + 3 = 0$   
 c) Use your graph to find approximate solutions to  $x^2 - 3x - 2 = 0$

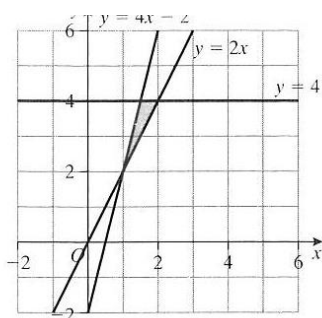
### Answers

- 1a)  $x > 4$  b)  $-8 \leq x < 3$  c)  $x > -\frac{3}{2}$  d)  $x < -5, x > 5$  e)  $-4 \leq x \leq 4$  f)  $-4 < x < \frac{3}{5}$   
 g)  $x < -3, x > 4$  h)  $-4 \leq x \leq -2$

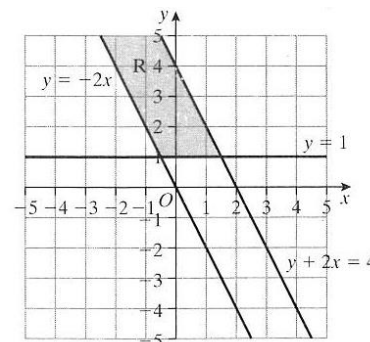
2a)



b)



c)

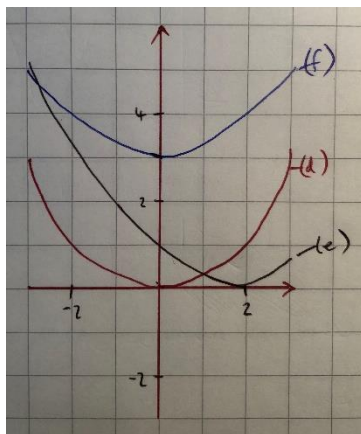
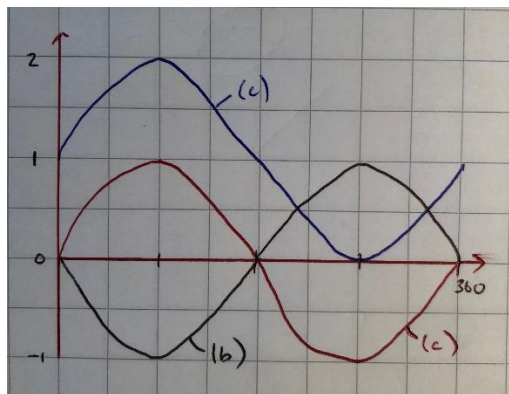


3a)  $y < 7 - x, y > 1, x > 3$  b)  $y < 5x + 5, y \geq \frac{1}{2}x - 1, y \leq 4 - 2x$

4a) 4 million b) y values in table; 4, 4.23, 4.52, 4.87, 5.30, 5.83, 6.48, 7.29, 8.28, 9.50, 11

c) ~5.3 hours d) ~0.3 million/hr

5)



6a)  $y = (x + 3)^2$  b)  $y = x^2 - 2$  7)  $y = -x^2$  8) y values; 32, 21, 12, 5, 0, -3, -4, -3, 0

a) ~0.3, 3.7 b)  $y = x - 3$  c) ~-0.6, 3.6