GRAPHICAL INEQUALITIES

Answer all questions. Show your working.

MAIN TASK

1. $y > 2x + 1$, $y < 4$, $x > -1$

2. $y -x + 3$, $y 0$, $x 2$

3. $y 3x - 2$, $y x + 4$, $x 0$

4. $y < 0.5x + 2$, $y > -x + 1$, $x < 3$

5. $y -2x + 5$, $y 3$, $x 1$

6. $y > x - 1$, $y < 2x + 2$, $x 4$

7. $y 4x - 3$, $y -x + 2$, $x -2$

8. $y < 3$, $y > -2x + 1$, $x > -3$

9. $y x$, $y 2x + 1$, $x 5$

10. $y > -3x + 4$, $y < x + 5$, $x 0$

11. $y 2$, $y x - 3$, $x 3$

12. $y > -2$, $y < 0.5x + 1$, $x -4$

13. $y -x + 2$, $y 3x - 1$, $x 1$

14. $y < 4x - 2$, $y > -3x + 5$, $x 2$

15. $y 0$, $y -x + 6$, $x -1$

16. $y > x + 1$, $y < 3x - 1$, $x 4$

17. $y 5$, $y 2x - 3$, $x 0$

18. $y < -x + 4$, $y > x - 2$, $x 3$

19. $y -2x + 3$, $y x + 2$, $x -2$

20. $y > 0$, $y < 4x + 1$, $x -1$

21. $y x + 3$, $y -x - 1$, $x 2$

22. $y > -3x + 2$, $y < 2x - 1$, $x 1$

23. $y -1$, $y 0.5x + 2$, $x 4$

24. $y < x + 5$, $y > -2x + 3$, $x 0$

25. $y 2x - 4$, $y -x + 5$, $x -3$

26. $y > -4$, $y < 3x + 2$, $x 3$

27. $y 3x - 2$, $y -2x + 1$, $x 0$

28. $y < 5$, $y > x - 3$, $x 6$

29. $y -0.5x + 1$, $y 2x + 3$, $x -2$

30. $y > x - 4$, $y < -x + 6$, $x 5$

MASTERY OF MATHEMATICS

1. A farmer has a field where he grows two crops, A and B. The profit from crop A is £2 per unit and from crop B is £3 per unit. The inequalities y ≤ -x + 6, y ≤ 2x + 2, and x ≥ 0 represent the constraints on the units of crops A and B he can grow. What is the maximum profit?

2. A shop sells two types of pens, X and Y. The cost constraints are given by y ≥ x - 2, y ≤ -0.5x + 5, and x ≥ 0. If pen X costs £1 and pen Y costs £2, what is the minimum total cost?

3. A garden has a rectangular lawn with constraints y ≥ 1, y ≤ 4, x ≥ 0, and x ≤ 3. What is the area of the lawn?

4. A company produces two products, P and Q. The production constraints are y ≤ x + 3, y ≤ -2x + 8, and y ≥ 0. If product P sells for £5 and product Q for £3, what is the maximum revenue?

5. A student has study time constraints given by y ≤ -x + 4, y ≥ x + 2, and x ≥ 0. If the student needs at least 3 hours of study, what is the feasible region?

6. A bakery makes cakes and pastries. The constraints are y ≤ 2x + 4, y ≤ -x + 6, and y ≥ 0. If cakes cost £4 and pastries £2, what is the maximum number of items they can make with a budget of £20?

7. A car park has constraints y ≤ -x + 3, y ≤ x + 1, and x ≥ 0. What is the maximum number of cars that can be parked if x and y must be integers?

8. A factory produces two goods with constraints y ≥ 0.5x - 1, y ≤ -x + 7, and x ≥ 0. If the profit is £2 per unit for good A and £1 per unit for good B, what is the maximum profit?

9. A school trip has constraints y ≤ 3x + 2, y ≤ -2x + 10, and y ≥ 0. If each student costs £10 and each teacher costs £20, what is the minimum cost for the trip?

10. A sports club has training constraints y ≥ x - 3, y ≤ -0.5x + 6, and x ≥ 0. If each session costs £5 for members and £10 for non-members, what is the maximum cost?

GRAPHICAL INEQUALITIES

MAIN TASK

1	y > 2x + 1, y < 4, x > -1	y > 2x + 1, y < 4, x > -1
2	y ≤ -x + 3, y ≥ 0, x ≤ 2	y ≤ -x + 3, y ≥ 0, x ≤ 2
3	y ≥ 3x - 2, y ≤ x + 4, x ≥ 0	y ≥ 3x - 2, y ≤ x + 4, x ≥ 0
4	y < 0.5x + 2, y > -x + 1, x < 3	y < 0.5x + 2, y > -x + 1, x < 3
5	y ≥ -2x + 5, y ≤ 3, x ≥ 1	y ≥ -2x + 5, y ≤ 3, x ≥ 1
6	y > x - 1, y < 2x + 2, x ≤ 4	y > x - 1, y < 2x + 2, x ≤ 4
7	y ≤ 4x - 3, y ≥ -x + 2, x ≥ -2	y ≤ 4x - 3, y ≥ -x + 2, x ≥ -2
8	y < 3, y > -2x + 1, x > -3	y < 3, y > -2x + 1, x > -3
9	y ≥ x, y ≤ 2x + 1, x ≤ 5	y ≥ x, y ≤ 2x + 1, x ≤ 5
10	y > -3x + 4, y < x + 5, x ≥ 0	y > -3x + 4, y < x + 5, x ≥ 0
11	y ≤ 2, y ≥ x - 3, x ≤ 3	y ≤ 2, y ≥ x - 3, x ≤ 3
12	y > -2, y < 0.5x + 1, x ≥ -4	y > -2, y < 0.5x + 1, x ≥ -4
13	y ≥ -x + 2, y ≤ 3x - 1, x ≥ 1	y ≥ -x + 2, y ≤ 3x - 1, x ≥ 1
14	y < 4x - 2, y > -3x + 5, x ≤ 2	y < 4x - 2, y > -3x + 5, x ≤ 2
15	y ≥ 0, y ≤ -x + 6, x ≥ -1	y ≥ 0, y ≤ -x + 6, x ≥ -1
16	y > x + 1, y < 3x - 1, x ≤ 4	y > x + 1, y < 3x - 1, x ≤ 4
17	y ≤ 5, y ≥ 2x - 3, x ≥ 0	y ≤ 5, y ≥ 2x - 3, x ≥ 0
18	y < -x + 4, y > x - 2, x ≤ 3	y < -x + 4, y > x - 2, x ≤ 3
19	y ≥ -2x + 3, y ≤ x + 2, x ≥ -2	y ≥ -2x + 3, y ≤ x + 2, x ≥ -2
20	y > 0, y < 4x + 1, x ≥ -1	y > 0, y < 4x + 1, x ≥ -1

21	y ≤ x + 3, y ≥ -x - 1, x ≤ 2	y ≤ x + 3, y ≥ -x - 1, x ≤ 2
22	y > -3x + 2, y < 2x - 1, x ≥ 1	y > -3x + 2, y < 2x - 1, x ≥ 1
23	y ≥ -1, y ≤ 0.5x + 2, x ≤ 4	y ≥ -1, y ≤ 0.5x + 2, x ≤ 4
24	y < x + 5, y > -2x + 3, x ≥ 0	y < x + 5, y > -2x + 3, x ≥ 0
25	y ≥ 2x - 4, y ≤ -x + 5, x ≥ -3	y ≥ 2x - 4, y ≤ -x + 5, x ≥ -3
26	y > -4, y < 3x + 2, x ≤ 3	y > -4, y < 3x + 2, x ≤ 3
27	y ≤ 3x - 2, y ≥ -2x + 1, x ≥ 0	y ≤ 3x - 2, y ≥ -2x + 1, x ≥ 0
28	y < 5, y > x - 3, x ≤ 6	y < 5, y > x - 3, x ≤ 6
29	y ≥ -0.5x + 1, y ≤ 2x + 3, x ≥ -2	y ≥ -0.5x + 1, y ≤ 2x + 3, x ≥ -2
30	y > x - 4, y < -x + 6, x ≤ 5	y > x - 4, y < -x + 6, x ≤ 5

1	A farmer has a field where he grows two crops, A and B. The profit from crop A is £2 per unit and from crop B is £3 per unit. The inequalities $y \leq -x + 6$, $y \leq 2x + 2$, and $x \geq 0$ represent the constraints on the units of crops A and B he can grow. What is the maximum profit?	£12
2	A shop sells two types of pens, X and Y. The cost constraints are given by $y \geq x - 2$, $y \leq -0.5x + 5$, and $x \geq 0$. If pen X costs £1 and pen Y costs £2, what is the minimum total cost?	£0
3	A garden has a rectangular lawn with constraints $y \geq 1$, $y \leq 4$, $x \geq 0$, and $x \leq 3$. What is the area of the lawn?	9 square units
4	A company produces two products, P and Q. The production constraints are $y \leq x + 3$, $y \leq -2x + 8$, and $y \geq 0$. If product P sells for £5 and product Q for £3, what is the maximum revenue?	£19
5	A student has study time constraints given by $y \geq -x + 4$, $y \leq x + 2$, and $x \geq 0$. If the student needs at least 3 hours of study, what is the feasible region?	The region where $y \geq 3$ and within the given constraints
6	A bakery makes cakes and pastries. The constraints are $y \leq 2x + 4$, $y \leq -x + 6$, and $y \geq 0$. If cakes cost £4 and pastries £2, what is the maximum number of items they can make with a budget of £20?	6 items

7	A car park has constraints $y \geq -x + 3$, $y \leq x + 1$, and $x \geq 0$. What is the maximum number of cars that can be parked if x and y must be integers?	4 cars
8	A factory produces two goods with constraints $y \geq 0.5x - 1$, $y \leq -x + 7$, and $x \geq 0$. If the profit is £2 per unit for good A and £1 per unit for good B, what is the maximum profit?	£10
9	A school trip has constraints $y \leq 3x + 2$, $y \leq -2x + 10$, and $y \geq 0$. If each student costs £10 and each teacher costs £20, what is the minimum cost for the trip?	£60
10	A sports club has training constraints $y \geq x - 3$, $y \leq -0.5x + 6$, and $x \geq 0$. If each session costs £5 for members and £10 for non-members, what is the maximum cost?	£60