Linear Inequalities in One Unknown
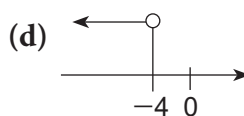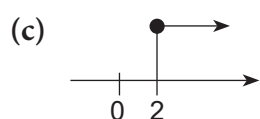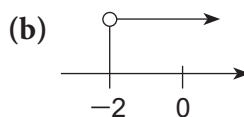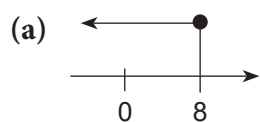
1. Write down an inequality in x corresponding to each of the following diagrams.

    (a)

    (b)

    (c)

    (d)

2. Represent the solutions of each of the following inequalities graphically.
    (a) $x < 7$

    (b) $x \geqslant -2$

    (c) $x \leqslant -5$
    (d) $x < 0$

    (e) $x > -6$

    (f) $x < -5$

3. Rewrite each of the following statements as an inequality.
    (a) a is less than -5.

    (b) The sum of x and 100 is not greater than 5.

    (c) fours times of w is greater than or equal to -11.

    (d) p is at most -2.

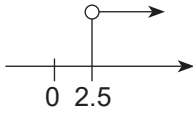4. Rewrite each of the following statments as an inequality.

    (a) x is less than or equal to -7.

    (b) The sum of two times of y and 5 is less than -2.
    (c) p is at least -3.
    (d) q is not less than -1.

5. **(a)** Write down an inequality in x represented by the following graph.

0 2.5

(b) Is $\dfrac{7}{3}$ a solution of the inequality?

(c) Is $\dfrac{5}{2}$ a solution of the inequality?

(d) Is $\dfrac{11}{4}$ a solution of the inequality?

6. Fill in each of the following blanks with '>' or '<'. If $a > b > 0$, then

   (a) $-8a$ _____ $-8b$

   (b) $-5 + b$ _____ $-5 + a$

   (c) $2a - 4$ _____ $2b - 4$

   (d) $\dfrac{1}{3a}$ _____ $\dfrac{1}{3b}$

   (e) $\dfrac{1}{4b + 1}$ _____ $\dfrac{1}{4a + 1}$

   (f) $-\dfrac{5}{a}$ _____ $-\dfrac{5}{b}$

Solve the inequalities and represent the solutions graphically. (7–10)

7. $2a + 8 \geqslant 23 - 3a$.

8. $\dfrac{2y - 11}{-3} > 7$.

9. $3(2k - 3) \leqslant 5(k + 4)$.

10. $\dfrac{7x + 5}{3} \leqslant 2x + 7$.

11. If the sum of two consecutive odd numbers is smaller than 74, find the maximum values of the smaller odd number.

12. The figure shows a rectangle, where the length is 5 cm longer than three times its width. If the perimeter of the rectangle is not greater than 52 cm, find the range of the width.