

Name: _____

Exam Style Questions

Quadratic Inequalities



Corbettmaths

Equipment needed: Calculator, pen, pencil & ruler

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 378



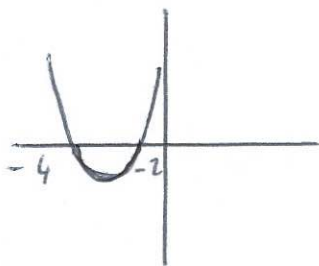
Answers and Video Solutions



1. Solve the inequality $x^2 + 6x + 8 < 0$



$$(x+2)(x+4) = 0$$
$$x = -2 \text{ or } x = -4$$



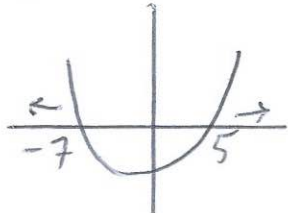
$$-4 < x < -2$$

(3)

2. Solve the inequality $x^2 + 2x - 35 > 0$



$$(x+7)(x-5) = 0$$
$$x = -7 \text{ or } x = 5$$



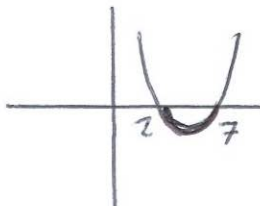
$$x < -7 \text{ or } x > 5$$

(3)

3. Solve the inequality $x^2 - 9x + 14 \leq 0$



$$(x-7)(x-2) = 0$$
$$x = 7 \text{ or } x = 2$$



$$2 \leq x \leq 7$$

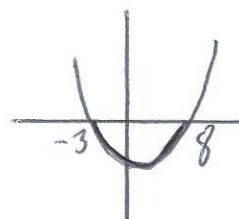
(3)

4. Solve the inequality $x^2 - 5x - 24 < 0$



$$(x-8)(x+3) = 0$$

$$x = 8 \text{ or } x = -3$$



$$-3 < x < 8$$

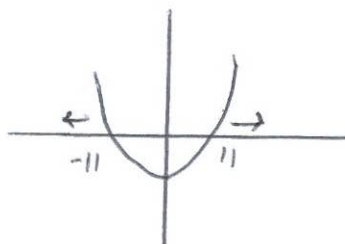
(3)

5. Solve the inequality $x^2 - 121 > 0$



$$(x-11)(x+11) = 0$$

$$x = 11 \text{ or } x = -11$$



$$x < -11 \text{ or } x > 11$$

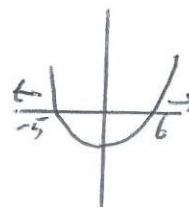
(3)

6. Solve the inequality $x^2 - x - 30 \geq 0$



$$(x-6)(x+5) = 0$$

$$x = 6 \text{ or } x = -5$$



$$x \leq -5 \text{ or } x \geq 6$$

(3)

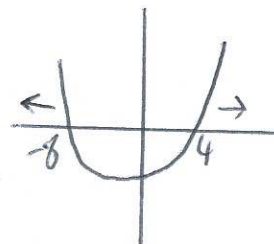
7. Solve the inequality $x^2 > 4(8 - x)$

$$x^2 > 32 - 4x$$

$$x^2 + 4x - 32 > 0$$

$$(x+8)(x-4) = 0$$

$$x = -8 \text{ or } x = 4$$



$$\underline{x < -8 \text{ or } x > 4}$$

(4)

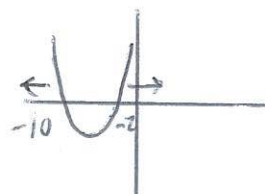
8. Solve the inequality $3x^2 - 5x - 1 < 4x^2 + 7x + 19$

$$0 < x^2 + 12x + 20$$

$$x^2 + 12x + 20 > 0$$

$$(x+2)(x+10) = 0$$

$$x = -2 \text{ or } x = -10$$



$$\underline{x < -10 \text{ or } x > -2}$$

(4)

9. Solve the inequality $\frac{5x}{x^2 + 4} \leq 1$

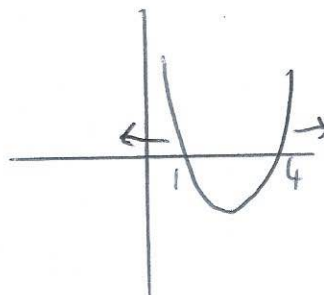
$$5x \leq x^2 + 4$$

$$0 \leq x^2 - 5x + 4$$

$$x^2 - 5x + 4 \geq 0$$

$$(x-1)(x-4) = 0$$

$$x = 1 \text{ or } x = 4$$



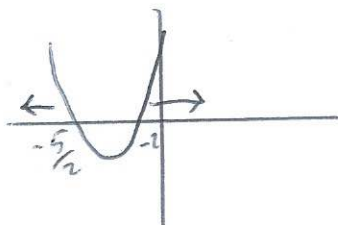
$$\underline{x \leq 1 \text{ or } x \geq 4}$$

(4)

10. Solve the inequality $2x^2 + 9x + 10 > 0$

$$(2x+5)(x+2) = 0$$

$$x = -\frac{5}{2} \text{ or } x = -2$$



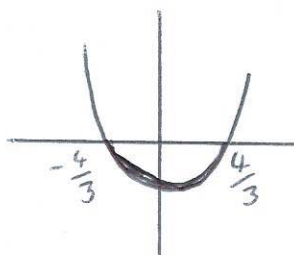
$$\underline{x < -\frac{5}{2} \text{ or } x > -2}$$

(4)

11. Solve the inequality $9x^2 - 16 \leq 0$

$$(3x - 4)(3x + 4) = 0$$

$$x = \frac{4}{3} \text{ or } x = -\frac{4}{3}$$



$$-\frac{4}{3} \leq x \leq \frac{4}{3}$$

(3)

12. Solve the inequality $25 < x^2 < 64$

$$25 < x^2$$

$$0 < x^2 - 25$$

$$(x-5)(x+5) = 0$$

$$x = 5 \text{ or } x = -5$$



$$x < -5 \text{ or } x > 5$$

$$x^2 < 64$$

$$x^2 - 64 < 0$$

$$(x-8)(x+8) = 0$$

$$x = 8 \text{ or } x = -8$$



$$-8 < x < 8$$

$$-8 < x < -5 \text{ or } 5 < x < 8$$

$$-8 < x < -5$$

or

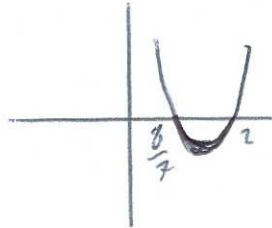
$$5 < x < 8$$

(3)

13. Solve the inequality $7x^2 - 22x + 16 \leq 0$

$$(7x - 8)(x - 2) = 0$$

$$x = \frac{8}{7} \text{ or } x = 2$$



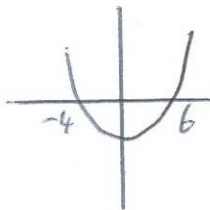
$$\frac{8}{7} \leq x \leq 2$$

(4)

14. Find the set of values of x for which $x^2 - 2x - 24 < 0$ **and** $12 - 5x \geq x + 9$

$$(x - 6)(x + 4) = 0$$

$$x = 6 \text{ or } x = -4$$



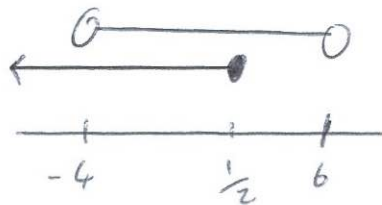
$$-4 < x < 6$$

$$12 \geq 6x + 9$$

$$3 \geq 6x$$

$$6x \leq 3$$

$$x \leq \frac{1}{2}$$

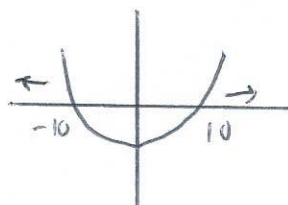


$$-4 < x \leq \frac{1}{2}$$

(6)

15. Find the set of values of x for which $x^2 - 100 > 0$ **and** $x^2 + 8x - 105 > 0$

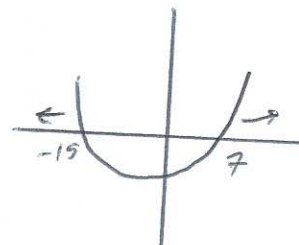
$$(x-10)(x+10) = 0$$



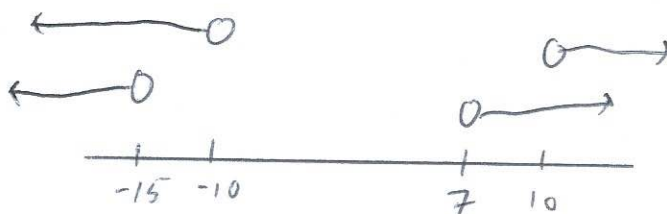
$$x < -10 \text{ or } x > 10$$

$$(x-7)(x+15) = 0$$

$$x = 7 \text{ or } x = -15$$



$$x < -15 \text{ or } x > 7$$



$$x < -15 \text{ or } x > 10$$

$$\underline{x < -15 \text{ or } x > 10}$$

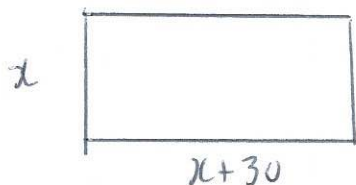
(5)

16. The width of a rectangular field is x metres.
The length of the field is 30m longer than the width.

The perimeter of the field is less than 500m.

The area of the field is greater than 4000m^2

By writing suitable inequalities, find the possible values of x .



$$x + x + x + 30 + x + 30 < 500$$

$$4x + 60 < 500$$

$$4x < 440$$

$$x < 110$$

$$x(x + 30) > 4000$$

$$x^2 + 30x > 4000$$

$$x^2 + 30x - 4000 > 0$$

$$(x + 80)(x - 50) = 0$$

$$x = -80 \text{ or } x = 50$$



$$x < -80$$

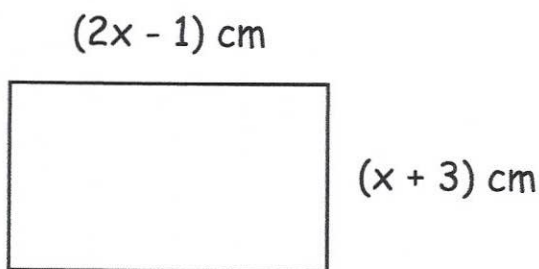
X

$$\text{or } x > 50$$

$$50 < x < 110$$

(5)

17. The area of this rectangle is greater than 40cm^2



Work out the range of possible values of x

$$(2x - 1)(x + 3) > 40$$

$$2x^2 + 6x - x - 3 > 40$$

$$2x^2 + 5x - 3 > 40$$

$$2x^2 + 5x - 43 > 0$$

$$2x^2 + 5x - 43 = 0$$

$$a = 2 \quad b = 5 \quad c = -43$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

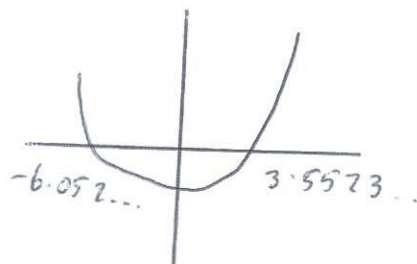
$$x = \frac{-5 \pm \sqrt{25 - (-344)}}{4}$$

$$x = \frac{-5 \pm \sqrt{369}}{4}$$

$$x = 3.5523\dots$$

or

$$x = -6.05234\dots$$



$$x < -6.052\dots \quad \times$$

or

$$x > 3.5523\dots \quad \checkmark$$

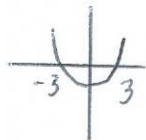
$$x > 3.5523$$

(5)

18. Find the set of values of x for which $x^2 - 9 < 0$ **and** $3x^2 - 19x + 20 < 0$

$$x^2 - 9 < 0$$

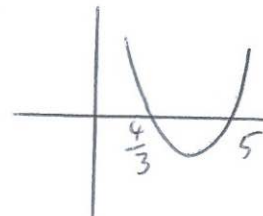
$$(x-3)(x+3) < 0$$



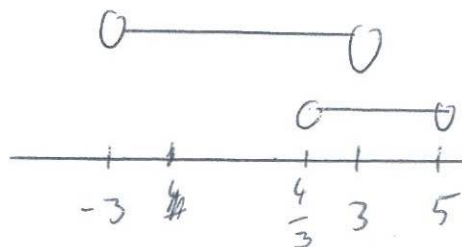
$$-3 < x < 3$$

$$(3x - 4)(x - 5) < 0$$

$$x = \frac{4}{3} \text{ or } x = 5$$



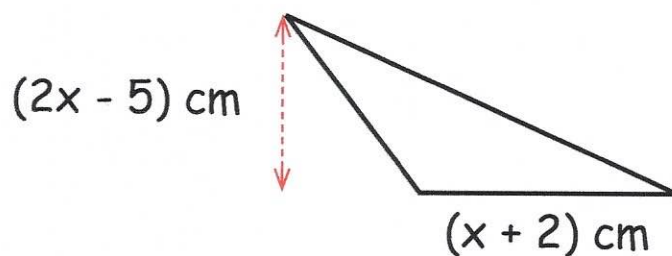
$$\frac{4}{3} < x < 5$$



$$\frac{4}{3} < x < 3$$

(5)

19.



(a) Write an expression for the area of the triangle.

$$\frac{1}{2} (x+2)(2x-5)$$

$$\frac{\frac{1}{2} (x+2)(2x-5)}{(1)}$$

The area of the triangle is greater than 80.5cm^2

(b) Show that $2x^2 - x - 171 > 0$

$$\frac{1}{2} (x+2)(2x-5) > 80.5$$

$$(x+2)(2x-5) > 161$$

$$2x^2 - 5x + 4x - 10 > 161$$

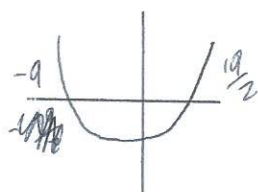
$$2x^2 - x - 171 > 0$$

(2)

(c) Find the possible range of values of x .

$$(2x - 19)(x + 9) = 0$$

$$x = \frac{19}{2} \text{ or } x = -9$$



$$\frac{x > \frac{19}{2}}{(2)}$$