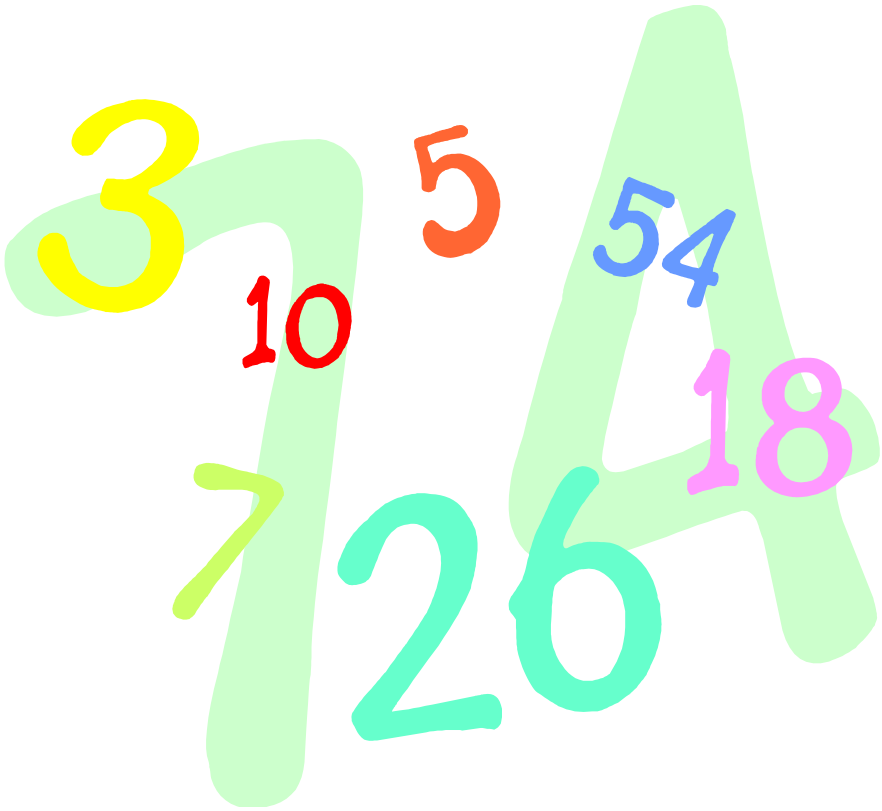
Maths

Higher Tier

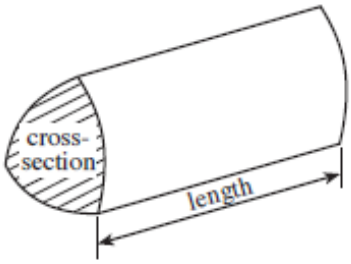


Algebra Revision

Inequalities

Formula List

Volume of prism = area of cross-section × length

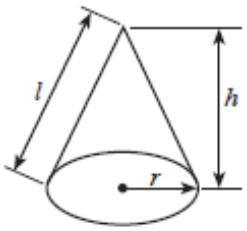


Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$

Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$

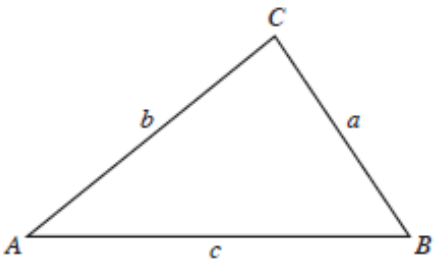


In any triangle ABC

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle $= \frac{1}{2}ab\sin C$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

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

Standard Deviation

Standard deviation for a set of numbers

$x_1, x_2, \ldots, x_n$, having a mean of $\bar{x}$ is given by

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n}} \quad \textbf{or} \quad s = \sqrt{\frac{\sum x^2}{n} - \left\{\frac{\sum x}{n}\right\}^2}$$

1. Solve

(a) $x + 13 > 5x - 3$

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(b) $3x + 4 < 5x - 4$

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(c) $7 - 2x \leq 4x + 10$

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(d) $10x - 2 \geq 6x$

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(e) $4x + 3 < 6x + 7$

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(f) $3(x + 1) > 7x + 27$

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(g) $3(2x - 4) > 2(2x + 1)$

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(h) $9(x - 1) \leq 4(2x - 3)$

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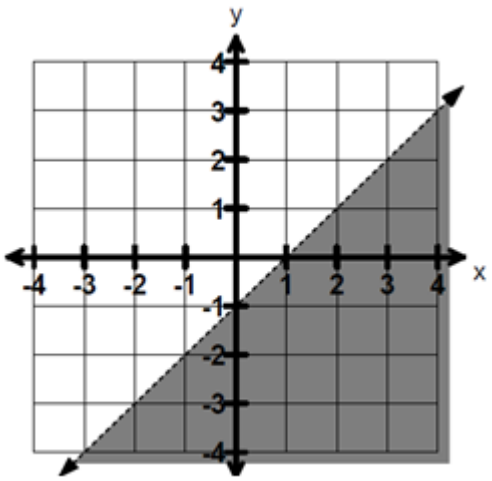
2. State the inequality satisfied by the un-shaded region.

(a)



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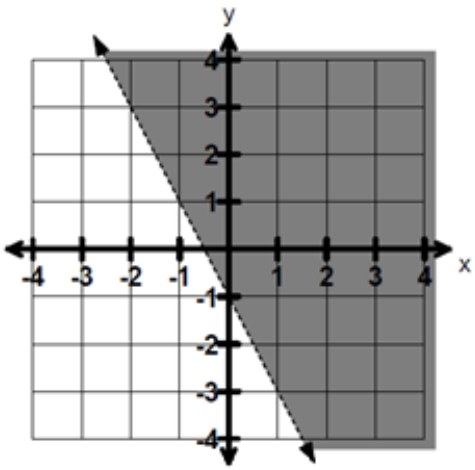
(b)



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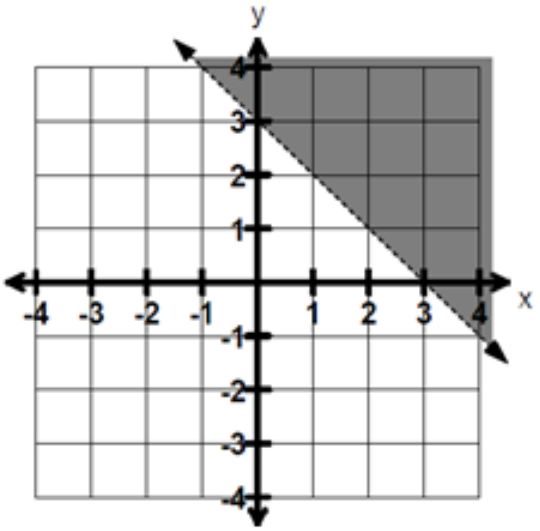
(c)



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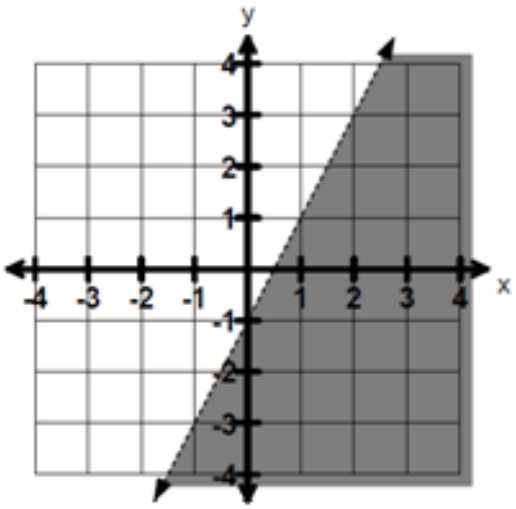
(d)



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3. (a) Solve the inequality

$2z + 2 \geq 7$

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(b) Write down the smallest integer value of z which satisfies the inequality

$2z + 2 \geq 7$

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4. $5x + 2y < 10$

x and y are both integers.

Write down two possible pairs of values that satisfy this inequality.

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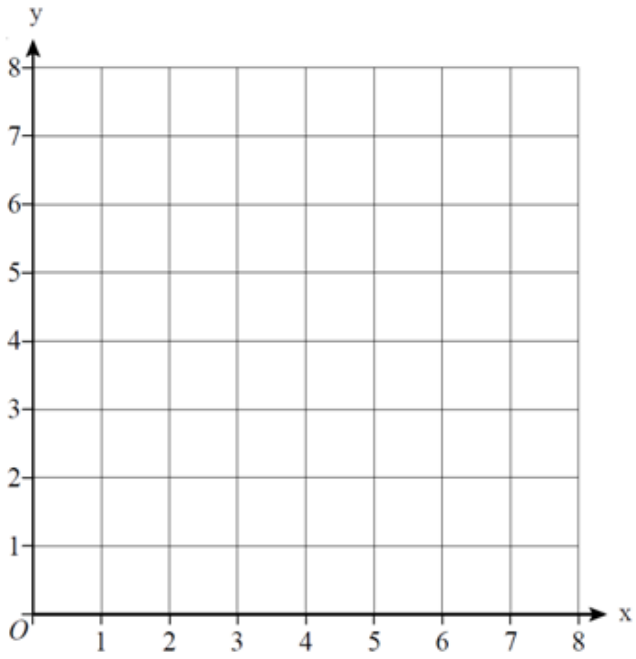
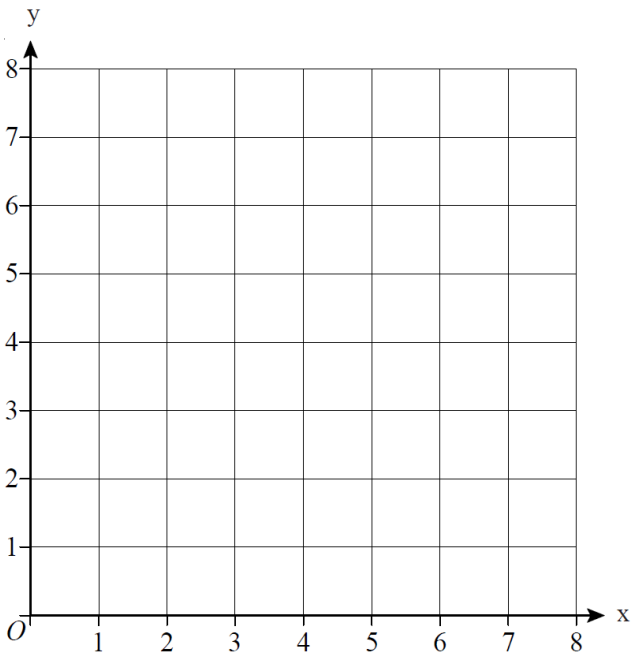
5. On the grid below, draw straight lines and use shading to show the region **R** that satisfies the inequalities $x \geq 1$ $y \geq x$ $x + y \leq 7$



6. On the grid below, draw straight lines and use shading to show the region **R** that satisfies the inequalities $y \geq x + 1$ $y \leq 5$ $x \geq 1$



7. On the graph paper provided, draw the region which satisfies all the following inequalities.

$$x + y \leq 8$$

$$y \geq 2x + 5$$

$$x \geq -3$$

Make sure you clearly indicate the region that represents your answer

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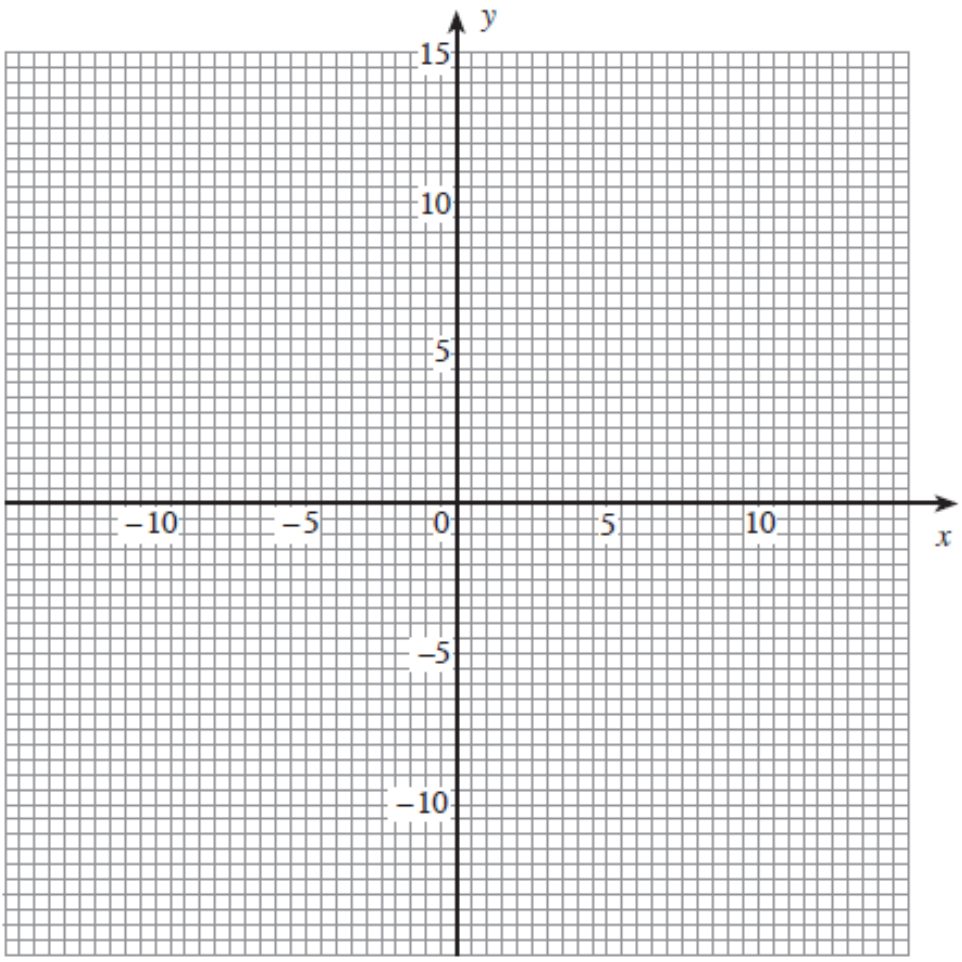

8. On the graph paper provided, draw the region which satisfies all the following inequalities.

$$y \leq x + 1$$

$$y \geq -2$$

$$x \leq 3$$

Make sure you clearly indicate the region that represents your answer

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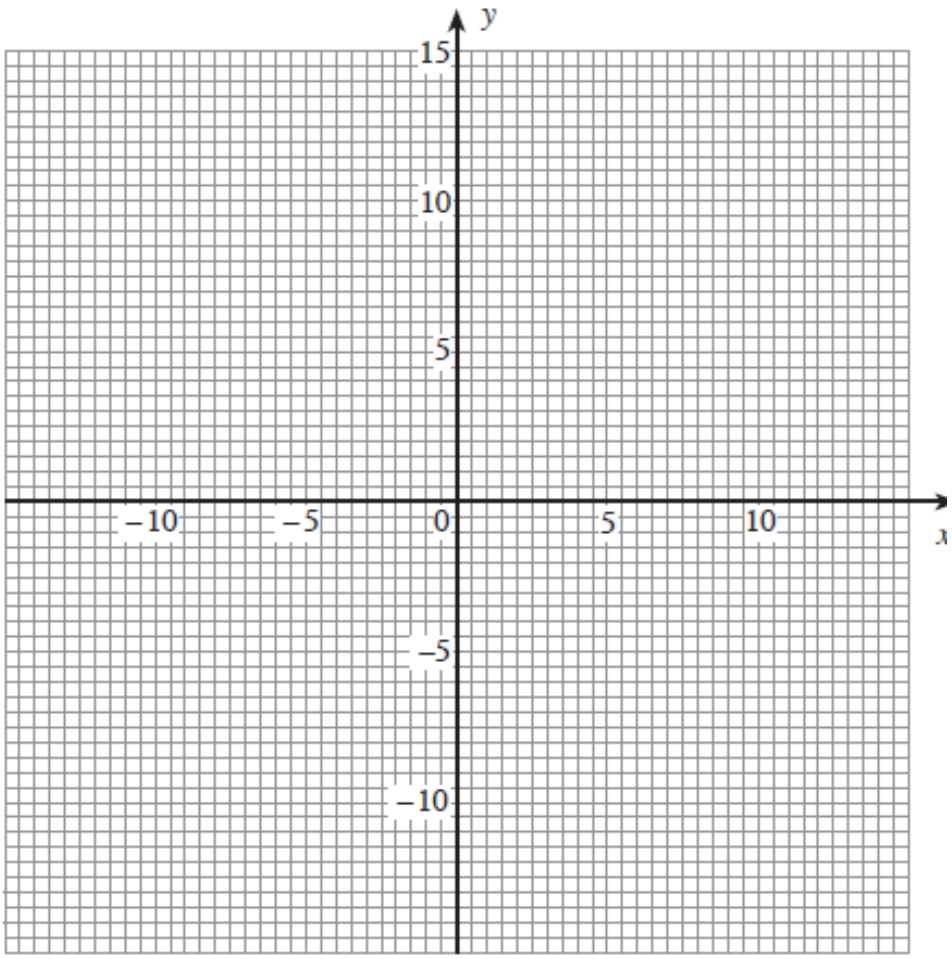

9. On the graph paper provided, draw the region which satisfies all the following inequalities.

$$y \leq 6$$

$$y \geq x - 3$$

$$x \leq 4$$

$$y \geq -3x$$

Make sure you clearly indicate the region that represents your answer

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