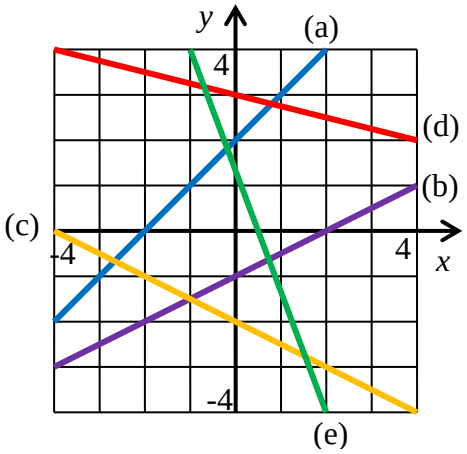
Section 1: Points and straight lines

Exercise level 1

1. (a) For the points A(3, 1) and B(7, 4) calculate
   (i) the gradient of AB
   (ii) the gradient of a line perpendicular to AB
   (iii) the midpoint of AB
   (iv) the distance AB
   (b) Repeat part (a) for the points A(-2, 9) and B(3, -1)

2. Sketch the following lines.
   (i) $y = x + 3$ (ii) $y = 2x - 1$ (iii) $x + y = 5$
   (iv) $4y = x + 12$ (v) $3y + x + 6 = 0$ (vi) $5y = 15 - 2x$

3. Find the equations of the lines (a)-(e) in the diagram below.



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4. A quadrilateral has vertices A(3, 5), B(9, 7), C(10, 4) and D(4, 2).
   Show that ABCD is a rectangle.

5. The following questions are about the coordinate geometry of the following points: A (2, 2), B (3, 1), C (4, 4), D (5, 5), E (6, -1), F (7, -3)
   (i) Find the lengths of the line segments AE and AB.
   (ii) Find the gradients of each of AB, AC, AE, DE, and CD.
   (iii) State which of the lines in part (ii) are parallel or perpendicular to each other.
   (iv) What is the angle between AC and BF?