First name: _____ Last name: _____ Student ID: _____

# Coordinates Homework

## Basic problems

### 1. Find an equation of a line in y = mx + b form that satisfies each statement.

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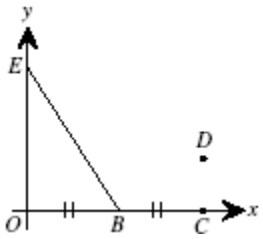
|---|---|
| 1. m = -19 and $b = \frac{5}{12}$ | 2. A line with 2 points: (-9, 11), (2, -11) |
| 3. m = 13; a point on the line: (-6, -89) | 4. A line with 2 points: (3, 18), (4, 23) |
| 5. A line with 2 points: (2, -49), (4, -83) | 6. $m = \frac{5}{8}$; a point on the line:$(4, 7\frac{1}{2})$ |
| 7. m = 3 and b = 19 | 8. A line with 2 points: (-8, 93), (1, -15) |

**Challenge problems**

1. Triangle ABC has its sides determined in the following way: side AB by line $3x - 2y + 3 = 0$; side BC by line $x + y - 14 = 0$; and side AC by line $y = 3$. If the point P is chosen so that PA = PB = PC, determine the equation of the line containing A and P.

2. Two identical triangles each have an area of 24. Their vertices are determined by the intersection of the lines with equations $y = -4$, $x = 0$ and $y = -\frac{3}{4}x + b$. Determine the two possible values for b.

3. In the diagram, point E has coordinates (0, 2), and B lies on the positive x-axis so that $BE = \sqrt{7}$. Also, point C lies on the positive x-axis so that BC = OB. If point D lies in the first quadrant such that $\angle CBD = 30^0$ and $\angle BCD = 90^0$, what is the length of ED?



4. Triangle *ABC* has vertices *A(* 0, 0), *B(*9, 0) and *C*(0, 6)□. The points *P* and *Q* lie on side *AB* such that *AP* = *PQ* = *QB*. Similarly, the points *R* and *S* lie on side *AC* so that *AR* = *R S*= *SC*.
The vertex *C* is joined to each of the points *P* and *Q*. In the same way, *B* is joined to *R* and *S*.

(a) Determine the equation of the line through the points *R* and *B*.

(b) Determine the equation of the line through the points *P* and *C*.

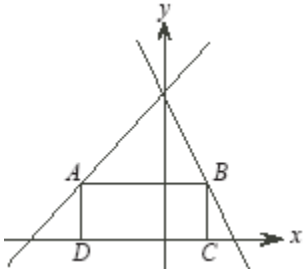
(c) The line segments *PC* and *RB* intersect at *X*, and the line segments *QC* and *SB* intersect at *Y*. Prove that the points *A*, *X* and *Y* lie on the same straight line.

5. Square *ABCD* has vertices *A(*0, 0), *B*(0, 8), *C*(8, 8), and *D(*8, 0). The points *P(*0, 5) and *Q*(0, 3) are on side *AB*, and the point *F*(8, 1) is on side *CD*.

(a) What is the equation of the line through *Q* parallel to the line through *P* and *F*?

(b) If the line from part (a) intersects *AD* at the point *G*, what is the equation of the line through *F* and *G*?

6. In the diagram, ABCD is a rectangle with A on the line y = x + 10, B on the line y = −2x + 10, and C and D on the x-axis. If AD = 4, what is the area of rectangle ABCD?



7. In the diagram, $\angle ABC = \angle BCD = 90^0$. Also, AB = 9, BC = 24 and CD = 18. The diagonals AC and BD of quadrilateral ABCD meet at E.

(a) Determine the area of the quadrilateral ABCD.
(b) Show that the ratio DE : EB = 2 : 1.
(c) Determine the area of triangle DEC.
(d) Determine the area of triangle DAE.