Evaluation 3

1. Given two points A(–2, 1) and B(4, –3), determine

a) the distance between A and B. $\sqrt{52}$

b) the coordinates of point M, mid-point of segment AB. **M(1, –1)**

c) the coordinates of point P that divides segment AB in a ratio of 2 : 1 from A.
$P\left(2, \frac{-5}{3}\right)$

d) the slope of the line AB. $\frac{-2}{3}$

e) the equation of the line AB. $y = -\frac{2}{3}x - \frac{1}{3}$

2. What kind of triangle is ABC with vertices A(1, 2), B(2, 4) and C(3, 1)? Justify your answer.

m$\overline{AB}$ = $\sqrt{5}$; m$\overline{AC}$ = $\sqrt{5}$; m$\overline{BC}$ = $\sqrt{10}$ $(m\overline{BC})^2 = (m\overline{AB})^2 + (m\overline{AC})^2$. ΔABC is an isosceles right triangle.

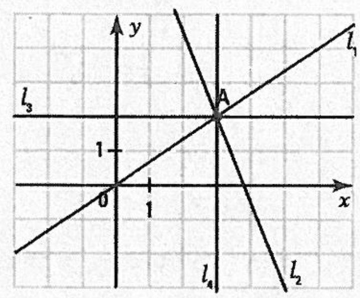
3. Using the point A(3, 2),

a) draw the line l_1 passing through A with a slope of $\frac{2}{3}$.

b) draw the line l_2 passing through A with a slope of $-\frac{5}{2}$.

c) draw the line l_3 passing through A with a slope of zero.

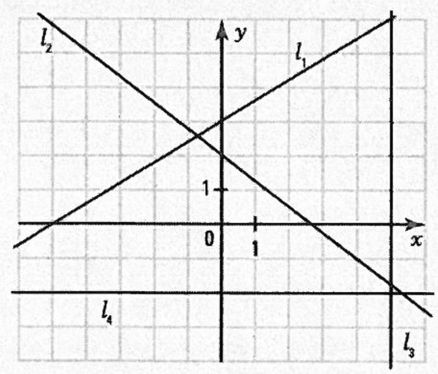
d) draw the line l_4 passing through A with an undefined slope.



4. Draw the following lines in the Cartesian plane on the right, and complete the table below.

$l_1: y = \frac{3}{5}x + 3$ $\qquad$ $l_2: y = \frac{-3}{4}x + 2$

$l_3: x = 5$ $\qquad$ $l_4: y = -2$

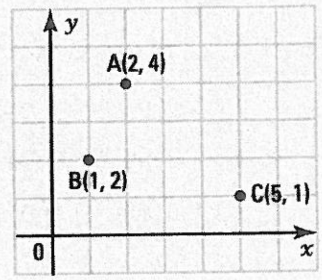


	Slope	x-intercept	y-intercept
l_1	$\frac{3}{5}$	-5	3
l_2	$\frac{-3}{4}$	$\frac{8}{3}$	2
l_3	does not exist	5	does not exist
l_4	0	does not exist	-2

5. The equation of a line l is $y = \frac{2}{3}x + 4$. Determine

a) the x-intercept **–6** $\qquad$ b) the y-intercept. **4**

6. Find the equation of



a) the line passing through A and C. *$y = -x + 6$*

b) the line passing through B and parallel to line AC.
$y = -x + 3$

c) the line passing through B and perpendicular to the line AC. *$y = x + 1$*

d) the vertical line passing through C. *$x = 5$*

e) the horizontal line passing through C. *$y = 1$*

7. Find the equation of the line passing through A(6, 2) and B(9, 4).

$y = \frac{2}{3}x - 2$

8. Given the line l: $y = \frac{3}{4}x + 3$ and the point A(1, 2).

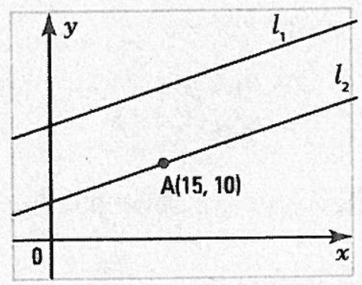
a) Find the equation of the line l_1 passing through A and parallel to l. *$y = \frac{3}{4}x + \frac{5}{4}$*

b) Find the equation of the line l_2 passing through A and perpendicular to l.
$y = -\frac{4}{3}x + \frac{10}{3}$

9. The lines l_1 and l_2 on the right are parallel. The equation of line l_1 is: $y = \frac{1}{3}x + 15$.

Find the y-intercept of line l_2 if it passes through the point A(15, 10).

l_2: $y = \frac{1}{3}x + 5$. The y-intercept of l_2 is 5.



10. Consider the points A(3, 4), B(−1, 2) and C(8, −1). Calculate the distance from point A to line BC.

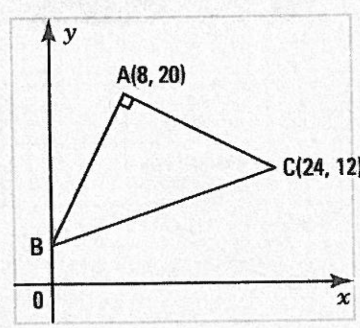
BC: $y = -\frac{x}{3} + \frac{5}{3}$; *d(A; BC) = $\frac{10}{\sqrt{10}} = \sqrt{10} \approx 3.16$ u*

11. Calculate the area of the triangle ABC on the right.

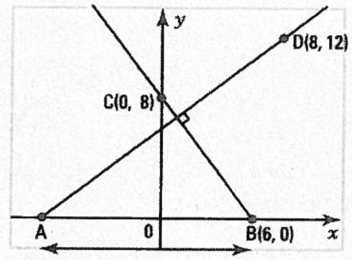
AB: $y = 2x + 4$; B(0,4);

$m\overline{AB} = \sqrt{320}$; $m\overline{AC} = \sqrt{320}$

Area of triangle ABC = 160 u²



12. Consider the figure on the right.
Calculate the distance between A and B.

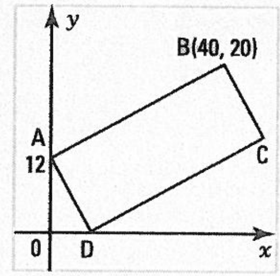


Slope of BC: $-\frac{4}{3}$***; slope of AD*** $= \frac{3}{4}$

Equation of the line AD: $y = \frac{3}{4}x + 6$

x-intercept of the line AD: −8; d(A, B) = 14

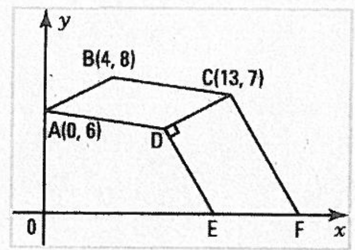
13. Consider the rectangle on the right. Find the area of this rectanlge to the nearest square unit.



m$\overline{AB} = \sqrt{1664}$***; AD:*** $y = -5x + 12$

$D\left(\frac{12}{5}, 0\right)$***; m***$\overline{AD} = \frac{\sqrt{3744}}{5}$***; Area= 499 u²***

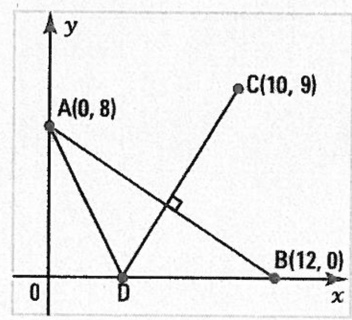
14. Consider the parallelogram ABCD and the right trapezoid CDEF represented on the right. Determine the x-coordinate of point F.



$a_{\overline{AB}} = \frac{1}{2}$; $a_{\overline{CF}} = -2$

CF: $y = -2x + 33$***; x-coordinate of point F: 16.5***

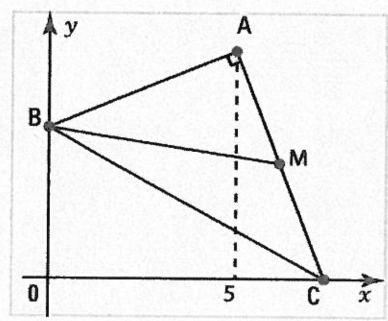
15. The segments AB and CD on the right are perpendicular. Calculate the area of triangle ABD.



CD: $y = \frac{3}{2}x - 6$***; D(4, 0); d(B, D) = 8 u***

Area of triangle ABD = 32 u²

16. Consider the right triangle ABC, in the Cartesian plane below. The equation of line AB is $y = \frac{2}{5}x + 4$. The x-coordinate of point A is 5.



Determine the length of median BM.

A(5, 6); AC : $y = -\frac{5}{2}x + \frac{37}{2}$***;*** ***C(7,4; 0);*** ***M(6,2; 3)***

B(0, 4); m$\overline{BM}$ ***= 6.28 u***