

Name:

Date:

1.  $AB$  is vertical,  $AC$  is horizontal

2.  $AD = 3, BD = 4, CE = 4$

3. We're going to use the distance formula,  $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ , to find the lengths of the sides of the triangle:

$$AB = \sqrt{(3 - 1)^2 + (4 - 1)^2} = \sqrt{2^2 + 3^2} = \sqrt{4 + 9} = \sqrt{13}$$

$$AC = \sqrt{(3 - 5)^2 + (4 - 2)^2} = \sqrt{(-2)^2 + 2^2} = \sqrt{4 + 4} = \sqrt{8} = 2\sqrt{2}$$

$$BC = \sqrt{(1 - 5)^2 + (1 - 2)^2} = \sqrt{(-4)^2 + (-1)^2} = \sqrt{16 + 1} = \sqrt{17}$$

The perimeter is  $AB + AC + BC = \sqrt{13} + 2\sqrt{2} + \sqrt{17}$ , which does not simplify further.

4.  $M$  is the midpoint of  $AB$  so we will use the midpoint formula,  $M = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ , to find  $B(x, y)$ :

$$(-7, -12) = \left(\frac{-3 + x}{2}, \frac{5 + y}{2}\right)$$

$$(-14, -24) = (-3 + x, 5 + y)$$

$$(x, y) = (-11, -29)$$

5.  $ML = 3, MN = \frac{3}{2}$

6. Since  $\overline{AB} \perp \overline{AC}$ , the area of  $\triangle ABC = \frac{1}{2}(AB)(AC)$ . We can use the distance formula to find  $AB, AC$ :

$$AB = \sqrt{(3 - -3)^2 + (7 - -1)^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$$

$$AC = \sqrt{(3 - 7)^2 + (7 - 4)^2} = \sqrt{(-4)^2 + 3^2} = \sqrt{16 + 9} = \sqrt{25} = 5$$

$$[ABC] = \frac{1}{2}(AB)(AC) = \frac{1}{2}(10)(5) = 25$$

7.  $a = 3, b = 5$

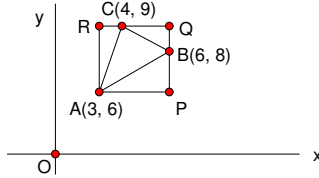
8.  $3x + 4y = 9$

9.  $4x - y = -11$

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10. In the diagram,  $APQR$  is a rectangle.  $AP$  is parallel to the  $x$ -axis. The vertices of  $\triangle ABC$  are  $A(3, 6)$ ,  $B(6, 8)$  and  $C(4, 9)$ .



(a)  $P = (6, 6), Q = (6, 9), R = (3, 9)$

(b)  $9$

(c) We can find the area by finding the area of rectangle  $APQR$  and subtracting the triangles  $CAR, BCQ, ABP$ . To do this we can use what we've found in (a) and (b).

$$[CAR] = \frac{1}{2}(AR)(CR) = \frac{1}{2}(3)1 = \frac{3}{2}$$

$$[BCQ] = \frac{1}{2}(CQ)(BQ) = \frac{1}{2}(2)1 = 1$$

$$[ABP] = \frac{1}{2}(AP)(BP) = \frac{1}{2}(3)2 = 3$$

$$[ABC] = 9 - \frac{3}{2} - 1 - 3 =$$