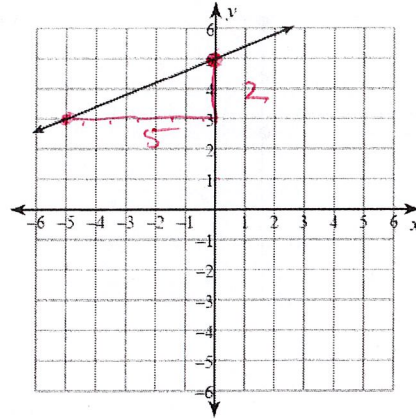


1. Write the equation of the line.

$$y = \frac{2}{5}x + 5$$



$$m = \frac{2}{5}$$

$$b = 5$$

In #s 2 & 3, Write the equation of the line with the given description.

2. Parallel to $y = \frac{5}{6}x + 7$ passing through $(4, -3)$

$$m = 5/6 \quad y + 3 = 5/6(x - 4)$$

$$y + 3 = \frac{5}{6}x - \frac{10}{3}$$

$$-3 \quad -3$$

$$y - y_1 = m(x - x_1)$$

$$y = \frac{5}{6}x - \frac{19}{3}$$

3. Perpendicular to $3x + 4y = 8$ passing through $(-3, 5)$

Solve for y first to find m!

$$\frac{4y}{4} = \frac{-3x + 8}{4} \quad y = \frac{-3}{4}x + 2$$

$$m = -3/4$$

$$m_{\perp} = \frac{4}{3}$$

$$y - 5 = \frac{4}{3}(x + 3)$$

$$y - 5 = \frac{4}{3}x + 4$$

$$+5 \quad +5$$

$$y = \frac{4}{3}x + 9$$

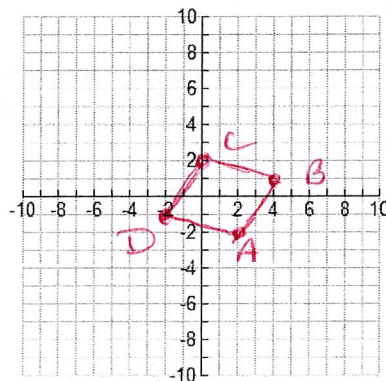
4. Prove that ABCD is a parallelogram.

A(2, -2), B(4, 1), C(0, 2), D(-2, -1)

Quickest way is to show that the diagonals have the same midpt.

$$\text{midpt } \overline{AC} = \left(\frac{2+0}{2}, \frac{-2+2}{2} \right) = (1, 0)$$

$$\text{midpt } \overline{BD} = \left(\frac{4+(-2)}{2}, \frac{1+(-1)}{2} \right) = (1, 0)$$



Same midpt, so diagonals bisect proving

5. Determine if $\triangle UGA$ is scalene, isosceles, or equilateral.

U(-1, -1) G(0, 3) A(2, 0)

$$UG = \sqrt{(1)^2 + (4)^2} = \sqrt{1+16} = \sqrt{17}$$

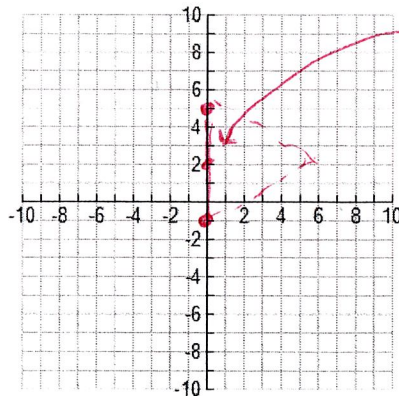
$$GA = \sqrt{(2)^2 + (3)^2} = \sqrt{4+9} = \sqrt{13}$$

$$UA = \sqrt{(3)^2 + (1)^2} = \sqrt{9+1} = \sqrt{10}$$

Three different lengths means scalene

that ABCD is a P'gram.

6. Two corners of an equilateral Δ live at $(0,5)$ and $(0,-1)$. What are possible coordinates of the 3rd vertex?



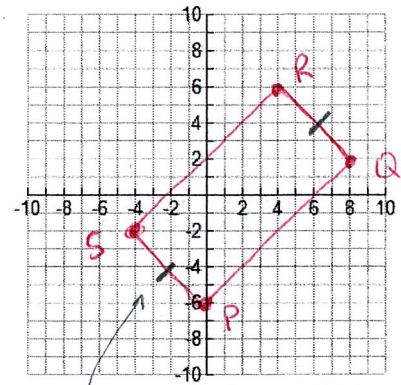
midpoint $(0, 2)$
 Use the 30-60-90
 $3 \quad 6 \quad 3\sqrt{3}$
 So the 3rd corner is
 at $(3\sqrt{3}, 2)$ or $(-3\sqrt{3}, 2)$

7. What's the perimeter and area of the rectangle PQRS?

$P(0, -6) \quad Q(8, 2) \quad R(4, 6) \quad S(-4, -2)$

$$P \approx 2\sqrt{32} + 2\sqrt{128} \\ \approx 33.9$$

$$A \approx \sqrt{32} \times \sqrt{128} \\ = 64$$



$$SP = \sqrt{(4-0)^2 + (-2+6)^2} \\ = \sqrt{16+16} \\ = \sqrt{32}$$

$$PQ = \sqrt{(8-0)^2 + (2+6)^2} \\ = \sqrt{64+64} \\ = \sqrt{128}$$

8. Graph ΔABC . Find the midpoints of segments AB and BC. Connect those midpoints with the midsegment. Verify that the midsegment is half the length of segment AC and half as long.

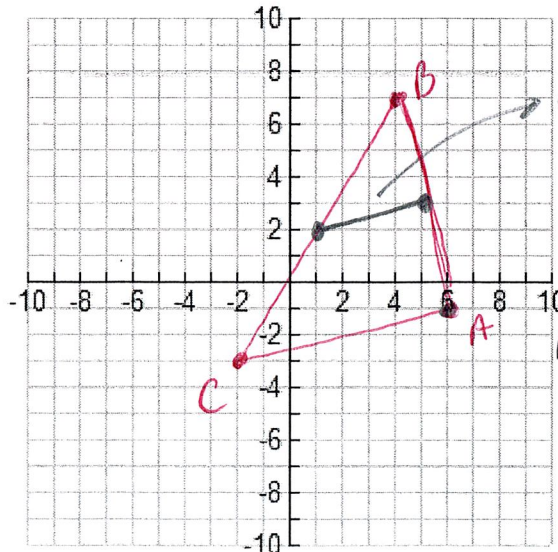
$A(6, -1) \quad B(4, 7) \quad C(-2, -3)$

$$\text{Midpt } \overline{AB} \left(\frac{6+4}{2}, \frac{-1+7}{2} \right) \\ (5, 3)$$

$$\text{Midpt } \overline{BC} \left(\frac{4+(-2)}{2}, \frac{7+(-3)}{2} \right) \\ (1, 2)$$

$$M_{AC} = \frac{-3-6}{-2-6} = \frac{-2}{-8} = \frac{1}{4}$$

$$M_{\text{midseg}} = \frac{3-2}{5-1} = \frac{1}{4} \quad \left. \vphantom{M_{AC}} \right\} \text{parallel}$$



$$d = \sqrt{(4)^2 + (1)^2} \\ = \sqrt{16+1} \\ = \sqrt{17} \approx 4.1$$

$$AC = \sqrt{8^2 + 2^2} \\ = \sqrt{64+4} \\ = \sqrt{68} = 2\sqrt{17} \\ \approx 8.2$$

9. Given segment AB at A(5, 2) and B(9, -4), what point partitions the segment into a 4:1 ratio?

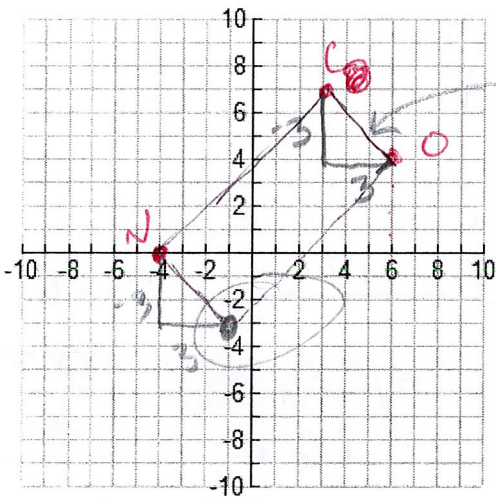
$$\left(\frac{bx_1 + ax_2}{b+a}, \frac{by_1 + ay_2}{b+a} \right)$$

$$\left(\frac{1 \cdot 5 + 4 \cdot 9}{1+4}, \frac{1 \cdot 2 + 4 \cdot (-4)}{1+4} \right)$$

$$\left(\frac{5+36}{5}, \frac{2-16}{5} \right)$$

$$\left(\frac{41}{5}, \frac{-14}{5} \right)$$

10. NCOB is a parallelogram. Given N(-4, 0), C(3, 7), and O(6, 4), what are the coordinates for B?



Use slope to do this
the slope b/w N & B must match.

$$B(-1, -3)$$

11. Show that NCOB from #10 is a rectangle, rhombus, square, or just a parallelogram.

looks like a rect., so check to see if diagonals are \cong .

$$\begin{aligned} NO &= \sqrt{(10)^2 + (4)^2} \\ &= \sqrt{100 + 16} \\ &= \sqrt{116} \end{aligned}$$

$$\begin{aligned} BC &= \sqrt{(4)^2 + (10)^2} \\ &= \sqrt{16 + 100} \\ &= \sqrt{116} \end{aligned}$$

$\overline{NO} \cong \overline{BC}$ so NCOB is a rectangle

Determine if the statements in 18-21 are *sometimes*, *always*, or *never* true.

18. The diagonals of a parallelogram are congruent. **S**

19. A rhombus is a parallelogram. **A**

20. A rhombus is a rectangle. **S**

21. The consecutive angles of a parallelogram sum to 180° . **A**

22. KLMN is a rectangle. Find the perimeter of KLMN.

$x = 12$
 $8x - 6 = 90$
 $8x = 96$
 $x = 12$
 $P = \frac{2(25) + 2(8)}{25} = 66$
 $2(12) + 1 = 25$
 $x - 4 = 12 - 4 = 8$

23. Find x in the parallelogram at right.

$x - 1 + 5x + 28 = 180$
 $6x + 27 = 180$
 $6x = 153$
 $x = 25.5$

24. The rhombus below has a perimeter of 28cm. Find x .

Each side is $28/4 = 7$
 $2x = 7$
 $x = 7/2$