

Mathematics II Resources for EOC Remediation

G-GPE Coordinate Geometry Cluster:

G-GPE.B.4

G-GPE.B.5

G-GPE.B.7

The information in this document is intended to demonstrate the depth and rigor of the Nevada Academic Content Standards. The items are **not** to be interpreted as indicative of items on the EOC exam. These are a collection of standard-based items for students and **only** include those standards selected for the Math II EOC examination.

G-GPE Coordinate Geometry Cluster

G-GPE.B.4 Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$.*

1. Prove that the quadrilateral with vertices $A(14,11)$, $B(24,9)$, $C(26,3)$ and $D(16,5)$ is a parallelogram.

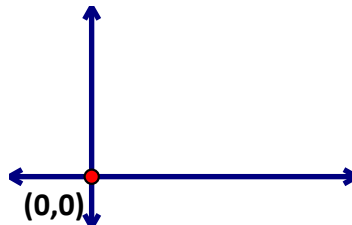
Answer: Answers will vary.

2. Parallelogram $ABCD$ has vertices $A(-6, 2)$, $B(-3, 6)$, $C(9, -3)$ and $D(6, -7)$. Prove the parallelogram is a rectangle.

Answer: Answers will vary.

3. Determine the missing coordinate below.

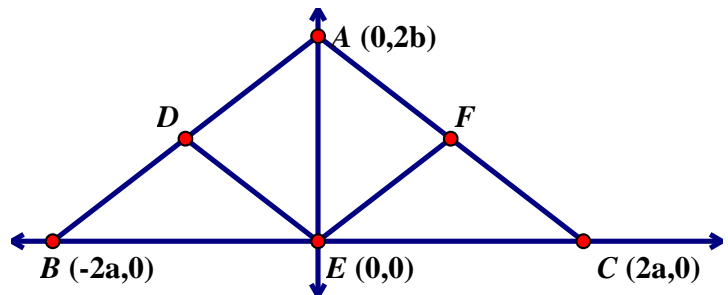
Isosceles $\triangle ABC$
 $A(0,0)$
 $B(a,c)$ $\angle B$ is the vertex
 $C(\underline{\hspace{1cm}}, 0)$



Answer: $(2a, 0)$

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4. Using isosceles $\triangle ABC$ with vertices $B(-2a,0)$, $A(0,2b)$ and $C(2a,0)$ such that $a \neq b$, and mid-segments \overline{DE} and \overline{FE} drawn to the base, what type of quadrilateral is $ADEF$? Show your work.



Answer: Rhombus, answers will vary on work.

5. Are the points $(-2,5)$, $(1,6)$, and $(0,-5)$ on, inside, or outside the circle whose diameter is defined by $(-2, -3)$ and $(6, 5)$?

Answer: Equation of the circle: $(x-2)^2 + (y-2)^2 = 32$
 $(-2,5)$ lies on the circle, $(1,6)$ is inside the circle and $(0,-5)$ lies outside the circle

G-GPE.B.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

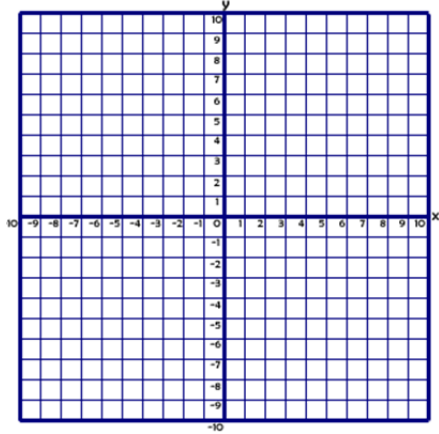
1. Given: $\triangle ABC$ with vertices $A(6,9)$, $B(2,1)$ and $C(11,5)$, write the equation of the perpendicular bisector of \overline{AB} .

Answer: $y = -\frac{1}{2}x + 7$

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2. In rhombus $MATH$, the coordinates of the endpoints of the diagonal \overline{MT} are $M(0, -1)$ and $T(4, 6)$. Write an equation of the line that contains diagonal \overline{AH} .

Using the given information, explain how you know that your line contains diagonal \overline{AH} .



Answer: $y = -\frac{4}{7}x + 5\frac{1}{14}$

3. $\triangle ABC$ has vertices $A(-3, 0)$ and $B(1, 8)$. Point C is at $(x, 0)$, such that $\angle ABC$ is a right angle. Find the value of x .

Answer: $m = \frac{8-0}{1-(-3)} = 2 \Rightarrow 8 = -\frac{1}{2}(1) + b \Rightarrow b = 8.5$
 $y = -\frac{1}{2}x + 8.5 \Rightarrow 0 = -\frac{1}{2}x + 8.5 \Rightarrow x = 17$

4. A segment \overline{AB} with endpoints $A(3, 3)$ and $B(5, 6)$ is translated using the following rule: $(x, y) \rightarrow (x - 8, y - 2)$. What is the equation of the line perpendicular to $A'B'$ and passing through B' ?

Answer: $y = -\frac{2}{3}x + 2$

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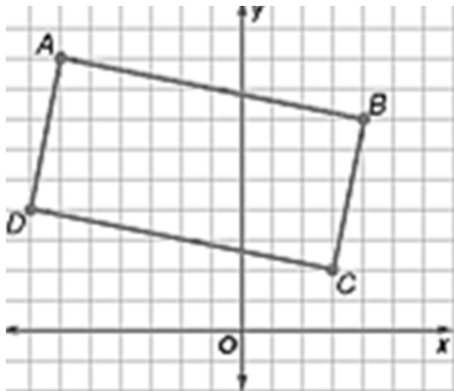
5. Write the equation of the line that is perpendicular to $y = \frac{2}{5}x - 3$ and passes through the point (3, 2).

Answer: $y = -\frac{5}{2}x + \frac{19}{2}$

6. Given two lines whose equations are $3x + y - 8 = 0$ and $-2x + by + 9 = 0$, determine the value of b such that the two lines will be perpendicular.

Answer: 6

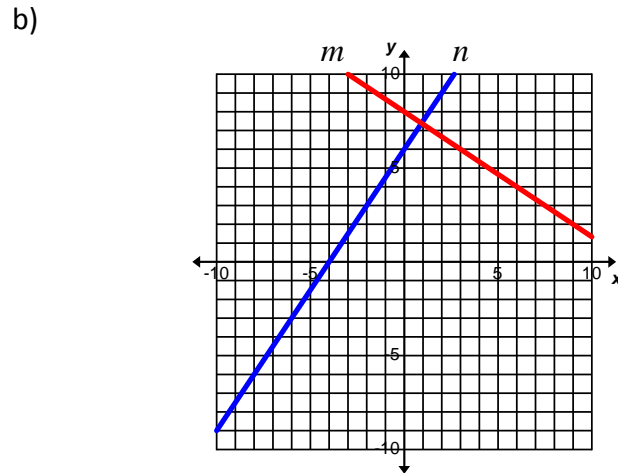
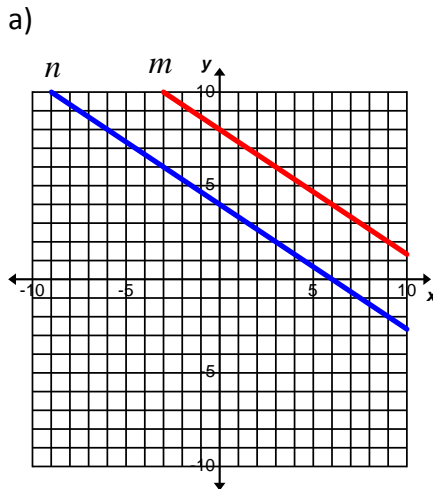
7. How can you prove that the quadrilateral is a rectangle? Show your work.



Answer: Possible answers: Show that $\overline{AB} \perp \overline{BC}$ and $\overline{AD} \perp \overline{DC}$ and $\overline{AD} \perp \overline{AB}$ (4 right angles) using slope. Show the slope of \overline{AB} and $\overline{DC} = -\frac{1}{5}$ and slope of \overline{AD} and $\overline{BC} = 5$, they are negative reciprocals, thus they are \perp and form 4 right angles. Quad. $ABCD$ therefore is a rectangle.

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8. Describe the following lines m and n relationship as parallel, perpendicular, or neither. Justify your response using the slope criteria for each relationship.



Answer: a) Line m has a slope of $-\frac{2}{3}$ and line n also has a $-\frac{2}{3}$ slope. Since line m & n have the same slope they are parallel. b) Line m has a slope of $-\frac{2}{3}$ and line n has a slope of $\frac{3}{2}$. Since line m and n have slopes that are opposite reciprocals they are perpendicular.

9. Given $3x - 5y = 60$, determine if the following lines are parallel, perpendicular, or neither.

- | | | | |
|-----------------------------|----------|---------------|---------|
| A. $y = \frac{3}{5}x - 8$ | parallel | perpendicular | neither |
| B. $y = -\frac{3}{5}x + 3$ | parallel | perpendicular | neither |
| C. $y = \frac{5}{3}x + 6$ | parallel | perpendicular | neither |
| D. $y = -\frac{5}{3}x - 2$ | parallel | perpendicular | neither |
| E. $y = -\frac{10}{6}x + 7$ | parallel | perpendicular | neither |
| F. $y = \frac{6}{10}x - 9$ | parallel | perpendicular | neither |

Answer: A. Parallel, B. Neither, C. Neither, D. Perpendicular, E. Perpendicular, F. Parallel

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G-GPE.B.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*

1. Find the approximate perimeter and area of the triangle with vertices $R(3, -2)$, $S(-2, -2)$ and $T(4, 4)$.

$$P = SR + RT + TS = 5 + \sqrt{37} + \sqrt{72} \approx 20 \text{ units}$$

Answer:

$$A = \frac{1}{2}(5)(6) = 15 \text{ units}^2$$

2. Find the area of the polygon with vertices $A(-8, 1)$, $B(-5, 6)$, $C(4, 2)$ and $D(-2, -2)$.

A. 44.5 units

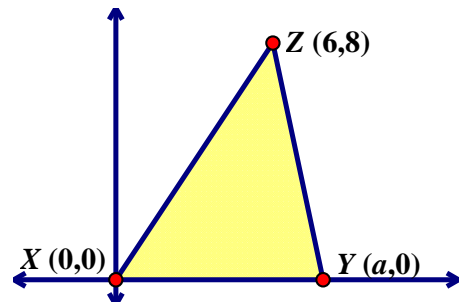
B. 46 units

C. 48 units

D. 49.5 units

Answer: D

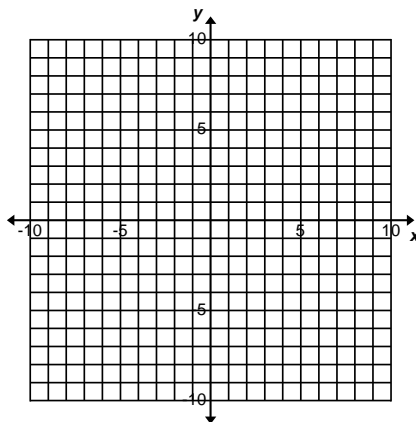
3. $\triangle XYZ$ has an area of 36 square units. What is the value of a ?



Answer: $36 = \frac{1}{2}(a)(8) \Rightarrow 36 = 4a \Rightarrow a = 9$

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4. What is the approximate perimeter of a parallelogram with vertices $A(3,5)$, $B(3,0)$, $C(-2,-3)$ and $D(-2,2)$?



Answer: $P = 2(5) + 2(\sqrt{34}) \Rightarrow P \approx 22$ units

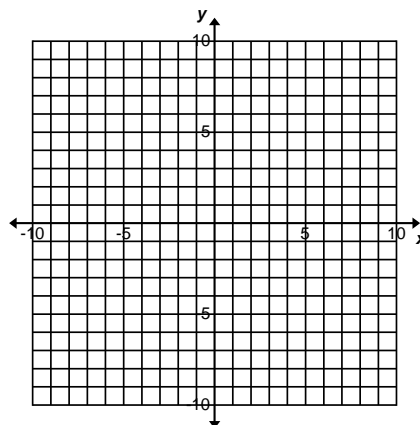
5. A triangle is placed on a coordinate grid with vertices at $(0,0)$, $(0,8)$ and $(6,0)$. An altitude is drawn from $(0,0)$ to the opposite side.

Part A:

Find the area of the triangle.

Part B:

Find the length of the altitude drawn from $(0,0)$.



Answer: Part A: 24 units^2 , Part B: 4.8 units
