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Unit 2 Study Guide: Rational Numbers

Vocabulary:

- 1) **Absolute Value:** The distance between a number and zero on the number line. The symbol for absolute value is shown in this equation $|8|=8$
 - 2) **Integers:** The set of whole numbers and their opposites $\{\dots-3, -2, -1, 0, 1, 2, 3\dots\}$
 - 3) **Natural Numbers:** The set of numbers $\{1, 2, 3, 4,\dots\}$. Natural numbers can also be called counting numbers.
 - 4) **Negative Numbers:** The set of numbers less than zero.
 - 5) **Opposites :** Two different numbers that have the same absolute value. Example: 4 and -4 are opposite numbers because both have an absolute value of 4.
 - 6) **Positive Numbers:** The set of numbers greater than zero.
 - 7) **Rational Numbers:** The set of numbers that can be written in the form a/b where a and b are integers and $b \neq 0$.
 - 8) **Sign:** a symbol that indicates whether a number is positive or negative. Example: in -4, the (-) sign shows this number is read "negative four".
 - 9) **Whole Numbers:** The set of all natural numbers and the number zero.
 - 10) **Coordinate:** An ordered pair, (x, y) , that locates a point in the plane.
 - 11) **Quadrant:** One of the four regions on a Coordinate plane formed by the intersection of the x-axis and the y-axis. Quadrants are named counterclockwise I, II, III, IV
 - 12) **Origin:** The point of intersection of the vertical and horizontal axes of a Cartesian plane. The coordinates of the origin are $(0, 0)$.
 13. **Zero Pair:** Pair of numbers whose sum is zero.
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Part A: Writing and Comparing Integers & Absolute Value

- I have completed Section A and checked my answers on Weebly.
- I can write integers to represent a situation, compare integers, and find the absolute value of number with confidence.
- I need help with understanding Section A.

Write an integer to represent the situation.

14. a jet climbing to an altitude of 20,000 feet
15. taking \$15 out of the bank
16. 7 degrees below zero
17. spending \$34
18. 300 feet below sea level
19. When the Jaguar football team passed the football, they gained 25 yards

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Part B: Adding & Subtracting Integers

- I have completed Section B and checked my answers on Weebly.
 I can add and subtract integers with confidence.
 I need help with understanding Section B.

44. $-8 + (-3)$

45. $-1 - (-3)$

46. $4 + (-15)$

47. $2 - (-2)$

48. $-207 + (-320)$

49. $12 - 12$

50. $-15 + 25$

51. $-8 - 7$

52. $40 + 36$

53. $-9 - (-8)$

54. $-10 + (-68)$

55. $-4 - 9$

Part C: Multiplying & Dividing Integers

- I have completed Section C and checked my answers on Weebly.
 I can multiply and divide integers with confidence.
 I need help with understanding Section C.

56. $-5 \cdot 4$

57. $7 \cdot (-3)$

58. $-40 \div (-10)$

59. $18 \div 6$

60. $2 \cdot (-8)$

61. $-8 \cdot (-4)$

62. $-45 \div 9$

63. $-30 \div 5$

64. $-6 \cdot 3$

65. $-9 \cdot (-9)$

66. $32 \div (-8)$

67. $-24 \div (-6)$

Part D: Real-life integer/absolute value application word problems

- I have completed Section D and checked my answers on Weebly.
 I can apply integers and absolute value to real-life with confidence.
 I need help with understanding Section D.

68. A penguin dove to 130 feet below the water's surface. Then it swam up 48 feet toward the water's surface. Which integer represents where the penguin swam to?

69. Emma and her friends were playing a game. Before her third turn, Emma had -2 points. During her third turn, Emma got 8 points. During her fourth turn, she lost 10 points and during her fifth turn, she got 5 points. How many points did Emma have at the end of her fifth turn?

70. A sunken ship is 12 m below the sea level. A search plane flies 35 m above the sunken ship. How far above the sea is the plane?

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71. A sunken treasure chest is 33 m below the sea level. A search plane flies 54 m above the sunken treasure chest. How far above the sea is the plane?

72. At midnight on a winter night, the temperature was -12°F . By 10 A.M. the temperature had risen 42°F . What was the new temperature?

73. The peak of Mt. Everest is approximately 26,544 ft above sea level. The shore of the Dead Sea is about 1,200 ft below sea level. How much higher is the peak of Mt. Everest than the shore of the Dead Sea?

74. Kim was walking down a rocky path. For 4 minutes, the elevation dropped steadily. Altogether it dropped 8 feet. What was the change in elevation per minute for the 4 minutes?

75. A scuba diver is swimming at a depth of -12 feet in the Flower Garden Banks National Marine Sanctuary. She dives down to a coral reef that is at five times this depth. What is the depth of the coral reef?

76. Eric's watch is water resistant up to -15 feet. Mike's watch is water resistant up to 8 times the depth of Eric's watch. Mike's watch is water resistant to what maximum depth?

77. As a front passed, the temperature changed steadily over 6 hours. Altogether it changed -18 degrees. What was the change in temperature per hour for the 6 hours?

Part E: Coordinate Plane

- I have completed Section E and checked my answers on Weebly.
- I can graph integers and solve problems on the coordinate plane with confidence.
- I need help with understanding Section E.

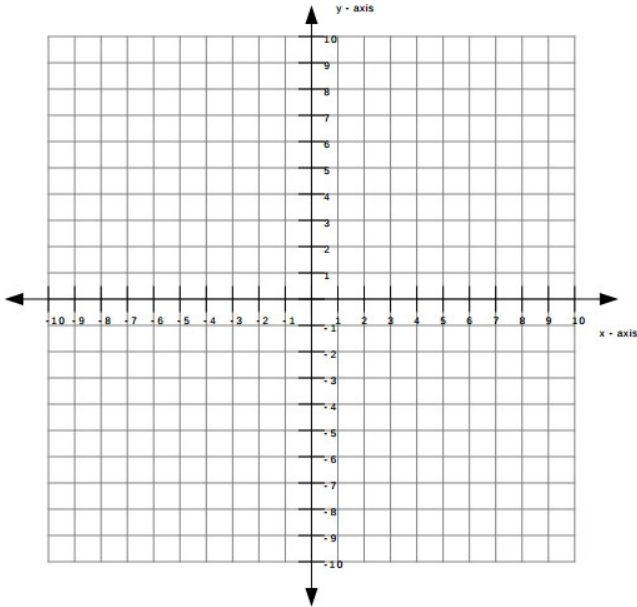
78. Sketch a coordinate plane, include labels for the quadrants.

79. Who is the French mathematician that the Cartesian plane is named after?

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80. Plot the following points on a coordinate plane.

(9,8) (-2, 2) (-7, 7) What shape do these points make if you connect them?



In which quadrant or on what axis is each point located?

81. (-5, 5) _____

82. (-15, -90) _____

83. ($x < 0, y < 0$) _____

84. ($x > 0, y = 0$) _____

85. ($x = 0, y > 0$) _____

86. ($x > 0, y < 0$) _____

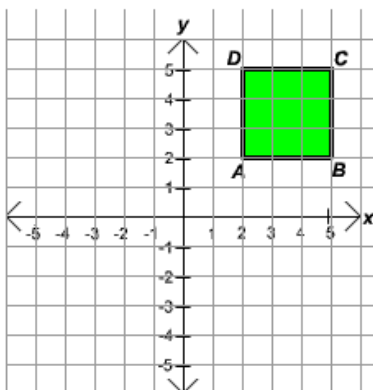
Use the coordinate plane below for #'s 87 – 88.

87. How far is point A from point B? _____

88. Give the new coordinates of square ABCD if it were reflected across the x and y axes.

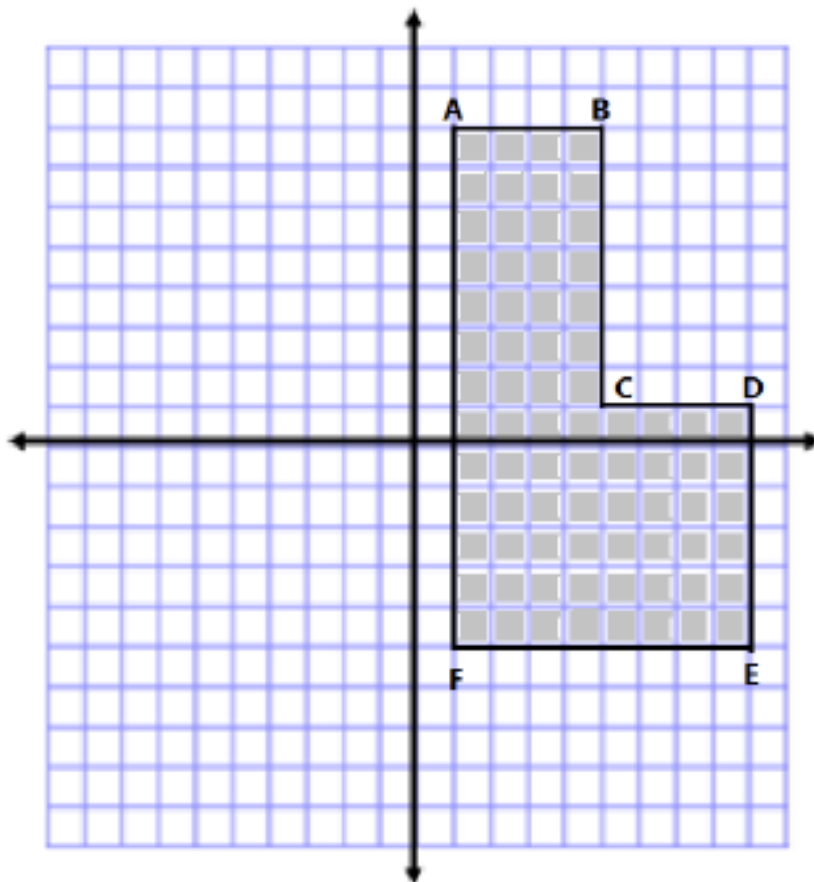
Reflected x axis: A _____ B _____ C _____ D _____

Reflected y axis: A _____ B _____ C _____ D _____



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- 89.
- An ordered pair has coordinates that have the same sign. In which quadrant(s) could the point lie? Explain.
 - Another ordered pair has coordinates that are opposites. In which quadrant(s) could the point lie? Explain.
90. How are the ordered pairs $(4, 9)$ and $(4, -9)$ similar, and how are they different? Are the two points related by a reflection over an axis in the coordinate plane? If so, indicate which axis is the line of symmetry between the points. If they are not related by a reflection over an axis in the coordinate plane, explain how you know.
91. Kayleigh has made a scale drawing of a vegetable garden she plans to make in her backyard. She needs to determine the perimeter and area to know how much fencing and dirt to purchase. Determine both the perimeter and area.



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Use the graph paper below to answer questions 92 – 94.

92. Maria plotted points on the coordinate plane at $(1, 1)$, $(-1, 1)$, $(-1, -1)$, and $(1, -1)$. What shape can Maria draw using these four points as its corners?

93. John plots points at $(4, 0)$, $(4, 3)$, and $(-1, 3)$. If John wants to draw a rectangle, where should she plot the last point?

94. Emily plots a triangle at $(-2, -1)$, $(4, -1)$, and $(1, 6)$. What is the height and width of the triangle?

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