

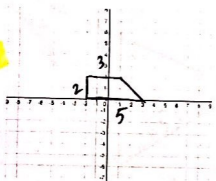
# THE ULTIMATE Unit 5A TEST REVIEW: Lines

**\*\*NO CALCULATOR SECTION\*\***

$m = \frac{1}{3}$   
 $k = -3$

1. What is the slope of the line that is perpendicular to the line whose equation is  $y = -\frac{3}{4}x + 1$ ?
2. The graphs of the equations  $y = 3x + 2$  and  $y + kx = 4$  are parallel when  $k$  equals:  
 $y - 3x = 4$
3. What is the perimeter of trapezoid?

$P = 10 + \sqrt{8}$



$2 + 3 + 5 + \sqrt{8}$   
 $a^2 + b^2 = c^2$   
 $2^2 + 2^2 = c^2$   
 $4 + 4 = c^2$   
 $8 = c^2$   
 $\sqrt{8} = c$

4. Consider the four equations of lines:

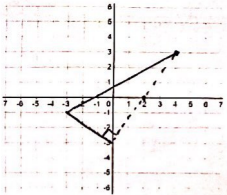
Line M:  $y = \frac{3}{4}x + 2$     Line N:  $y = -\frac{4}{3}x - \frac{1}{2}$     Line O:  $y = -\frac{3}{4}x - 2$     Line P:  $y = \frac{4}{3}x + \frac{1}{2}$

Lines **M** and **N** are perpendicular.

Lines **O** and **P** are also perpendicular.

5. The graph below shows two sides of a right triangle. What is the equation of the missing line that completes the right triangle?

$y = \frac{3}{2}x - 9$



## GEOMETRY

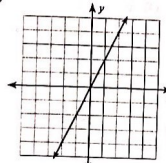
Name \_\_\_\_\_

### Unit 5A TEST REVIEW Lines

**\*\*CALCULATOR ALLOWED\*\***

Find the slope of each line.

6)



- A)  $-\frac{1}{2}$     B) 2  
 C)  $\frac{1}{2}$     D) -2

Find the slope of the line through each pair of points.

7) (20, -6), (18, -13)

- A)  $-\frac{7}{2}$     B)  $\frac{7}{2}$   
 C)  $-\frac{2}{7}$     D)  $\frac{2}{7}$

Find the slope of each line.

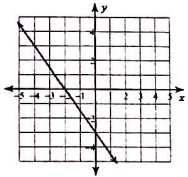
8)  $y = -\frac{5}{3}x + 5$

- A)  $-\frac{3}{5}$     B)  $-\frac{5}{3}$   
 C)  $\frac{5}{3}$     D)  $\frac{3}{5}$

9)  $x + y = 2$

- A) 1    B) -1  
 C)  $-\frac{5}{4}$     D)  $\frac{5}{4}$

10)

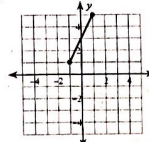


- A)  $y = \frac{1}{2}x - 3$
- B)  $y = \frac{3}{2}x - 3$
- C)  $y = -\frac{3}{2}x - 3$**
- D)  $y = -3x - \frac{3}{2}$

11)  $7x + 4y = 20$

- A)  $y = -\frac{7}{4}x + 5$**
- B)  $y = \frac{7}{4}x + 5$
- C)  $y = 5x + \frac{1}{4}$
- D)  $y = \frac{1}{4}x + 5$

14)



- A) 6
- B) 2.4
- C) 11.2
- D) 4.5**

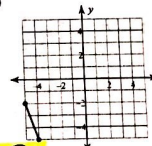
Write the slope-intercept form of the equation of the line PARALLEL to the given line.

12) through:  $(-3, 1)$ , parallel to  $y = -\frac{5}{3}x + 5$

- A)  $y = -4x + \frac{5}{3}$
- B)  $y = \frac{5}{3}x - 4$
- C)  $y = -\frac{5}{3}x - 4$**
- D)  $y = 4x + \frac{5}{3}$

Find the midpoint of each line segment.

15)



- A)  $(-4.5, -3.5)$**
- B)  $(-2, 2.5)$
- C)  $(-6, 1)$
- D)  $(0.5, -1.5)$

Write the slope-intercept form of the equation of the line PERPENDICULAR to the given line.

13) through:  $(1, -4)$ , perp. to  $y = \frac{1}{4}x$

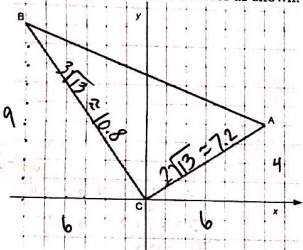
- A)  $y = -1$
- B)  $y = -4x$**
- C)  $y = 3x - 1$
- D)  $y = -x$

16. Given the points  $P(-9, -6)$  and  $Q(2, -1)$ , what are the coordinates of the point on the line segment  $\overline{PQ}$  that is  $\frac{2}{5}$  of the way from  $P$  to  $Q$ ?

$$\left(-9 + \frac{2}{5}(2 - (-9)), -6 + \frac{2}{5}(-1 - (-6))\right)$$

$$\left(-\frac{23}{5}, -4\right)$$

17. Right triangle ABC has vertices as shown. What is the area of the triangle?



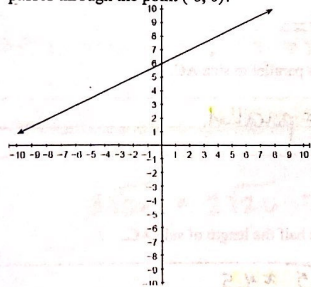
$$A = \frac{1}{2} b \cdot h$$

$$A = \frac{1}{2} (3\sqrt{13})(2\sqrt{13})$$

$$10.8 \quad 7.2$$

$$A \approx 38.88 \approx 39 \text{ units}^2$$

18. The equation of line  $a$  is  $y = \frac{1}{2}x + 6$ . What is the equation of the line that is perpendicular to line  $a$  and passes through the point  $(-8, 0)$ ?



$$y = mx + b$$

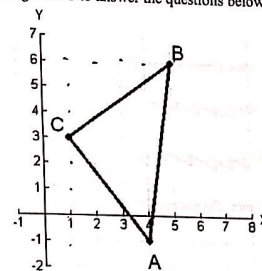
$$0 = -2(-8) + b$$

$$0 = 16 + b$$

$$-16 = b$$

$$y = -2x - 16$$

19. Use triangle ABC to answer the questions below.



a.  $\triangle ABC$  is a right triangle because the slopes of  $\overline{CB}$  and  $\overline{AC}$  are opposite reciprocals.

- i. The slope of  $\overline{CB} = \frac{3}{4}$
- ii. The slope of  $\overline{AC} = -\frac{4}{3}$

b.  $\triangle ABC$  is isosceles because the distance between C and B is equal to the distance between C and A.

- i. The length of  $\overline{CB} = 5$
- ii. The length of  $\overline{AC} = 5$

c. Find the point that partitions  $\overline{CB}$  in a 1:2 ratio.  $C(1, 3)$   $B(5, 6)$

$$\left(1 + \frac{1}{1+2}(5-1), 3 + \frac{1}{1+2}(6-3)\right)$$

$$\left(\frac{7}{3}, 4\right)$$

$$\left(2.\overline{3}, 4\right)$$

d. Find the midpoint of  $\overline{CB}$ .

$$\left(\frac{1+5}{2}, \frac{3+6}{2}\right)$$

$$(3, 4.5)$$

20. Square  $ABCD$  is graphed on a coordinate grid. Vertex  $A$  is on the point  $(0, 4)$ . Vertex  $B$  is on the point  $(3, 0)$ .

a. What are the other possible coordinates for Vertex  $C$  and Vertex  $D$ ?

i.  $(4, 1)$  and  $(-1, 3)$

ii.  $(4, 7)$  and  $(7, 3)$

b. The perimeter of square  $ABCD$  is 20 units. Do not round.

$$5 + 5 + 5 + 5$$

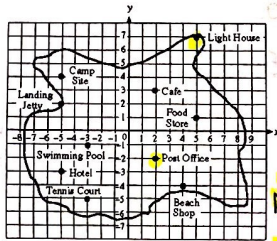
c. The area of square  $ABCD$  is 25 square units.

$$5 \cdot 5$$

d. The equation of the line connecting vertex  $A$  and  $B$  is

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

21. Which is the point midway between the Post Office and the Light House?



$(5, 7)$   $(2, -2)$   
 $(\frac{5+2}{2}, \frac{7+(-2)}{2})$   
 $M = (\frac{7}{2}, \frac{5}{2})$   
 $M = (3.5, 2.5)$

22. Line segment  $AB$  has endpoints  $(-6, -5)$  and  $(-3, 19)$ . What are the coordinates that partitions  $AB$  into three equal parts?

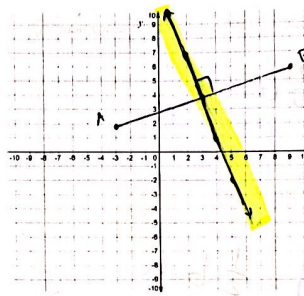
For  $1/3$   $(-6 + \frac{1}{3}(-3 - (-6)), -5 + \frac{1}{3}(19 - (-5))) = (-5, 3)$

For  $2/3$   $(-6 + \frac{2}{3}(-3 - (-6)), -5 + \frac{2}{3}(19 - (-5))) = (-4, 11)$

23. Line segment  $\overline{PQ}$  has been bisected at the point  $(6, -1)$ . If point  $P = (3, 6)$ , then what are the coordinates of point  $Q$ ?

$$(9, -8)$$

24. Line segment  $\overline{AB}$  has endpoints  $(-3, 2)$  and  $(9, 6)$ . Draw the perpendicular bisector of  $\overline{AB}$ .



25. Write the equation of the line that passes through the point  $(-4, 3)$  and is parallel to the line given by the equation  $3x + 7y = -14$ .

$$-3x - 7y = -14$$

$$y = -\frac{3}{7}x - 2$$

$$y = mx + b$$

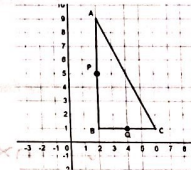
$$3 = -\frac{3}{7}(-4) + b$$

$$3 = \frac{12}{7} + b$$

$$b = \frac{9}{7}$$

CONSTRUCTED RESPONSE

26. Right Triangle  $ABC$  is shown below. Points  $P$  and  $Q$  are the midpoints of sides  $AB$  and  $BC$ , respectively.



$P(2, 5)$   $Q(4, 1)$   
 $A(2, 9)$   $C(8, 1)$

A. Prove that the line that connects midpoints  $P$  and  $Q$  is parallel to side  $AC$ .

$PQ$  slope  $= -\frac{4}{2} = -2/1$  \* Same slope = parallel  
 $AC$  slope  $= -\frac{8}{4} = -2/1$

B. Prove that the line that connects midpoints  $P$  and  $Q$  is half the length of side  $AC$ .

length  $PQ = \sqrt{(4-2)^2 + (1-5)^2} = 2\sqrt{5} \approx 4.5$   
 length  $AC = \sqrt{(8-2)^2 + (1-9)^2} = 4\sqrt{5} \approx 8.9$

$$AC \div PQ = 2$$

27. Triangle XYZ has vertices  $X(1, -5), Y(6, -7), Z(8, -2)$ . Explain how you could use these coordinates to show that  $\overline{XY}$  and  $\overline{XZ}$  are perpendicular.

$$XY \text{ slope} = \frac{-7 - (-5)}{6 - 1} = \frac{-2}{5}$$

$$XZ \text{ slope} = \frac{-2 - (-5)}{8 - 1} = \frac{3}{7}$$

$$YZ \text{ slope} = \frac{-2 - (-7)}{8 - 6} = \frac{5}{2}$$

$XY$  &  $YZ$  have opp. reciprocal slopes  
so  $XY$  &  $YZ$  are perpendicular

28. The local recreation department has created a map of its newest baseball field. The department is planning to install a rectangular fence around the field. The corners of the field are represented on the map by the points  $A(-9, 7), B(-6, -8), C(1, 9)$ , and  $D(4, -6)$ . Each unit on the map represents 10 feet.

How many feet of fencing are needed for the baseball field?  $51 \times 10 = 510 \text{ ft}$   
\*\*Find the perimeter\*\*

$$\begin{array}{r} AB + BD + CD + AC \\ 3\sqrt{26} + 2\sqrt{26} + 3\sqrt{26} + 2\sqrt{26} = 10\sqrt{26} \approx 51 \\ 15.3 + 10.2 + 15.3 + 10.2 = 51 \end{array}$$

$$AB = \sqrt{(-6 - (-9))^2 + (-8 - 7)^2} = 3\sqrt{26} \approx 15.3$$

$$AC = \sqrt{(1 - (-9))^2 + (9 - 7)^2} = 2\sqrt{26} \approx 10.2$$

What is the area of the fenced-in field?  $156 \times 10 = 1560 \text{ ft}^2$

$$3\sqrt{26} \cdot 2\sqrt{26} = 156$$