

## Practice for Test 3

Math 130 *Kovitz* Fall 2018

The test is on Tuesday, October 2.

*Problems 1 through 9: True or false.*

1. A line segment with endpoints at  $(-2, 9)$  and  $(7, -1)$  will have a midpoint at  $(3.5, 5)$ .
2. If the coordinates of  $A$  are  $(-1, 4)$  and the coordinates of the midpoint of  $\overline{AB}$  are  $(-3, 6)$ , the coordinates of  $B$  are  $(-5, 8)$ .
3. The length of the line segment connecting the points whose coordinates are  $(-1, -2)$  and  $(1.5, 4)$  is exactly 6.5.
4. The graph of  $3y - x = b$  is parallel to the graph of  $y = -\frac{1}{3}x + b$ .
5. The graphs of  $\frac{1}{2}y + x = 3$  and  $y = 2x - 6$  are perpendicular and have the same  $x$ -intercept.
6. An equation of the line that is parallel to  $y = -3x + 6$  and passes through the point  $(0, -3)$  is  $y = 3x - 3$ .
7. The line with slope  $= \frac{3}{2}$  through the point  $(5, -2)$  will also contain the point  $(8, 0)$ .
8. Given points  $A(0, 0)$ ,  $B(2, 1)$ , and  $C(1, 2)$ , none of the lines  $AB$ ,  $AC$ , or  $BC$  are parallel or perpendicular; but the lengths of lines  $AB$  and  $AC$  are equal.
9. An equation of the line that is parallel to  $y + 3x + 4 = 0$  and has the same  $y$ -intercept as  $y = -5x - 7$  is  $y = 3x - 7$ .

*Problem 10: Solve this and show all the work.*

10. The coordinates of points  $A$  and  $B$  are  $A(4, -3)$  and  $B(2, 3)$ . What is an equation of the line that is perpendicular to  $\overline{AB}$  at its midpoint?

Answers follow on next page.

**ANSWERS to the PRACTICE for TEST 3**

1. False; the midpoint will be at  $(3.5, 4)$ .
2. True.
3. True, because  $2.5^2 + 6^2 = 6.5^2$ .
4. False. It is parallel to the graph of  $y = \frac{1}{3}x + b$ .
5. False. The  $x$ -intercepts are the same, but the slopes are  $-2$  and  $2$ . Those slopes are not negative reciprocals.
6. False. A correct equation would be  $y = -3x - 3$ .
7. False. A new point could be found by going up 3 and right 2; that produces the point  $(7, 1)$ . The point  $(8, 0)$  was determined by going right 3 and up 2; that does not correspond to a slope of  $\frac{3}{2}$ . The slope to the point  $(8, 0)$  is  $\frac{2}{3}$ . The slope is the change in  $y$  over the change in  $x$ .
8. True.
9. False. An equation could be  $y = -3x - 7$ , as the original equation had slope of  $-3$ .
10. An equation for that line is  $y = \frac{1}{3}x - 1$ .

The slope of the given line is  $\frac{\Delta y}{\Delta x} = \frac{6}{-2} = -3$ .

The slope of any perpendicular line is the negative reciprocal of  $-3$ , that is:  $\frac{1}{3}$ .

The perpendicular bisector must pass through the midpoint, which is  $\left(\frac{4+2}{2}, \frac{-3+3}{2}\right) = (3, 0)$ .

The equation is of the form  $y = \frac{1}{3}x + b$ .

Substitute 3 for  $x$  and 0 for  $y$  and solve:  $0 = \frac{1}{3}(3) + b$ .

That yields  $b = -1$ .

The answer is therefore  $y = \frac{1}{3}x - 1$ .