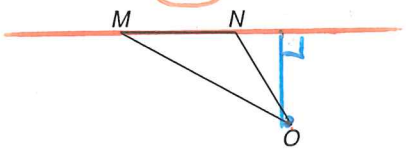
NAME Key DATE _____ PERIOD ____

# 3-6 Practice

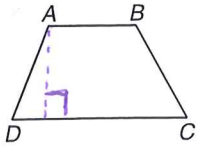
## Perpendiculars and Distance

**Draw the segment that represents the distance indicated.**

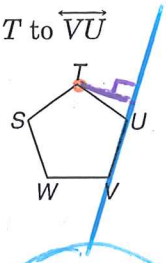
1. $O$ to $\overleftrightarrow{MN}$




2. $A$ to $\overleftrightarrow{DC}$

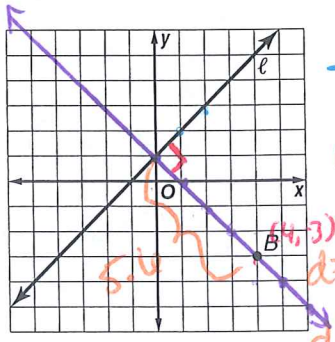



3. $T$ to $\overleftrightarrow{VU}$

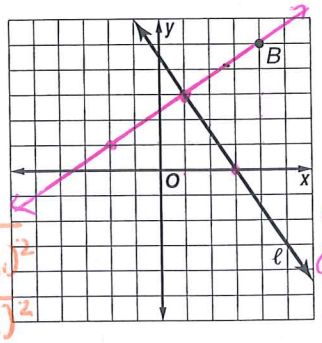



**Construct a line perpendicular to $\ell$ through $B$. Then find the distance from $B$ to $\ell$.**

4.




5.



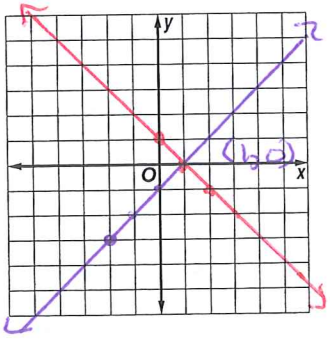

**Find the distance between each pair of parallel lines.**

6. $y = -x$
   $y = -x - 4$

7. $y = 2x + 7$
   $y = 2x - 3$

8. $y = 3x + 12$
   $y = 3x - 18$

9. Graph the line $y = -x + 1$. Construct a perpendicular segment through the point at $(-2, -3)$. Then find the distance from the point to the line.




10. **CANOEING** Bronson and a friend are going to carry a canoe across a flat field to the bank of a straight canal. Describe the shortest path they can use.

⑥

① $y = -x$ $(0,0)$ ★

② $y = -x - 4$ $(0,-4)$

Step 1: Find the equation for a perpendicular Line

$m = \frac{-1}{1} \rightleftarrows = 1$ — $(0,0)$ $x_1\ y_1$

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

$y - 0 = 1(x - 0)$

$\boxed{y = 1x}$

Step 2: use systems of equations to solve for intersection point.

$(-2, -2)$
$x_2 \quad y_2$

Step 3: Use distance formula w/ 2 points

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(-2 - 0)^2 + (-2 - 0)^2}$

$= \sqrt{(-2)^2 + (-2)^2}$

$= \sqrt{4 + 4}$

$= \sqrt{8}$

$= 2.8$

⑦

① $y = 2x + 7$

② $y = 2x - 3$

$m = \frac{2}{1} \rightleftarrows -\frac{1}{2}$

$(0, 7)$

$y - 7 = -\frac{1}{2}(x - 0)$

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

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

① $y = -x - 4$

② $y = x$

$x = -x - 4$

$+x \quad +x$

$\frac{2x}{2} = \frac{-4}{2}$

$x = -2$

$y = -2$

$y = 2x - 3$

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

$2x - 3 = -\frac{1}{2}x + 7$

$+\frac{1}{2}x \quad +3 \quad +\frac{1}{2}x \quad +3$

$2.5x = 10$

$x = 4$

$y = 2(4) - 3$

$y = 8 - 3$

$y = 5$

$(4, 5)$

$(0, 7) \quad (4, 5)$
$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(4 - 0)^2 + (5 - 7)^2}$

$= \sqrt{(4)^2 + (-2)^2}$

$= \sqrt{16 + 4}$

$= \sqrt{20} = \boxed{4.47}$

⑧ $y = 3x + 12$ $y = 3x - 18$

$y = 3x - 18$ $y = -\frac{1}{3}x + 12$

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

$(0, 12)$
$x_1\ y_1$

$y - 12 = -\frac{1}{3}(x - 0)$

$y - 12 = -\frac{1}{3}x$

$y = -\frac{1}{3}x + 12$

$3x - 18 = -\frac{1}{3}x + 12$

$\frac{3}{10}\left(\frac{10}{3}\right)x = 30\left(\frac{3}{10}\right)$

$x = 9$

$y = 3(9) - 18$

$y = 27 - 18$

$y = 9$

$(9, 9)$

$d = \sqrt{(9 - 0)^2 + (9 - 12)^2}$

$= \sqrt{9^2 + (-3)^2}$

$\sqrt{81 + 9} = \sqrt{90} = 9.5$