Distance & Midpoint WS Name Key

Find the distance between the given two points. Give exact answers

1. (-2, 8) , (6,0)

$\sqrt{(6+2)^2+(0-8)^2} = \sqrt{8^2+(-8)^2} = \sqrt{64+64} =$

$= \sqrt{128} = \boxed{8\sqrt{2}}$

$2 \cdot 64$

2. (-3, -1) , (7,4)

$\sqrt{(7+3)^2+(4+1)^2} = \sqrt{10^2+(5)^2} =$

$= \sqrt{100+25} = \sqrt{125} = 5\sqrt{5}$

$5 \cdot 25$

3. (-5,8) , (1,6)

$\sqrt{(1+5)^2+(6-8)^2} = \sqrt{6^2+(-2)^2} = \sqrt{36+4} =$

$= \sqrt{40} = \boxed{2\sqrt{10}}$

$2 \cdot 2 \cdot 10$

4. (-2,10), (10, -2)

$\sqrt{(10+2)^2+(-2-10)^2} = \sqrt{12^2+(-12)^2} = \sqrt{144+144}$

$= \sqrt{288} = \boxed{12\sqrt{2}}$

$2 \cdot 144$

5. (8,3) , (2, -1)

$\sqrt{(2-8)^2+(-1-3)^2} = \sqrt{(-6)^2+(-4)^2} = \sqrt{36+16} =$

$= \sqrt{52} = \boxed{2\sqrt{13}}$

$2 \cdot 2 \cdot 13$

6. (-10, -15) , (-4, -8)

$\sqrt{(-4+10)^2+(-8+15)^2} = \sqrt{6^2+7^2} =$

$= \sqrt{36+49} = \boxed{\sqrt{85}}$

$5 \cdot 17$

Find the Midpoint between the given two points.

7. (3, -7) , (-3,1)

$\left(\frac{3+-3}{2}, \frac{-7+1}{2}\right) = \left(\frac{0}{2}, \frac{-6}{2}\right) = \boxed{(0,-3)}$

8. (2, 2) , (6, 14)

$\left(\frac{2+6}{2}, \frac{2+14}{2}\right) = \left(\frac{8}{2}, \frac{16}{2}\right) = \boxed{(4,8)}$

9. (0,-6) , (-4, 9)

$\left(\frac{0+-4}{2}, \frac{-6+9}{2}\right) = \left(-\frac{4}{2}, \frac{3}{2}\right) = \boxed{\left(-2, \frac{3}{2}\right)}$

10. (9, -2) , (3, 6)

$\left(\frac{9+3}{2}, \frac{-2+6}{2}\right) = \left(\frac{12}{2}, \frac{4}{2}\right) = \boxed{(6,2)}$

11. (-5,8) , (1,6)

$\left(\frac{-5+1}{2}, \frac{8+6}{2}\right) = \left(-\frac{4}{2}, \frac{14}{2}\right) = \boxed{(-2,7)}$

12. (-5, 4) , (2, -4)

$\left(\frac{-5+2}{2}, \frac{4+-4}{2}\right) = \left(\frac{-3}{2}, \frac{0}{2}\right) = \boxed{\left(-\frac{3}{2}, 0\right)}$

13. The point (1, -12) is the midpoint of segment $\overline{AB}$. If the coordinates of point A are (3, 4), find the coordinates of point B.

(3,4) (1,-12) (x_2, y_2)

A m B

$\left(\frac{3+x_2}{2}, \frac{4+y_2}{2}\right) = (1, -12)$

$\frac{3+x_2}{2} = 1$ $\quad \frac{4+y_2}{2} = -12$

$3 + x_2 = 2$ $\quad 4 + y_2 = -24$

$x_2 = -1$ $\quad y_2 = -28$

$\boxed{(-1, -28)}$

14. If the distance between points A and B is $3\sqrt{2}$ units and point A is (-2, 6), find the values of x if point B is (x, 3).

(-2,6) (x,3)

A B

$3\sqrt{2}$

$3\sqrt{2} = \sqrt{(x-2)^2+(3-6)^2}$

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

$(3\sqrt{2})^2 = \left(\sqrt{(x+2)^2+9}\right)^2$

$9(2) = (x+2)^2+9$

$18 = (x+2)^2+9$

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

$\pm 3 = x+2$

$x+2=3$ $\quad x+2=-3$

$\boxed{x=1 \quad x=-5}$

Answers: 1) $8\sqrt{2}$ 2) $5\sqrt{5}$ 3) $2\sqrt{10}$ 4) $12\sqrt{2}$ 5) $2\sqrt{13}$ 6) $\sqrt{85}$ 7) (0, −3) 8) (4, 8) 9) (−2, 1.5) 10) (6,2) 11) (−2, 7) 12) (-1.5, 0) 13) (−1, −28) 14) x = 1 or x = −5