Formula for the Day: $Distance = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Find the **distance** between the two given points. Leave your answers in simplified radical form.

1. (0, 3) and (-4, 6)

$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(-4-0)^2 + (6-3)^2}$

$\sqrt{(-4)^2 + (3)^2}$

$\sqrt{16+9} = \sqrt{25} = \boxed{5}$

2. (-7, 3) and (0, 0)

$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(0+7)^2 + (0-3)^2}$

$\sqrt{(7)^2 + (-3)^2}$

$\sqrt{49+9} = \boxed{\sqrt{58}} \approx 7.6$

58 → 2 · 29

3. (-3, -6) and (-2, 1)

$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(-2+3)^2 + (1+6)^2}$

$\sqrt{(1)^2 + (7)^2}$

$\sqrt{1+49} = \sqrt{50} = \boxed{5\sqrt{2}}$

50 → 2 · 25 → 2 · 5 · 5

4. (4, 7) and (-2, -5)

$x_1\ y_1 \quad x_2\ y_2$

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

$\sqrt{(-6)^2 + (-12)^2}$

$\sqrt{36+144}$

$\sqrt{180} = \boxed{6\sqrt{5}}$

180 → 2 · 90 → 2 · 2 · 45 → 2 · 2 · 3 · 3 · 5

5. (12, 2) and (6, 10)

$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(6-12)^2 + (10-2)^2}$

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

$\sqrt{36+64} = \sqrt{100} = \boxed{10}$

6. (5, 4) and (9, -2)

$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(9-5)^2 + (-2-4)^2}$

$\sqrt{(4)^2 + (-6)^2}$

$\sqrt{16+36} = \sqrt{52} = \boxed{2\sqrt{13}}$

52 → 2 · 26 → 2 · 2 · 13

Use the distance formula to find the missing value of the coordinate pair.

7. Find *x* if the distance between (5, -1) and (x, 4) is 13 units.

$x_1\ y_1 \quad x_2\ y_2$

$13 = \sqrt{(x-5)^2 + (4+1)^2}$

$13 = \sqrt{(x-5)^2 + (5)^2}$

$(13)^2 = \left(\sqrt{(x-5)^2 + 25}\right)^2$

$169 = (x-5)^2 + 25$

$144 = (x-5)^2$

$\sqrt{144} = \sqrt{(x-5)^2}$

$12 = (x-5)$

$+5 \quad +5$

$17 = x$

8. Find *y* if the distance between (2, 6) & (8, y) is 10 units.

$10 = \sqrt{(8-2)^2 + (y-6)^2}$

$10 = \sqrt{(6)^2 + (y-6)^2}$

$(10)^2 = \left(\sqrt{36 + (y-6)^2}\right)^2$

$100 = 36 + (y-6)^2$

$64 = (y-6)^2$

$\sqrt{64} = \sqrt{(y-6)^2}$

$8 = y-6$

$+6 \quad +6$

$14 = y$

9. Find *x* if the distance between (3, 2) and (x, -2) is 5 units.

$5 = \sqrt{(x-3)^2 + (-2-2)^2}$

$5 = \sqrt{(x-3)^2 + (-4)^2}$

$(5)^2 = \left(\sqrt{(x-3)^2 + 16}\right)^2$

$25 = (x-3)^2 + 16$

$9 = (x-3)^2$

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

$3 = x-3$

$+3 \quad +3$

$6 = x$

10. Find *y* if the distance between (4, -2) & (-8, y) is 13 units

$13 = \sqrt{(-8-4)^2 + (y+2)^2}$

$13 = \sqrt{(-12)^2 + (y+2)^2}$

$(13)^2 = \left(\sqrt{144 + (y+2)^2}\right)^2$

$169 = 144 + (y+2)^2$

$25 = (y+2)^2$

$\sqrt{25} = \sqrt{(y+2)^2}$

$5 = y+2$

$-2 \quad -2$

$3 = y$