

Push Tasks — Answers



1. Find the distance between $(-6, -4)$ and $(9, 16)$.

Solution

$$\Delta x = 15, \Delta y = 20$$

$$d = \sqrt{15^2 + 20^2} = \sqrt{625} = 25$$

3. A rectangle has corners $(-2, -1)$, $(6, -1)$, $(6, 14)$, $(-2, 14)$. Find the diagonal length.

Solution

$$\Delta x = 8, \Delta y = 15$$

$$d = \sqrt{8^2 + 15^2} = \sqrt{289} = 17$$

2. A square has vertices $(1, 1)$, $(7, 1)$, $(7, 7)$, $(1, 7)$. Find the diagonal length.

Solution

$$\Delta x = 6, \Delta y = 6$$

$$d = \sqrt{6^2 + 6^2} = \sqrt{72} = 6\sqrt{2} \approx 8.49$$

4. Point $A = (2, 3)$. Find a point B so that $AB = 13$ and both coordinates of B are integers.

Solution

Using the 5:12:13 triple:

$$B = (2 + 5, 3 + 12) = (7, 15)$$

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5. For $A = (-4, 5)$, give an integer-coordinate point B with $AB = 17$.

Solution

Using the 8:15:17 triple:

$$B = (-4 + 8, 5 + 15) = (4, 20)$$

7. A segment is 15 units long with horizontal change 9. Find both possible vertical changes.

Solution

$$81 + v^2 = 225 \Rightarrow v^2 = 144$$

$$v = 12 \text{ or } v = -12$$

6. The distance from $(-3, 2)$ to $(x, 14)$ is 13. Find both values of x .

Solution

$$\Delta y = 12; \Delta x^2 + 144 = 169 \Rightarrow \Delta x = \pm 5$$
$$x = 2 \text{ or } x = -8$$

8. A segment is 26 units long with vertical change 24. Find both possible horizontal changes.

Solution

$$h^2 + 576 = 676 \Rightarrow h^2 = 100$$

$$h = 10 \text{ or } h = -10$$

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9. For $(-2, -3)$ and $(3, 9)$, explain why $5^2 + 12^2 = 13^2$ gives the distance.

Solution

$\Delta x = 5, \Delta y = 12$ are the legs; the distance is the hypotenuse $d = 13$.

11. Give two points an irrational distance apart. Show the exact distance.

Solution

E.g. $(0, 0)$ and $(1, 2)$:

$$d = \sqrt{1^2 + 2^2} = \sqrt{5} \text{ (irrational)}$$

10. A student claims $(1, 1)$ and $(6, 13)$ are 14 units apart. Test the claim.

Solution

$\Delta x = 5, \Delta y = 12; d = \sqrt{169} = 13 \neq 14$: false.

12. Create two points with integer coordinates that are 25 units apart.

Solution

E.g. using the 7:24:25 triple:

$(0, 0)$ and $(7, 24)$: $d = \sqrt{49 + 576} = 25$