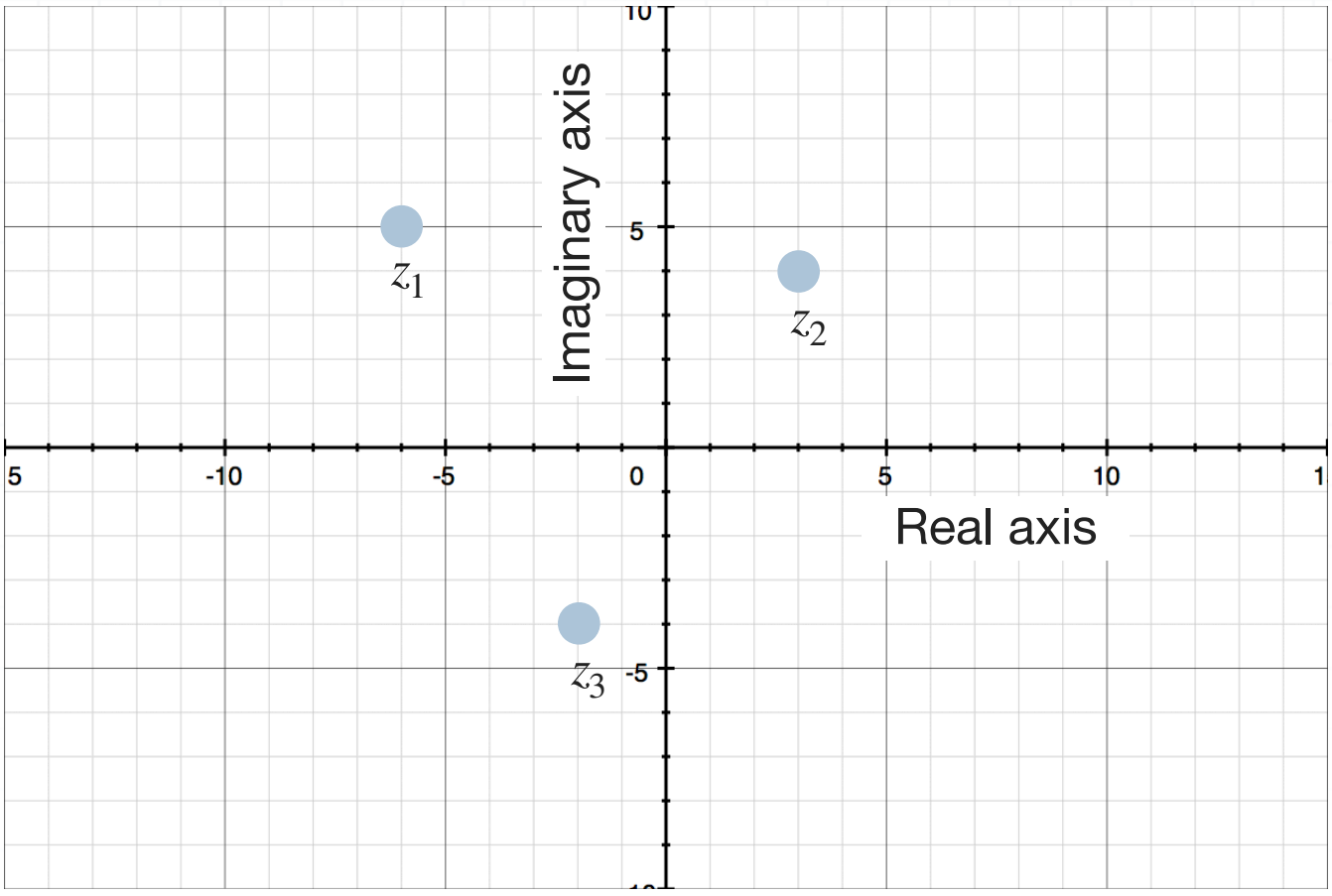
**Topic**: Graphing complex numbers

**Question**: Which three complex numbers are represented in the graph?




**Answer choices**:

A $3 - 4i$, $2 + 4i$, and $-5 + 6i$

B $-2 - 4i$, $3 + 4i$, and $-6 + 5i$

C $5 + 6i$, $2 + 4i$, and $-3 - 4i$

D $3 + 4i$, $-6 - 5i$, and $-4 - 2i$

**Solution**: B

The point $z_1$ is $6$ units to the left of the vertical axis and $5$ units above the horizontal axis, so it's the complex number $-6 + 5i$.

The point $z_2$ is $3$ units to the right of the vertical axis and $4$ units above the horizontal axis, so it's the complex number $3 + 4i$.

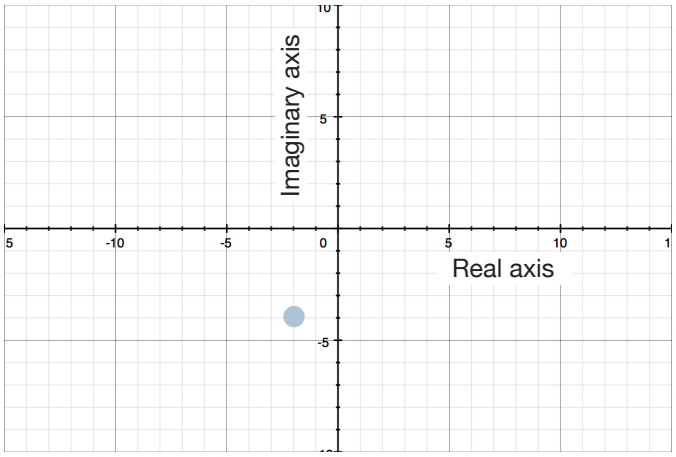
The point $z_3$ is $2$ units to the left of the vertical axis and $4$ units below the horizontal axis, so it's the complex number $-2 - 4i$.

**Topic**: Graphing complex numbers

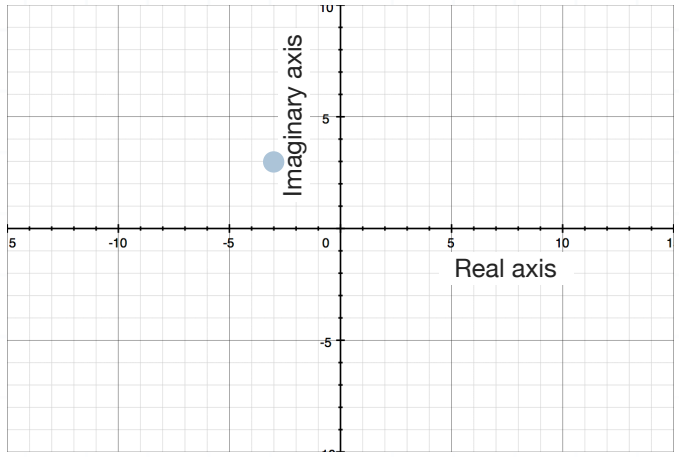
**Question**: Which graph shows the difference of $-8+5i$ and $-6+9i$ ($(-8+5i)-(-6+9i)$)?

**Answer choices**:

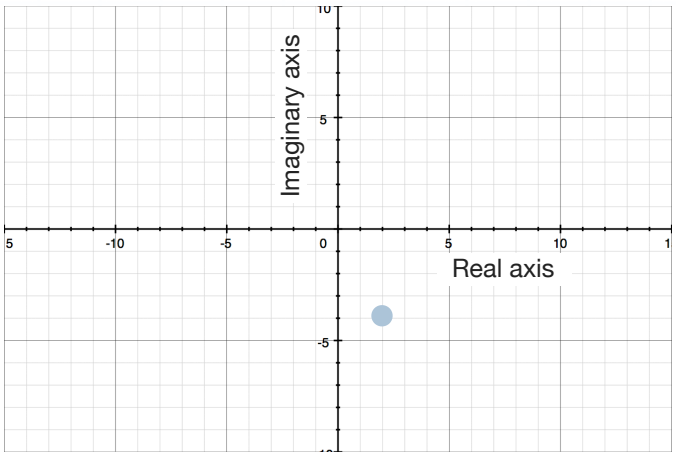
A



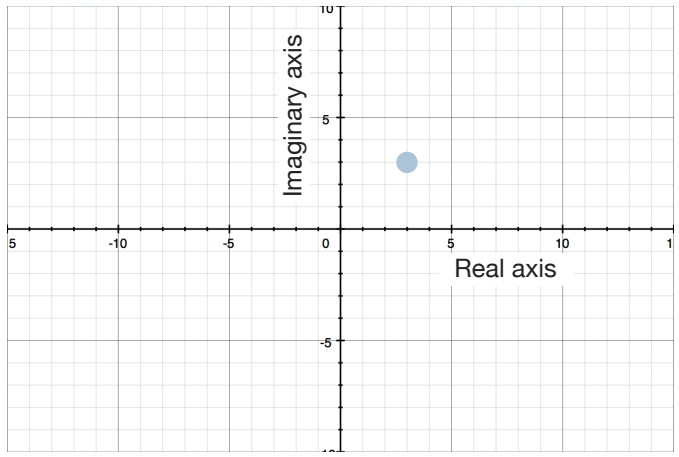

B




C




D



**Solution**: A

First, we'll compute the difference of the complex numbers.

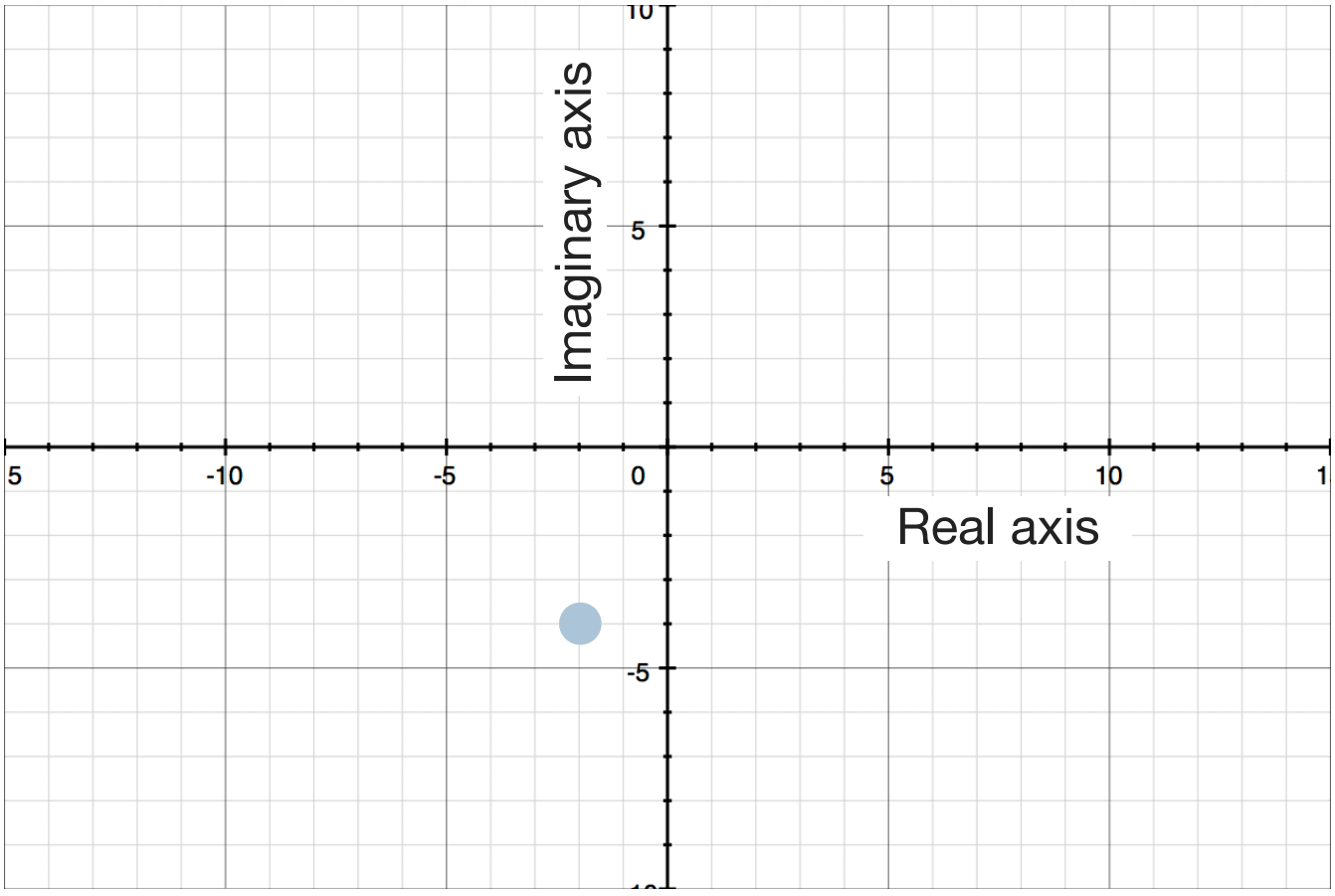
$$(-8+5i)-(-6+9i)$$

$$(-8-(-6))+(5-9)i$$

$$(-8+6)+(5-9)i$$

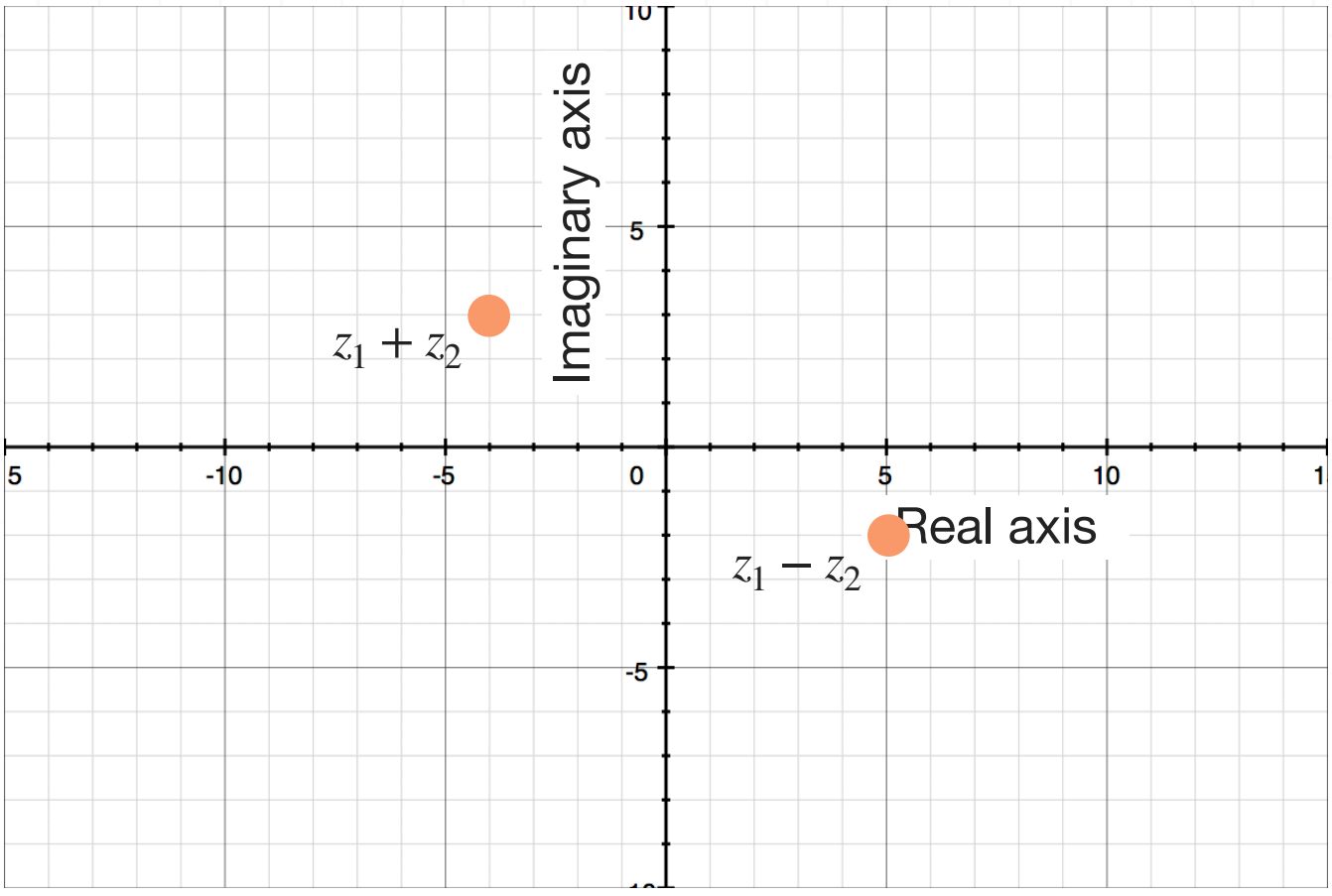
$$-2-4i$$

The real part of their difference is $-2$, and the imaginary part is $-4$. This means that the difference should be graphed $2$ units to the left of the vertical axis and $4$ units below the horizontal axis.



**Topic**: Graphing complex numbers

**Question**: The points on the graph are the sum $z_1 + z_2$ and difference $z_1 - z_2$ of two $z_1$ and $z_2$. Use a system of equations to find $z_1$ and $z_2$.




**Answer choices**:

A $z_1 = (5/2) - (1/2)i$ and $z_2 = (1/2) + (1/2)i$

B $z_1 = (3/2) + (7/2)i$ and $z_2 = -(5/2) - (3/2)i$

C $z_1 = (1/2) + (1/2)i$ and $z_2 = -(9/2) + (5/2)i$

D $z_1 = (7/2) - (3/2)i$ and $z_2 = (5/2) + (1/2)i$

**Solution**: C

The points on the graph are $z_1 + z_2 = -4 + 3i$ and $z_1 - z_2 = 5 - 2i$. We'll set up this system of equations:

$$z_1 + z_2 = -4 + 3i$$

$$z_1 - z_2 = 5 - 2i$$

Add the two equations together to eliminate $z_2$.

$$z_1 + z_2 = -4 + 3i$$

$$z_1 + z_2 + (z_1 - z_2) = -4 + 3i + (5 - 2i)$$

$$z_1 + z_2 + z_1 - z_2 = -4 + 3i + 5 - 2i$$

$$2z_1 = 1 + i$$

$$z_1 = \frac{1}{2} + \frac{1}{2}i$$

Substitute $z_1$ back into one of the other equations to find $z_2$.

$$z_1 + z_2 = -4 + 3i$$

$$\frac{1}{2} + \frac{1}{2}i + z_2 = -4 + 3i$$

$$z_2 = -4 + 3i - \frac{1}{2} - \frac{1}{2}i$$

$$z_2 = -\frac{9}{2} + \frac{5}{2}i$$