

Review Exercise Set 21

Exercise 1: Add and simplify.

$$(-8 + 5i) + (9 - 2i) =$$

Exercise 2: Subtract and simplify.

$$\left(\frac{2}{3} - \frac{3}{4}i\right) - \left(\frac{1}{2} + \frac{1}{6}i\right) =$$

Exercise 3: Simplify.

$$\sqrt{-\frac{16}{36}} =$$

Exercise 4: Find the following product and express your answer in the standard form of a complex number ($a + bi$).

$$(-3i)(2 - 4i) =$$

Exercise 5: Divide and express your answer in the standard form of a complex number ($a + bi$).

$$\frac{5i}{2-3i} =$$

Exercise 6: Find the following product and express your answer in the standard form of a complex number ($a + bi$).

$$(-1 + 2i)(5 + 6i) =$$

Review Exercise Set 21 Answer Key

Exercise 1: Add and simplify.

$$(-8 + 5i) + (9 - 2i) =$$

Group like terms

$$(-8 + 5i) + (9 - 2i) = (-8 + 9) + (5i - 2i)$$

Simplify

$$(-8 + 5i) + (9 - 2i) = -1 + 3i$$

Exercise 2: Subtract and simplify.

$$\left(\frac{2}{3} - \frac{3}{4}i\right) - \left(\frac{1}{2} + \frac{1}{6}i\right) =$$

Distribute the minus sign

$$\left(\frac{2}{3} - \frac{3}{4}i\right) - \left(\frac{1}{2} + \frac{1}{6}i\right) = \frac{2}{3} - \frac{3}{4}i - \frac{1}{2} - \frac{1}{6}i$$

Group like terms

$$\begin{aligned} \left(\frac{2}{3} - \frac{3}{4}i\right) - \left(\frac{1}{2} + \frac{1}{6}i\right) &= \frac{2}{3} - \frac{1}{2} - \frac{3}{4}i - \frac{1}{6}i \\ &= \left(\frac{2}{3} - \frac{1}{2}\right) + \left(-\frac{3}{4}i - \frac{1}{6}i\right) \end{aligned}$$

Get common denominators

$$\begin{aligned} \left(\frac{2}{3} - \frac{3}{4}i\right) - \left(\frac{1}{2} + \frac{1}{6}i\right) &= \left(\frac{2}{3} \times \frac{2}{2} - \frac{1}{2} \times \frac{3}{3}\right) + \left(-\frac{3}{4}i \times \frac{3}{3} - \frac{1}{6}i \times \frac{2}{2}\right) \\ &= \left(\frac{4}{6} - \frac{3}{6}\right) + \left(-\frac{9}{12}i - \frac{2}{12}i\right) \end{aligned}$$

Simplify

$$\left(\frac{2}{3} - \frac{3}{4}i\right) - \left(\frac{1}{2} + \frac{1}{6}i\right) = \frac{1}{6} - \frac{11}{12}i$$

Exercise 3: Simplify.

$$\begin{aligned}\sqrt{-\frac{16}{36}} &= \sqrt{\frac{16}{36}} \times \sqrt{-1} \\ &= \frac{4}{6} \times i \\ &= \frac{2}{3}i\end{aligned}$$

Exercise 4: Find the following product and express your answer in the standard form of a complex number ($a + bi$).

$$\begin{aligned}(-3i)(2 - 4i) &= (-3i)(2) - (-3i)(4i) \\ &= -6i + 12i^2 \\ &= -6i + 12(-1) \\ &= -6i - 12 \\ &= -12 - 6i\end{aligned}$$

Exercise 5: Divide and express your answer in the standard form of a complex number ($a + bi$).

$$\begin{aligned}\frac{5i}{2 - 3i} &= \frac{5i}{2 - 3i} \times \frac{2 + 3i}{2 + 3i} \\ &= \frac{(5i)(2 + 3i)}{(2 - 3i)(2 + 3i)} \\ &= \frac{10i + 15i^2}{4 + 6i - 6i - 9i^2} \\ &= \frac{10i + 15(-1)}{4 - 9(-1)} \\ &= \frac{10i - 15}{4 + 9} \\ &= \frac{-15 + 10i}{13} \\ &= -\frac{15}{13} + \frac{10}{13}i\end{aligned}$$

Exercise 6: Find the following product and express your answer in the standard form of a complex number ($a + bi$).

$$\begin{aligned}(-1 + 2i)(5 + 6i) &= (-1)(5 + 6i) + (2i)(5 + 6i) \\ &= -5 - 6i + 10i + 12i^2 \\ &= -5 + 4i + 12(-1) \\ &= -5 + 4i - 12 \\ &= -17 + 4i\end{aligned}$$