Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Introduction to imaginary numbers



|  |
| --- |
| **i2 = -1** |

A complex number is of the form a + bi, where a is the real number and bi is the imaginary number.

Simplify negative square roots:

* Rewrite $\sqrt{-a}$ as $\sqrt{a ∙-1}$
* Break down the perfect square if necessary, and simplify

|  |  |  |
| --- | --- | --- |
| 1. $\sqrt{-9}$
 | 1. $\sqrt{-196}$
 | 1. $\sqrt{-5}$
 |
| 1. $\sqrt{-80}$
 | 1. $\sqrt{-32}$
 | 1. -4$\sqrt{-20}$
 |

Add or subtract. Write your final answer in the form a + bi.

|  |  |  |
| --- | --- | --- |
| 1. (4 + 7i) + (2 – 3i)
 | 1. (5 – 2i) – (7 – 6i)
 | 1. (3 + i) + (-4 – 2i)
 |
| 1. (9 + $\sqrt{-36}$) + (-2 + $\sqrt{-4)}$
 | 1. (8 - $\sqrt{-100)}$ - (2 + $\sqrt{-9}$)
 | 1. (2 + $\sqrt{-12)}$ + (5 - $\sqrt{-27}$)
 |

|  |  |
| --- | --- |
| i1 | i5 |
| i2 | i6 |
| i3 | i7 |
| i4 | i8 |

How can we compute higher powers of I without extending the table?

|  |  |  |  |
| --- | --- | --- | --- |
| 1. I20
 | 1. I37
 | 1. I203
 | 1. I62
 |

Use properties of exponents and the above table to multiply

|  |  |  |
| --- | --- | --- |
| 1. 5i(9i)
 | 1. -8i(4i)
 | 1. 3i(2i)(5i)
 |
| 1. (3 + 2i)(5 + 3i)
 | 1. (3 – i)(3 + i)
 | 1. (2 – 5i)(5 – 2i)
 |

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|  |  |  |  |
| --- | --- | --- | --- |
| 1. $\sqrt{-225}$
 | 1. $\sqrt{-1}$
 | 1. $\sqrt{-300}$
 | 1. $\sqrt{-88}$
 |
| 1. $\sqrt{-75}$
 | 1. $\sqrt{-44}$
 | 1. $\sqrt{-48}$
 | 1. -2$\sqrt{-63}$
 |
| 1. (1 + 5i) + (1 – 5i)
 | 1. (3 + 2i) – (3 + 2i)
 | 1. (2 + 6i) – (7 + 9i)
 | 1. (3 + 3i) – (8 – 3i)
 |
| 1. (5 + 4i) – (-1 – 2i)
 | 1. (6 – 8i) + (4 – 5i)
 | 1. (3 + i) + (3 + i)
 | 1. (-1 – 7i) + (-4 – 3i)
 |
| (2 + $\sqrt{-1}$) + (-3 + $\sqrt{-16}$) | (4 + $\sqrt{-25}$) – (-5 - $\sqrt{-25}$)  | (4 + $\sqrt{-9}$) + (6 - $\sqrt{-49) }$ | (8 + $\sqrt{-1}$) – (3 + $\sqrt{-16}$) |
| (3 + $\sqrt{-25}$) + (12 + $\sqrt{-121}$) | (2 + $\sqrt{-16}$) – (4 - $\sqrt{-16}$)  | (2 + $\sqrt{-8}$) + (3 + $\sqrt{-18}$) | (-1 + $\sqrt{-45}$) + (-1 - $\sqrt{-20})$ |
| 1. i29
 | 1. i47
 | 1. i78
 | 1. i44
 |
| 1. (3i)(3i)
 | 1. (4i)2
 | 1. (-3i)(8i)
 | 1. (2i)(4i)(6i)
 |
| 1. 4(5i)
 | 1. 4i(5i)
 | 1. (3i2)(4i2)
 | 1. -5i(5i)
 |
| 1. (3 + 6i)(3 – 6i)
 | 1. (3 + i)(9 – 3i)
 | 1. (2 + 3i)(4 + 7i)
 | 1. (2 – 5i)(3 – 6i)
 |