

**4.6 Complex Numbers**

Name \_\_\_\_\_

Write each expression as a complex number in the form,  $a + bi$ .

1.  $-3 + \sqrt{-4}$

2.  $5 + \sqrt{-9}$

3.  $10 - \sqrt{-10}$

4.  $3 - \sqrt{-7}$

5.  $2 + \sqrt{-45}$

6.  $-2 - \sqrt{-27}$

7.  $\sqrt{-80}$

8.  $\sqrt{-200}$

Answers: 1.  $-3 + 2i$ ; 3.  $10 - i\sqrt{10}$ ; 5.  $2 + 3i\sqrt{5}$ ; 7.  $4i\sqrt{5}$

Simplify each expression. Write your answer in the form, $a + bi$ .	
<b>9.</b> $(4 + 5i) + (3 + 2i)$	<b>10.</b> $(7 + 2i) + (4 + 3i)$
<b>11.</b> $(6 + 3i) - (2 + 4i)$	<b>12.</b> $(5 - 5i) - (3 + i)$
<b>13.</b> $(5 - 6i)(2 + i)$	<b>14.</b> $(2 - 3i)(3 - 4i)$
<b>15.</b> $(5 - 6i)(5 + 6i)$	<b>16.</b> $(4 + 3i)(4 - 3i)$
<b>17.</b> $(1 - 2i)^2$	<b>18.</b> $(3 + i)^2$
Answers: <b>9.</b> $7 + 7i$ ; <b>11.</b> $4 - i$ ; <b>13.</b> $16 - 7i$ ; <b>15.</b> $61$ ; <b>17.</b> $-3 - 4i$	

Simplify each expression. Write your answer in the form,  $a + bi$ .

19.  $\frac{3}{2i}$

20.  $-\frac{5}{3i}$

21.  $\frac{6}{2+i}$

22.  $\frac{9}{2-2i}$

23.  $\frac{5-i}{4-3i}$

24.  $\frac{4+2i}{1-5i}$

25.  $\frac{1+i}{1-i}$

26.  $\frac{3+i}{3-i}$

Answers: 19.  $-\frac{3}{2}i$ ; 21.  $\frac{12}{5} - \frac{6}{5}i$ ; 23.  $\frac{23}{25} + \frac{11}{25}i$ ; 25.  $i$

Simplify.

27.  $i^{12}$

28.  $i^{13}$

29.  $i^{50}$

30.  $i^{81}$

31.  $(3i)^4$

32.  $(2i)^5$

Answers: 27. 1; 29. -1; 31. 81