Complex Numbers Worksheets

1. Compute $(1+2i)(1-2i)$

2. Compute $(1+i)(1-i)$

3. Verify that $-1+2i$ and $-1-2i$ are solutions to $x^2+2x+5=0$

4. Compute $i(2-i)(1+2i)$

5. Compute $\left((5-\boldsymbol{i})-2(1-3\boldsymbol{i})\right)^2$

6. Compute $(3-\boldsymbol{i})(4+7\boldsymbol{i})$

7. Compute $-i(2-i)(5+6i)$

Complex Numbers Worksheets

1. Compute $(1+2i)(1-2i)$

$$(1+2i)(1-2i)$$
$$= 1+2i-2i-4i^2$$
$$= 1+0-4(-1)$$
$$= 1+4=5$$

2. Compute $(1+i)(1-i)$

$$(1+\boldsymbol{i})(1-\boldsymbol{i})$$
$$= 1+\boldsymbol{i}-\boldsymbol{i}-\boldsymbol{i}^2$$
$$= 1-\boldsymbol{i}^2$$
$$= 1+1$$
$$= 2+0\boldsymbol{i}=2$$

3. Verify that $-1+2i$ and $-1-2i$ are solutions to $x^2+2x+5=0$

$-1+2i$:

$$(-1+2i)^2+2(-1+2i)+5$$
$$= 1-4i+4i^2-2+4i+5$$
$$= 4i^2-4i+4i+1-2+5$$
$$= -4+0+4=0$$

$-1-2i$:

$$(-1-2i)^2+2(-1-2i)+5$$
$$= 1+4i+4i^2-2-4i+5$$
$$= 4i^2+4i-4i+1-2+5$$
$$= -4+0+4=0$$

So, both complex numbers $-1-2i$ and $-1+2i$ are solutions to the quadratic equation $x^2+2x+5=0$

4. Compute $i(2-i)(1+2i)$

$$i(2-i)(1+2i)$$
$$= i(2+4i-i-2i^2)$$
$$= i(2+3i-2(-1))$$
$$= i(2+3i+2)$$
$$= i(4+3i)$$
$$= 4i+3i^2$$
$$= -3+4i$$

5. Compute $\left((5-\boldsymbol{i})-2(1-3\boldsymbol{i})\right)^2$

$$(3+5\boldsymbol{i})^2$$
$$= 9+30\boldsymbol{i}+25\boldsymbol{i}^2$$
$$= 9+30\boldsymbol{i}+(-25)$$
$$= -16+30\boldsymbol{i}$$

6. Compute $(3-\boldsymbol{i})(4+7\boldsymbol{i})$

$$12-4i+21i-7i^2$$
$$= 12+17i-(-7)$$
$$= 19+17i$$

7. Compute $-i(2-i)(5+6i)$

$$-i(2-i)(5+6i)$$
$$= -i(10-5i+12i-6i^2)$$
$$= -i(10+7i+6)$$
$$= -i(16+7i)$$
$$= -16i-7i^2=-16i+7$$
$$= 7-16i$$