Precalculus Name Key

HW 2B.1 Complex Numbers - Rationalizing the Denominator

Simplify.

1) $(-7 - 6i)(4 + 7i)$

	$-7 - 6i$
4	$-28 \quad -24i$
$7i$	$-49i \quad -42i^2$

42

$14 - 73i$

2) $(3 + 2i)(6 + 5i)$

	$3 + 2i$
6	$18 \quad 12i$
$5i$	$15i \quad 10i^2$

-10

$8 + 27i$

3) $(-8i)(7i)(6 - 8i)$

$-56i^2(6 - 8i)$

$56(6 - 8i)$

$336 - 448i$

4) $(4i)(-4i)(6 + 6i)$

$-16i^2(6 + 6i)$

$16(6 + 6i)$

$96 + 96i$

5) $(-4 - 2i)^2$

$(-4 - 2i)(-4 - 2i)$

	$-4 - 2i$
-4	$16 \quad 8i$
$-2i$	$8i \quad 4i^2$

-4

$12 + 16i$

6) $(-1 + 5i)(-5 - 4i)$

	$-1 + 5i$
-5	$5 \quad -25i$
$-4i$	$4i \quad -20i^2$

20

$25 - 21i$

7) $(-i)(-8i)(-6 + 2i)$

$8i^2(-6 + 2i)$

$-8(-6 + 2i)$

$48 - 16i$

8) $(-3i)(2i)(-5 + 8i)$

$-6i^2(-5 + 8i)$

$6(-5 + 8i)$

$-30 + 48i$

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

$-8i^2(-8 + 5i)$

$8(-8 + 5i)$

$-64 + 40i$

10) $(-2 - 6i)(4 + 4i)$

	$-2 - 6i$
4	$-8 \quad -24i$
$4i$	$-8i \quad -24i^2$

24

$16 - 32i$

11) $\frac{(-6+7i)(6-i)}{(6+i)(6-i)} = \frac{(-6+7i)(6-i)}{37}$

	$-6+7i$
6	$-36 \quad 42i$
$-i$	$6i \quad -7i^2$

-7

$-29+48i$

$= \boxed{\frac{-29+48i}{37}}$

12) $\frac{8i(-2-7i)}{(-2+7i)(-2+7i)} = \frac{8i(-2-7i)}{53}$

$2^2+7^2=53$

$= \frac{-16i-56i^2}{53}$

$= \boxed{\frac{-16i+56}{53}}$

13) $\frac{8i(-1+10i)}{(-1-10i)(-1+10i)} = \frac{8i(-1+10i)}{101}$

$1^2+10^2=101$

$= \frac{-8i+80i^2}{101}$

$= \boxed{\frac{-8i-80}{101}}$

14) $\frac{(8-4i)(5+7i)}{(5-7i)(5+7i)} = \frac{(8-4i)(5+7i)}{74}$

$5^2+7^2=74$

	$8-4i$
5	$40 \quad -20i$
$7i$	$56i \quad -28i^2$

28

$68+36i$

$= \frac{68+36i}{74} = \frac{68}{74}+\frac{36}{74}i$

$= \boxed{\frac{34}{37}+\frac{18i}{37}}$

15) $\frac{3i(1+5i)}{(1-5i)(1+5i)} = \frac{3i(1+5i)}{26}$

$1^2+5^2=26$

$= \frac{3i+15i^2}{26}$

$= \boxed{\frac{3i-15}{26}}$

16) $\frac{4(-9+7i)}{(-9-7i)(-9+7i)} = \frac{4(-9+7i)}{130}$

$9^2+7^2=130$

$= \frac{-36+28i}{130}$

$= \boxed{\frac{-18+14i}{65}}$

17) $\frac{(-5-3i)(10-4i)}{(10+4i)(10-4i)} = \frac{(-5-3i)(10-4i)}{116}$

$10^2+4^2=116$

	$-5-3i$
10	$-50 \quad -30i$
$-4i$	$20i \quad 12i^2$

-12

$-62+10i$

$= \frac{-62+10i}{116}$

$= \frac{2(-31+5i)}{116_{58}}$

$= \boxed{\frac{-31+5i}{58}}$

18) $\frac{(2-10i)(-8-7i)}{(-8+7i)(-8-7i)} = \frac{(2-10i)(-8-7i)}{113}$

$64+49=$

	$2-10i$
-8	$-16 \quad 80i$
$-7i$	$-14i \quad 70i^2$

-70

$-86+66i$

$= \boxed{\frac{-86+66i}{113}}$

19) $\frac{(4-i)(10+4i)}{(10-4i)(10+4i)} = \frac{(4-i)(10+4i)}{116}$

$10^2+4^2=116$

	$4-i$
10	$40 \quad -10i$
$4i$	$16i \quad -4i^2$

4

$44+6i$

$= \frac{44+6i}{116}$

$= \frac{2(22+3i)}{116_{58}}$

$= \boxed{\frac{22+3i}{58}}$

20) $\frac{10i(9-4i)}{(9+4i)(9-4i)} = \frac{10i(9-4i)}{97}$

$9^2+4^2=97$

$= \frac{90i-40i^2}{97}$

$= \boxed{\frac{90i+40}{97}}$

