

Name \_\_\_\_\_  
Date \_\_\_\_\_ Period \_\_\_\_\_

Accelerated Geometry  
Complex Numbers Review

Simplify the following radicals.

1) $\sqrt{-80}$ $4i\sqrt{5}$	2) $-2\sqrt{-72}$ $-12i\sqrt{2}$	3) $9i\sqrt{-49}$ $-63i$
4) $\sqrt{\frac{-96}{64}}$ $\frac{4i\sqrt{6}}{8} = \frac{i\sqrt{6}}{2}$	5) $\sqrt{\frac{126}{50}}$ $\frac{3\sqrt{7}}{5}$	
6) $\sqrt{\frac{-120}{8}}$ $\frac{2i\sqrt{15}}{2} = i\sqrt{15}$	7) $-5\sqrt{-90}$ $-15i\sqrt{10}$	

Simplify using powers of i:

8) $i^{20} + 6i^{10} - 9i^{20}$ $1 + 6(-1) - 9(1)$ $1 - 6 - 9 = -14$	9) $i^{250}$ $-1$
10) $3i^{27}$ $3(-i) = -3i$	11) $-2i^{60} - 3i^{14}$ $-2(1) - 3(-1)$ $-2 + 3 = 1$
12) $3i^{22} - 7i$ $3(-1) - 7i = -3 - 7i$	13) $3i^{22} - 16i^{314}$ $3(-1) - 16(-1)$ $3 + 16 = 19$
14) $-18i^{57}$ $-18(i) = -18i$	15) $-13i^{55} + 5i^{140} + 8i^{10}$ $-13(-i) + 5(1) + 8(-1)$ $13i + 5 - 8$ $-3 + 13i$

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Solve the following quadratic equations.

16) $4x^2 + 2 = -2$ $4x^2 = -4$ $\sqrt{x^2} = \sqrt{-1}$ $x = \pm i$	17) $2(x^2 - 1) = -6$ $x^2 - 1 = -3$ $\sqrt{x^2} = \sqrt{-2}$ $x = \pm i\sqrt{2}$	18) $(x+1)^2 = -4$ $x+1 = \pm 2i$ $x = -1 \pm 2i$
19) $\frac{2}{3}(x-4)^2 = -6 \cdot \frac{3}{2}$ $\sqrt{(x-4)^2} = \sqrt{-9}$ $x-4 = \pm 3i$ $x = 4 \pm 3i$	20) $x^2 - 70 = 2$ $-x^2 = 72$ $\sqrt{x^2} = \sqrt{-72}$ $x = \pm 6i\sqrt{2}$	

Solve for x and y:

21) $6x - 4 + 15yi = -10 - 30i$ $6x - 4 = -10$ $6x = -6$ $x = -1$ $15y = -30$ $y = -2$	22) $5(x+2) + 12(\frac{1}{2}y)i = 15x - 24yi + 4i$ $5(x+2) = 15x$ $5x + 10 = 15x$ $10 = 10x$ $x = 1$ $12(\frac{1}{2}y)i = -24yi + 4i$ $6y = -24y + 4$ $30y = 4$ $y = \frac{4}{15}$
23) $16x + 2i - 4 = 20 + 10yi$ $16x - 4 = 20$ $16x = 24$ $x = \frac{3}{2}$ $2 = \frac{10y}{10}$ $y = \frac{1}{5}$	24) $5x - 12 + 36yi = 13 + 6i$ $5x - 12 = 13$ $5x = 25$ $x = 5$ $36y = 6$ $y = \frac{1}{6}$

Simplify the following expressions.

$$25) 5i(9-2i)(1-3i)$$

$$45i + 10i^2$$

$$(10+45i)(1-3i)$$

$$10 - 30i + 45i + 135i^2$$

$$\boxed{145+15i}$$

$$26) \frac{4+6i}{4-3i} \cdot \frac{4+3i}{4+3i} = \frac{16+12i+24i+18i^2}{16+12i+12i+9i^2}$$

$$= \frac{-2+36i}{25}$$

$$27) 5(-2-3i) - (-2+7i)$$

$$-10-15i+2-7i$$

$$\boxed{-8-22i}$$

$$28) \frac{2i}{3+6i} \cdot \frac{3-6i}{3-6i} = \frac{6i+12i^2}{9-18i+18i+36i^2}$$

$$= \frac{12+6i}{45} = \frac{4+2i}{15}$$

$$29) (7+4i)^2$$

$$(7+4i)(7+4i)$$

$$49+28i+28i+16i^2$$

$$\boxed{33+56i}$$

$$30) -2i(13+5i) - 3(14-6i)$$

$$-26i+10i^2-42+18i$$

$$\boxed{-32-8i}$$

$$31) -4i(1-6i)(12-2i)$$

$$-4i+24i^2$$

$$(-24-4i)(12-2i)$$

$$-288+48i-48i+8i^2$$

$$\boxed{-296}$$

$$32) \frac{6+7i}{1-9i} \cdot \frac{1+9i}{1+9i} = \frac{6+54i+7i+63i^2}{1+9i-9i+81i^2}$$

$$= \frac{-57+61i}{82}$$

$$33) -3(-5-9i) + (-1+7i)$$

$$15+27i-1+7i$$

$$\boxed{14+34i}$$

$$34) \frac{15i}{5+10i} \cdot \frac{5-10i}{5-10i} = \frac{75i+150i^2}{25-50i+50i+100i^2}$$

$$= \frac{150+75i}{125} = \frac{6+3i}{5}$$

$$35) (-8+3i)^2$$

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

$$64-24i-24i+9i^2$$

$$\boxed{55-48i}$$

$$36) 2i(5+2i) - 10(11-4i)$$

$$10i+4i^2-110+40i$$

$$\boxed{-114+50i}$$