Name __Key__ ID: 1

apter 4 Review for Test 2

Date_____ Period_____

Solve each equation by completing the square.

1) $x^2 + 4x - 96 = 0$

$x^2 + 4x + \underline{(2)^2} = 96 + \underline{4}$

$(x+2)^2 = 100$

$x + 2 = \pm\sqrt{100}$

$x + 2 = \pm 10$
$-2 \quad -2$

$x = \begin{matrix} 10-2 \\ -10-2 \end{matrix}$ $\boxed{\{8, 12\}}$

2) $n^2 - 2n - 82 = 0$

$n^2 - 2n + \underline{(-1)^2} = 82 + \underline{1}$

$(n-1)^2 = 83$

$n - 1 = \pm\sqrt{83}$

$\boxed{n = 1 \pm \sqrt{83}}$

3) $2n^2 - 14n + 45 = 0$

$\dfrac{2n^2}{2} - \dfrac{14n}{2} = \dfrac{-45}{2}$

$n^2 - 7n + \underline{(-\frac{7}{2})^2} = \dfrac{-45}{2} + \dfrac{49}{4}$

$(n-\frac{7}{2})^2 = -\dfrac{90}{4} + \dfrac{49}{4}$

$\sqrt{(n-\frac{7}{2})^2} = \pm\sqrt{-\dfrac{41}{4}}$

$n - \frac{7}{2} = \dfrac{\pm i\sqrt{41}}{2}$

$+\frac{7}{2} \quad +\frac{7}{2}$

$\boxed{n = \dfrac{7 \pm i\sqrt{41}}{2}}$

Solve each equation with the quadratic formula.

4) $6b^2 - 4b + 1 = 0$

a : 6
b : -4
c : 1

-b : 4

$b^2 - 4ac: 16 - 4(6)(1) = -8$
$2a : 12$

$x = \dfrac{4 \pm \sqrt{-8}}{12} - \sqrt{4\cdot 2}$

$x = \dfrac{4 \pm 2i\sqrt{2}}{12}$ $\boxed{x = \dfrac{2 \pm i\sqrt{2}}{6}}$

5) $2x^2 - 5x + 6 = 0$

a : 2
b : -5
c : 6

-b : 5

$b^2 - 4ac: 25 - 4(2)(6) = -23$
$2a : 4$

$x = \dfrac{5 \pm \sqrt{-23}}{4}$

$\boxed{x = \dfrac{5 \pm i\sqrt{23}}{4}}$

Simplify.

6) $9 + 4i - (3 + 6i)$

$9 + 4i - 3 - 6i$

$\boxed{6 - 2i}$

7) $5 + 3i - 7 + 8i$

$\boxed{-2 + 11i}$

8) $(-6i) + (4i)(2i)$

$-6i + 8i^2$
$\quad\quad (-1)$

$\boxed{-8 - 6i}$

9) $2(-2 + 4i) - (-7 - 8i)$

$-4 + 8i + 7 + 8i$

$\boxed{3 + 16i}$

10) $(-2 + 4i)(-2 - 8i)$

$4 + 16i - 8i - 32i^2$
$\quad\quad\quad\quad (-1)$

$\boxed{36 + 8i}$

11) $(-2 - 8i)^2$

$(-2 - 8i)(-2 - 8i)$

$4 + 16i + 16i + 64i^2$
$\quad\quad\quad\quad\quad (-1)$
$\boxed{-60 + 32i}$

12) $8(2 + 6i) - 2(5 + 5i)$

$16 + 48i - 10 - 10i$

$\boxed{6 + 38i}$

13) $\dfrac{-5 - 5i}{4i} \cdot \dfrac{-4i}{-4i} = \dfrac{20i + 20i^2}{-16i^2}$
$\quad\quad\quad\quad\quad\quad\quad\quad (-1)$
$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad (-1)$

$\dfrac{20i - 20}{16} = \boxed{\dfrac{5i - 5}{4}}$

14) $\dfrac{(3 - 6i)}{(10 - 6i)} \cdot \dfrac{(10 + 6i)}{(10 + 6i)}$

$\dfrac{30 + 18i - 60i - 36i^2}{100 - 36i^2}$

$\dfrac{66 - 42i}{136} = \boxed{\dfrac{33 - 21i}{68}}$

15) $\dfrac{(-8 + 4i)}{(6 + 9i)} \cdot \dfrac{(6 - 9i)}{(6 - 9i)} = \dfrac{-48 + 72i + 24i - 36i}{36 - 54i + 54i - 81i^2}$

$\dfrac{-12 + 96i}{117}$

$\boxed{\dfrac{-4 + 32i}{39}}$

Simplify

16) i^{19} $\;-i$

17) i^{16} $\;1$

18) i^{22} $\;-1$

19) i^{53} $\;i$
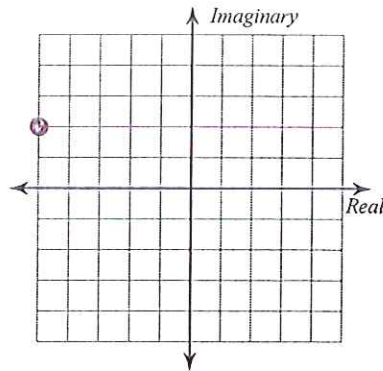
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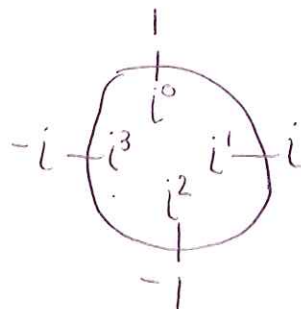
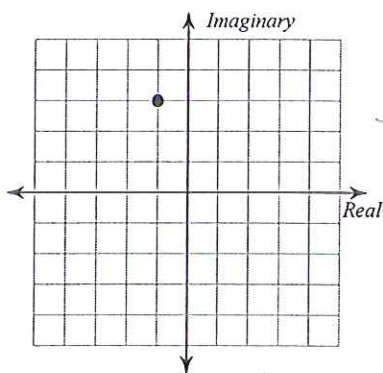**Graph each number in the complex plane.**

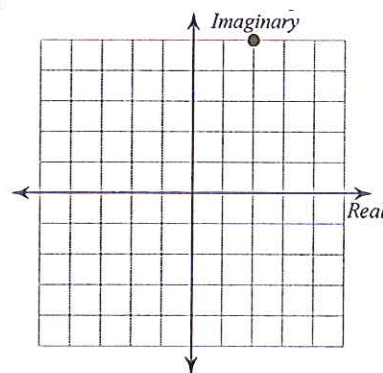20) $-3 - 3i$
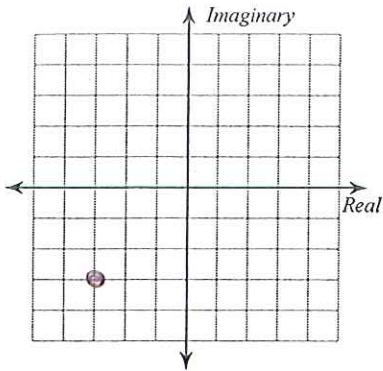
21) $-5 + 2i$

Identify each complex number graphed.

22)

$-1 + 3i$

23)

$2 + 5i$

Find all zeros. factor or use quad. formula

24) $f(x) = 5x^2 + 12x - 9$ Mult: -45

$(5x^2 + 15x - 3x - 9)$ Add: 12

$5x(x+3) - 3(x+3) = 0$

$(5x - 3)(x + 3) = 0$

Simplify.

$5x - 3 = 0 \quad x + 3 = 0$

26) $\sqrt{200x^3}$

$\boxed{x = 3/5, -3}$

$10ix\sqrt{2x}$

25) $f(x) = x^2 + 9x - 9$ $x = \dfrac{-9 \pm \sqrt{117}}{2}$

a: 1
b: 9
c: -9
-b: -9 $\boxed{x = \dfrac{-9 \pm 3\sqrt{13}}{2}}$
$b^2 - 4ac: 81 - 4(1)(-9) = 117$

27) $\sqrt{75r^2}$

$5r\sqrt{3}$

28) $\sqrt{192x}$ $\sqrt{64 \cdot 3}$

$\boxed{8\sqrt{3x}}$

29) $\sqrt{-512k}$ $\sqrt{-256 \cdot 2k}$

$\boxed{16i\sqrt{2k}}$

Factor each completely.

30) $\left(6r^3 - 4r^2\right) + \left(15r - 10\right)$

$2r^2(3r-2) + 5(3r-2)$

$\boxed{(2r^2+5)(3r-2)}$

31) $\left(12x^3 + 32x^2\right) - 21x - 56$

$4x^2(3x+8) - 7(3x+8)$

$\boxed{(4x^2-7)(3x+8)}$

32) $12x^2 + 82x + 140$

$2(6x^2 + 41x + 70)$ Mult: 420
add: 41
$(6x^2 + 20x) + (21x + 70)$ 20, 21
$2x(3x+10) + 7(3x+10)$
$\boxed{2(2x+7)(3x+10)}$

33) $20x^2 + 30x$

$\boxed{10x(2x+3)}$

Solve each equation by factoring.

34) $r^2 + 2 = -3r$

$r^2 + 3r + 2 = 0$
$(r+2)(r+1) = 0$
$\boxed{r = -2, -1}$

35) $4x^2 = 16x$

$4x^2 - 16x = 0$
$4x(x-4) = 0$
$4x = 0 \quad x - 4 = 0$
$\boxed{x = 0, 4}$

36) $175b^2 = 7$

$\dfrac{175}{175} \quad \dfrac{7}{175}$

$b^2 = \dfrac{7}{175}$

$b = \dfrac{\pm\sqrt{7}}{\sqrt{175}} = \dfrac{\pm\sqrt{7}}{5\sqrt{7}} = \boxed{\pm\dfrac{1}{5}}$

37) $42x^2 - 114x = 36$

$42x^2 - 114x - 36 = 0$
$6(7x^2 - 19x - 6) = 0$
$(7x^2 + 2x) - 21x - 6) = 0$ Mult: -42
$x(7x+2) - 3(7x+2) = 0$ Add: -19
$6(x-3)(7x+2) = 0$ 2, -21
$x - 3 = 0 \quad 7x + 2 = 0$
$\boxed{x = 3, -2/7}$

Solve each equation by taking square roots.

38) $2n^2 - 3 = -27$

$+3 \quad +3$

$\dfrac{2n^2}{2} = \dfrac{-24}{2}$

$\sqrt{n^2} = \sqrt{-12}$

$\boxed{n = \pm 2i\sqrt{3}}$

39) $8a^2 - 3 = 453$

$+3 \quad +3$

$\dfrac{8a^2}{8} = \dfrac{456}{8}$

$a^2 = 57$

$\boxed{a = \pm\sqrt{57}}$