

# Intro to Complex Numbers

Name: Key

Simplify.

1)  $i^{18} = i^2 = (-1)$     2)  $i^{47} = i^3 = -i$     3)  $i^{120} = i^0 = 1$     4)  $i^{25} = i^1 = i$

5)  $i^{39} = i^3 = -i$     6)  $i^{76} = i^0 = 1$     7)  $i^{114} = i^2 = -1$     8)  $i^{17} = i^1 = i$

9)  $\sqrt{-25} = \sqrt{-1 \cdot 25} = i \cdot 5 = 5i$

10)  $\sqrt{-40} = \sqrt{-1 \cdot 4 \cdot 10} = \sqrt{-1} \sqrt{4} \sqrt{10} = 2i\sqrt{10}$

11)  $-\sqrt{12x^7} = -\sqrt{4 \cdot 3 \cdot x^6 \cdot x} = -2x^3\sqrt{3x}$

12)  $-\sqrt{-4x} = -\sqrt{-1 \cdot 4 \cdot x} = -i \cdot 2 \sqrt{x} = -2i\sqrt{x}$

13)  $\sqrt{-72x^3} = \sqrt{-1 \cdot 36 \cdot 2 \cdot x^2 \cdot x} = 6xi\sqrt{2x}$

14)  $-\sqrt{20a^4} = -\sqrt{4 \cdot 5 \cdot a^4} = -2a^2\sqrt{5}$

15)  $\sqrt{-3n^8} = \sqrt{-1 \cdot 3 \cdot n^8} = i\sqrt{3}n^4 = n^4i\sqrt{3}$

16)  $\sqrt{-300} = \sqrt{-1 \cdot 100 \cdot 3} = 10i\sqrt{3}$

State all sets of numbers to which each belongs.

(Complex, Real, Imaginary, Rational, Irrational, Integer, Whole, Natural)

17)  $\sqrt{-8}$   
Imaginary  
Complex

18)  $\frac{2}{3}$   
Complex  
Real  
Rational

19)  $-\sqrt{49} = -7$   
Complex  
Real  
Rational  
Integer

20)  $\pi$   
Complex  
Real  
Irrational

21)  $5i$   
Complex  
Imaginary

22)  $8.7$   
Complex  
Real  
Rational

23)  $0$   
Complex  
Real  
Rational  
Integer  
Whole

24)  $7-2i$   
Complex

Simplify.

25)  $9i \cdot 3i = 27i^2 = 27(-1) = -27$

26)  $\sqrt{-8} \cdot \sqrt{-18} = \sqrt{-1} \sqrt{8} \sqrt{-1} \sqrt{18} = i\sqrt{4} \sqrt{2} \cdot i\sqrt{9} \sqrt{2} = i \cdot 2 \sqrt{2} \cdot i \cdot 3 \sqrt{2} = 6i^2 \sqrt{4} = 6(-1) \cdot 2 = -12$

27)  $2i \cdot 5i \cdot 3i = 30i^3 = 30 \cdot -i = -30i$

28)  $\sqrt{5} \cdot \sqrt{-20} = \sqrt{5} \sqrt{-1} \sqrt{20} = \sqrt{5} \cdot i \sqrt{4} \sqrt{5} = 2i\sqrt{25} = 2i \cdot 5 = 10i$