Name: _____ Points: _____

1. Definition of i: $i =$ _____

2. Definition of $\sqrt{-b}$ for $b > 0$ $\sqrt{-b} =$ _____

3. Simplify the expressions.
   a. $\sqrt{-81}$ b. $\sqrt{-75}$ c. $-\sqrt{-49}$ d. $\sqrt{-15}$

4. Simplify the product or quotient in terms of i
   a. $\dfrac{\sqrt{-36}}{\sqrt{9}}$ b. $\sqrt{-9}\cdot\sqrt{-49}$ c. $\sqrt{-7}\cdot\sqrt{-7}$

5. A **complex number** is a number of the form _____ where *a* and *b* are real numbers.

6. The complex number $a+bi$ and _____ are called **conjugates.**

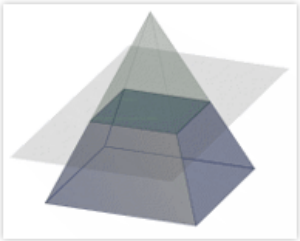

Figure 1

Complex number or imaginary number concept was first investigated by a mathematician and inventor named Heron (c. 10-70 A.D.) from the city of Alexandria on the coast of the Mediterranean, in Egypt. While trying to find the volume of the frustum of a pyramid (see Figure 1) with a square base of a certain size, Heron of Alexandria first encountered the square root of a negative number (Nahin, 1998).

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7. Perform the indicated operation.

a. $\left(\frac{3}{5}+\frac{2}{3}i\right)+\left(\frac{1}{4}-\frac{1}{3}i\right)$

b. $(-5+9i)-(-2+3i)$

c. $4i\left(6-\frac{11}{16}i\right)$

d. $(2+3i)(2-3i)$

e. $\frac{20i}{-2-i}$

f. $\frac{3-4i}{5-3i}$

Reference:
Nahin, J. P. (1998). *An imaginary tale: The story of i.* Princeton, NJ: Princeton University Press.

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