SAT 41 Complex Numbers

1) Which of the following is equivalent to the complex number shown below? *(no calculator)*

$$(3-4i)^2$$

A) $7-i$
B) $7-12i$
C) $9-16i$
D) $-7-24i$

2) For $i=\sqrt{-1}$, what is the sum of the complex numbers $2+3i$ and $4+9i$? *(no calculator)*

A) $-4+27i$
B) $7-12i$
C) $6+12i$
D) $-6-12i$

3) For $i=\sqrt{-1}$, what is equivalent to the expression below? *(no calculator)*

$$\frac{4+5i}{3-2i}$$

A) $\frac{25}{13}i$

B) $\frac{2}{13}+\frac{23}{13}i$

C) $\frac{22}{13}-\frac{23}{13}i$

D) $\frac{2}{13}$

4) For $i=\sqrt{-1}$, which of the following is equivalent to the expression below? *(no calculator)*

$$\frac{3+8i}{(2+2i)^2}$$

A) $\frac{3}{5}i-2$
B) $24i$
C) $-\frac{3}{8}i+1$
D) $8i$

5) For $i=\sqrt{-1}$, what is the product of the complex numbers $3+3i$ and $4-10i$? *(no calculator)*

A) $18-18i$
B) $4+18i$
C) $2-i$
D) $42-18i$

6) Which of the following is equivalent to the complex number shown below? *(no calculator)*

$$\frac{10+4i}{8-2i}$$

A) $\frac{18}{17}+\frac{13}{17}i$

B) $\frac{31}{17}i$

C) $2+3i$

D) $\frac{15}{17}-\frac{13}{17}i$

7) What is the sum of the complex numbers $2+3i$ and $-3+8i$? *(no calculator)*

A) $2+4i$
B) $-5+11i$
C) $-1+11i$
D) $5+5i$

8) For $i=\sqrt{-1}$, what is equivalent to the expression below? *(no calculator)*

$$(6+3i)-(9-4i)^2$$

A) $-59+75i$
B) $97+75i$
C) $-97+69i$
D) $-24+70i$

9) Which of the following complex numbers is equal to the product of $-5+4i$ and $7+7i$? *(no calculator)*

A) $-7-7i$
B) $-63-7i$
C) $63+7i$
D) $-54-9i$

10) If the expression below is simplified into the form $a+bi$, where a and b are real numbers, what is the value of a? *(no calculator)*

$$\frac{12+i}{3-4i}$$

A) $\frac{32}{25}$
B) $\frac{3}{25}$
C) $\frac{3}{7}$
D) $\frac{4}{17}$