

# SATPREP

## Assignment : *Complex Number*

- Which of the following is equal to  $i^{50} + i^0$ ?
  - 1
  - 2
  - 1
  - 0
- Which of the following is equivalent to  $2i^2 + 3i^3$ ?
  - $-2 - 3i$
  - $2 - 3i$
  - $-2 + 3i$
  - $2 + 3i$
- Expressed in simplest form,  $2\sqrt{-50} - 3\sqrt{-8}$  is equivalent to
  - $16i\sqrt{2}$
  - $3i\sqrt{2}$
  - $4i\sqrt{2}$
  - $-i\sqrt{2}$
- If  $x = 3i$ ,  $y = 2i$ ,  $z = m + i$ , and  $i = \sqrt{-1}$ , then the expression  $xy^2z =$ 
  - $-12 - 12mi$
  - $-6 - 6mi$
  - $12 - 12mi$
  - $6 - 6mi$
- If  $g(x) = (x\sqrt{1-x})^2$ , what is  $g(10)$ ?
  - 30
  - 900
  - $30i$
  - $900i$
- Which of the following is equal to  $(x + i)^2 - (x - i)^2$ ?
  - 0
  - 2
  - $-2 + 4xi$
  - $4xi$

$$i^{13} + i^{18} + i^{31} + n = 0$$

- In the equation above, what is the value of  $n$  in simplest form?

- (A)  $-i$   
(B)  $-1$   
(C)  $1$   
(D)  $i$
8. Which of the following is equivalent to  $2i(xi - 4i^2)$ ?  
(A)  $2x - 8i$   
(B)  $-2x + 8i$   
(C)  $-6xi$   
(D)  $-8xi$
9. If  $x = 2i$ ,  $y = -4$ ,  $z = 3i$ , and  $i = \sqrt{-1}$ , then  $\sqrt{x^3yz} =$   
(A)  $4\sqrt{6}i$   
(B)  $24i$   
(C)  $-4\sqrt{6}$   
(D)  $-24$
10. Which of the following is equal to  $(13 + 17i)(4 - 9i)$ ?  
(A)  $-12$   
(B)  $116$   
(C)  $115 - 89i$   
(D)  $52 - 126i$
11. If  $(x - yi) + (a + bi) = 2x$  and  $i = \sqrt{-1}$ , then  $(x + yi)(a + bi) =$   
(A)  $x^2 + y^2$   
(B)  $x^2 - y^2$   
(C)  $4x^2 + y^2$   
(D)  $5x^2$
12. Which of the following complex numbers is equivalent to  $\frac{3+i}{4-7i}$ ?  
(A)  $\frac{17}{28}$   
(B)  $-\frac{19}{33} - \frac{25}{33}i$   
(C)  $\frac{1}{13} - \frac{5}{13}i$   
(D)  $\frac{1}{13} + \frac{5}{13}i$
13. In an electrical circuit, the voltage,  $E$ , in volts, the current,  $I$ , in amps, and the opposition to the flow of current, called impedance,  $Z$ , in ohms, are related by the equation  $E = IZ$ . What is the impedance, in ohms, of an electrical circuit that has a current of  $(3 + i)$  amps and a voltage of  $(-7 + i)$  volts?  
(A)  $-2 + i$   
(B)  $1 - 2i$   
(C)  $-\frac{11}{25} - \frac{1}{5}i$   
(D)  $-\frac{16}{25}i$

$$(9 + 2i)(4 - 3i) - (5 - i)(4 - 3i)$$

14. The expression above is equivalent to which of the following?

- (A) 7
- (B)  $14 - 18i$
- (C) 25
- (D)  $16 + 18i$

### Grid-In

**NOTE:** Unless indicated otherwise,  $i = \sqrt{-1}$  for each problem.

1. What is the value of  $\left(\frac{1}{2} + i\sqrt{5}\right)\left(\frac{1}{2} - i\sqrt{5}\right)$ ?

$$(2 - \sqrt{-25})(-7 + \sqrt{-4}) = x + yt$$

2. In the equation above, what is the value of  $y$ ?

3. If  $(1 - 3i)(7 + 5i + i^2) = a + bi$ , what is the value of  $a + b$ ?

4. If  $\frac{6 + 4i}{1 - 3i}$ , what is the value of  $a + b$ ?

$$g(x) = a\sqrt{41 - x^2}$$

5. Function  $g$  is defined by the equation above where  $a$  is a nonzero real constant. If  $g(2i) = \sqrt{5}$ , where  $i = \sqrt{-1}$ , what is the value of  $a$ ?