



# MATHS

## BOOKS - KAPLAN INC MATHS (ENGLISH)

### IMAGINARY NUMBERS

#### How Much Do You Know

1. Which of the following is the correct simplification of the expression

$(2i - 3) - (6 + 4i)$ , where  $I = \sqrt{-1}$ ?

A.  $-9 - 2i$

B.  $-9 + 6i$

C.  $-7 - 4i$

D.  $3 + 6i$

**Answer: A**



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2. Given that  $i = \sqrt{-1}$ , which of the following is equivalent to

$$(6i^2 - 7i) + (3 + 6i) ?$$

A.  $6i^2 + i + 3$

B.  $-3 - i$

C.  $-9 - i$

D. 10

**Answer: B**



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3. Which of the following is equal to

$$(17 + 7i)(3 - 5i)?$$

A. 16

B. 86

C.  $16 - 64i$

D.  $86 - 64i$

**Answer: D**



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4. If the expression  $\frac{2 - i}{2 + i}$  is written as the complex number  $a + bi$ , where  $a$  and  $b$  are real numbers, then what is the value of  $a$  ?

(Note:  $i = \sqrt{-1}$ )



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1. Given that  $i = \sqrt{-1}$ , what is the sum of the complex numbers  $(21i^2 - 12i) + (3 - 5i)$  ?

A. 7

B.  $7i$

C.  $-18 - 17i$

D.  $24 - 17i$

**Answer: C**



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2. What is the result of the multiplication

$(5 - 6i)(3 + 3i)$  ? (Note:  $i = \sqrt{-1}$ )

A.  $33 - 3i$

B.  $23 - 3i$

C.  $11 - i$

D.  $-6$

**Answer: A**



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3. Which of the following is equivalent to

$$\frac{38 + 18i}{4 + 6i} ?$$

A.  $\frac{11}{13} - 3i$

B.  $5 - 3i$

C.  $\frac{19}{2} + 3i$

D.  $44 + 300i$

**Answer: B**



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4.  $\frac{7 + i}{8 - i}$

If the expression above is expressed in the



form  $a + bi$ , where  $I = \sqrt{-1}$ , what is the value of  $b$  ?

A.  $-1$

B.  $\frac{3}{13}$

C.  $\frac{11}{13}$

D.  $\frac{15}{64}$

**Answer: B**



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5. If the expression  $\frac{-3I^2 + 2i}{2 + i}$  is written in the form  $a + bi$ , where  $a$  and  $b$  are real numbers and  $I = \sqrt{-1}$ , what is the value of  $a$  ?



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6.  $\frac{25i^2 - 9}{5i + 3}$

For  $I = \sqrt{-1}$ , the expression above is equal to which of the following complex numbers ?

A.  $5i - 3$

B.  $5i + 3$

C.  $16i - 9$

D.  $80i - 48$

**Answer: A**



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7.  $(3 + 4i) - (2 + 3i)$

Given that  $I = \sqrt{-1}$ , what is the value of the expression above ?

A.  $1 - i$

B.  $1 + i$

C.  $1 + 7i$

D.  $5 + 7i$

**Answer: B**



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8.  $\frac{3i + 2}{-i - 3}$

If the expression above is expressed in the

form  $a + bi$ , where  $I = \sqrt{-1}$ , what is the value of  $b$  ?

A.  $-0.7$

B.  $0.7$

C.  $-0.9$

D.  $0.9$

**Answer: A**



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9. Which of the following expressions is equivalent to the expression above, assuming that  $I = \sqrt{-1}$ , ?

A.  $\frac{1}{5}$

B.  $\frac{5}{7}$

C.  $\frac{13 + 18i}{20}$

D.  $\frac{13 + 18i}{29}$

**Answer: D**



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10. If the expression  $\frac{1 + 2i}{4 + 2i}$  is rewritten as a complex number in the form of  $a + bi$ , what is the value of  $a$ ? (Note  $i = \sqrt{-1}$ )



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11. Given that  $I = \sqrt{-1}$ , what is the product of  $\frac{2 - 4i + 2i^2}{2}$  and  $\frac{1}{1 - i}$ ?

A.  $-1 + i$

B.  $-1 - i$

C.  $1 - i$

D.  $1 + i$

**Answer: C**



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## Arithmetic Operations With Complex Numbers

1. Which of the following complex numbers is equivalent to  $\frac{2 + I}{3 + 5i}$  ?



A.  $\frac{2}{3} + \frac{i}{5}$

B.  $\frac{2}{3} - \frac{i}{5}$

C.  $\frac{11}{34} + \frac{7i}{34}$

D.  $\frac{11}{34} - \frac{7i}{34}$

**Answer: D**



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