Coefficient Matching

Grid-In (No Calculator)

Assume a, b, and c are constants in all of the following equations or expressions.

1. $(ax + 3)(bx - 2) = 12x^2 + x - 6$

If the above equation is true for all values of x:

- What is ab?
- What is $3b - 2a$?

2. If $(ax - 2)(3x + 4) = 9x^2 + bx - 8$ is true for all values of x:

- What is a?
- What is b?
- What is $4a - 6$?

3. $f(x) = 2x^2 + ax$
$g(x) = 4x^2 - 8x$

The functions f and g are defined above. If $f(x) \cdot g(x) = 8x^4 - 13x^3 - 6x^2$, what is the value of a ?

4. If i is defined as $\sqrt{-1}$ and $(2a - 3i)(3 + bi) = 48 + 19i$, what is the value of $6a + 3b$?

5. $(x^3 + 3a) + (x^3 + 3b) = cx^3 + 15$

If the equation above is true for all values of x, what is the value of $a + b + c$?

Multiple Choice (No Calculator)

6. $3ax + 9 = 2(2x - 3) + 5(x + 2)$

In the equation above, a is a constant. If no value of x satisfies the equation, what is the value of a?

A) 0

B) $\frac{1}{3}$

C) 3

D) 9

7. $(x + f)(x + g) = x^2 + hx + 13$

In the equation above, $f, g,$ and h are positive integer constants. What is the value of h?

A) 9
B) 10
C) 13
D) 14

8. $ax^2 + x + a = 5x(2x - 3) + 2(8x + 5)$

In the equation above, a is a constant. If any real value of x satisfies the equation, what is the value of a?

A) -5
B) 5
C) 10
D) 26

9. $(ax - 2)(4x^2 + bx + 5) = 6x^3 + 4x^2 - 8.5x - 10$

The equation above is true for all x, where a and b are constants. What is the value of ab?

A) $\frac{3}{2}$

B) 4

C) 8

D) 12

10. If $(ax + 3)(bx + 12) = 12x^2 + cx + 36$ for all values of x, and $a + b = 7$, what are the two possible values for c?

A) 3 and 4
B) 7 and 12
C) 36 and 48
D) 48 and 57

11. If $f(x) = 3x^2 - 5$ and $f(x + a) = 3x^2 - 12x + 7$, what is the value of a?

A) -4
B) -2
C) 2
D) 5

12. $$(3x - 5)(2ax + 3) - 3x^2 + 15$$

In the expression above, a is a constant. If the expression is equivalent to bx, where b is a constant, what is the value of b?

A) -2
B) $\frac{1}{2}$
C) 3
D) 4

13. $$\frac{3}{x+3} + \frac{2}{x-2} = \frac{sx+r}{(x+3)(x-2)}$$

The equation above is true for all $x > 2$, where s and r are constants. What is the value of sr?

A) -3
B) -2
C) 0
D) 6

14. $\frac{3}{x-12} - \frac{2}{x+12} = \frac{sx+r}{x^2-144}$

The equation above is true for all $x > 12$, where s and r are constants. What is the value of sr?

A) -24
B) 12
C) 36
D) 60

15. $3x(ax - 5) + 7(3x - a) + 14 = 3ax(x + 1)$

The equation above is true for all x, where a is a constant. What is the value of $a + 1$?

A) 0
B) 1
C) 2
D) 3