

A2.N.7: Imaginary Numbers 2: Simplify powers of i

- 1 Mrs. Donahue made up a game to help her class learn about imaginary numbers. The winner will be the student whose expression is equivalent to $-i$. Which expression will win the game?
 - 1) i^{46}
 - 2) i^{47}
 - 3) i^{48}
 - 4) i^{49}
- 2 The expression i^{25} is equivalent to
- 3 Which expression is equivalent to i^{55} ?
- 4 The value of i^{16} is
- 5 The expression i^{10} is equivalent to
- 6 When simplified, i^{99} is equivalent to
- 7 Which expression is equivalent to i^{233}
- 8 Which expression is equivalent to i^{37}
- 9 The expression $2i^2 + 3i^3$ is equivalent to
- 10 When simplified, $i^{27} + i^{34}$ is equal to
- 11 The expression $i^{100} + i^{101} + i^{102}$ equals
- 12 If i is the imaginary unit, the expression $i^8 + i^9 + i^{10} + i^{11}$ is equivalent to
- 13 Expressed in simplest form, $i^{16} + i^6 - 2i^5 + i^{13}$ is equivalent to
- 14 What is the value of $i^{99} - i^3$?
- 15 The product $i^3 \cdot i^7$ is
- 16 The product of i^7 and i^5 is equivalent to
- 17 The expression $i^0 \cdot i^1 \cdot i^2 \cdot i^3 \cdot i^4$ is equal to
- 18 The expression $\frac{i^{16}}{i^3}$ is equivalent to
- 19 The expression $i^2(2 - i)$ is equivalent to
- 20 The expression $3i(2i^2 - 5i)$ is equivalent to
- 21 What is the value of $(5i^3)^3$?
- 22 If $f(x) = x^2$, what is the value of $f(i^3)$?
- 23 If $f(x) = x^2$, what is the value of $f(2i)$?
- 24 If $f(x) = x^3 - 2x^2$, then $f(i)$ is equivalent to
- 25 The expression $x(3i^2)^3 + 2xi^{12}$ is equivalent to
- 26 Express $xi^8 - yi^6$ in simplest form.
- 27 Express $4xi + 5yi^8 + 6xi^3 + 2yi^4$ in simplest $a + bi$ form.
- 28 Determine the value of n in simplest form:
 $i^{13} + i^{18} + i^{31} + n = 0$

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Answer Section

1 ANS: 2 REF: 060615b

2 ANS:
 i

REF: 010705b

3 ANS:
 $-i$

REF: 010905b

4 ANS:
1

REF: 018631siii

5 ANS:
-1

REF: 069527siii

6 ANS:
 $-i$

REF: 089830siii

7 ANS:
 i

REF: 010334siii

8 ANS:
 i

REF: 080327siii

9 ANS:
 $-2 - 3i$
 $2i^2 + 3i^3 = 2(-1) + 3(-i) = -2 - 3i$

REF: 081004a2

10 ANS:
 $-i - 1$

REF: 080407b

11 ANS:
 i

REF: 060819b

12 ANS:
0

REF: 060331siii

13 ANS:
 $-i$

REF: 080215b

14 ANS:
 0

REF: 060315b

15 ANS:
 -1

REF: 088423siii

16 ANS:
 1

REF: 061019a2

17 ANS:
 -1

REF: 060410b

18 ANS:
 i

REF: 010518b

19 ANS:
 $-2 + i$

REF: 069925siii

20 ANS:
 $15 - 6i$

REF: 080702b

21 ANS:
 $125i$

REF: 060224siii

22 ANS:
 -1

REF: 010034siii

23 ANS:
 -4

REF: 080128siii

24 ANS:
 $2 - i$

REF: 010415b

25 ANS:

$$-25x$$

$$x(27i^6) + x(2i^{12}) = -27x + 2x = -25x$$

REF: 011620a2

26 ANS:

$$xi^8 - yi^6 = x(1) - y(-1) = x + y$$

REF: 061533a2

27 ANS:

$$4xi + 5yi^8 + 6xi^3 + 2yi^4 = 4xi + 5y - 6xi + 2y = 7y - 2xi$$

REF: 011433a2

28 ANS:

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

$$i + (-1) - i + n = 0$$

$$-1 + n = 0$$

$$n = 1$$

REF: 061228a2