

**A.APR.A.1: Powers of Powers 1b**

1 Three expressions are shown below.

- I.  $(x^3)^3$
- II.  $x^4 \bullet x^5$
- III.  $x^{10} \bullet x^{-1}$

Which expressions are equivalent for all positive values of  $x$ ?

2 If the expression  $(2y^a)^4$  is equivalent to  $16y^8$ , what is the value of  $a$ ?

3 Which expression is equivalent to  $(3x^2)^3$ ?

4 The expression  $(6x^3y^6)^2$  is equivalent to

5 The expression  $(-4a^3b)^2$  is equivalent to

6 Which expression is equivalent to  $(-4x^2)^3$ ?

7 Which expression is *not* equivalent to  $(5^{2x})^3$ ?

- 1)  $(5^x)^6$
- 2)  $(5^{3x})^2$
- 3)  $(5^5)^x$
- 4)  $(5^2)^{3x}$

8 Expressed in simplest form,  $(3x^3)(2y)^2(4x^4)$  is equivalent to

9 The product of  $(5ab)$  and  $(-2a^2b)^3$  is

10 If  $x \neq 0$ , then  $\frac{(x^2)^3}{x^5} \cdot 1000$  is equivalent to

11 The expression  $\frac{(4x^3)^2}{2x}$  is equivalent to

12 The expression  $\frac{(10w^3)^2}{5w}$  is equivalent to

13 The expression  $\frac{(b^{2n+1})^3}{b^n \cdot b^{4n+3}}$  is equivalent to

14 Which equation is true?

- 1)  $\frac{c^5}{d^7} \div \frac{d^3}{c} = \frac{c^4}{d^4}$
- 2)  $(-2m^2p)^3 = -8m^6p^3$
- 3)  $\left(\frac{s^3t^8}{s^4t^5}\right)^2 = \frac{t^5}{s^2}$
- 4)  $(-2a^2b^3)(3ab^2) = a^3b^5$

15 Which statement is correct?

- 1)  $(2b^3c^5)(-3b^2c) = -6b^5c^5$
- 2)  $\frac{6m^3t^8}{-2m^5t^3} = \frac{-3t^5}{m^2}$
- 3)  $(-5n^4q)^2 = 25n^6q^2$
- 4)  $\frac{t^3}{v^5} \div \frac{v}{t} = \frac{t^2}{v^2}$

16 If  $10^k = x$ , then  $10^{3k}$  is equal to

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### Answer Section

1 ANS:

I, II, and III

Each expression equals  $x^9$ .

REF: 082311ai

2 ANS:

2

REF: 061312ia

3 ANS:

 $27x^6$ 

REF: 080827ia

4 ANS:

 $36x^6y^{12}$ 

REF: 010728a

5 ANS:

 $16a^6b^2$ 

REF: 080824a

6 ANS:

 $-64x^6$ 

REF: 062114ai

7 ANS: 3

REF: 062209ai

8 ANS:

 $48x^7y^2$ 

$$(3x^3)(2y)^2(4x^4) = (3x^3)(4y^2)(4x^4) = 48x^7y^2$$

REF: 010529a

9 ANS:

 $-40a^7b^4$ 

$$(5ab)(-2a^2b)^3 = (5ab)(-8a^6b^3) = -40a^7b^4$$

REF: 010506b

10 ANS:

1000x

$$\frac{(x^2)^3}{x^5} \cdot 1000 = \frac{x^6}{x^5} \cdot 1000 = 1000x$$

REF: 060518a

11 ANS:

$$\frac{8x^5}{\frac{(4x^3)^2}{2x}} = \frac{16x^6}{2x} = 8x^5$$

REF: 011216ia

12 ANS:

$$\frac{20w^5}{\frac{(10w^3)^2}{5w}} = \frac{100w^6}{5w} = 20w^5$$

REF: 011124ia

13 ANS:

$$\frac{b^n}{\frac{(b^{2n+1})^3}{b^n \cdot b^{4n+3}}} = \frac{b^{4n+3}}{b^{5n+3}} = b^n$$

REF: 080415b

14 ANS: 2

REF: 081318ia

15 ANS: 2

REF: 061625ia

16 ANS:

$$x^3$$

REF: 080811b