

A.APR.A.1: Powers of Powers

1 Three expressions are shown below.

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

Which expressions are equivalent for all positive values of x ?

- 1) I and II, only
- 2) I and III, only
- 3) II and III, only
- 4) I, II, and III

2 Three expressions are written below.

- A. $(2xy^2)^3$
- B. $(2x)^3y^6$
- C. $(2x^2y^2)(4xy^3)$

Which expressions are equivalent to $8x^3y^6$?

- 1) A and B, only
- 2) B and C, only
- 3) A and C, only
- 4) A, B, and C

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

- 1) 12
- 2) 2
- 3) 32
- 4) 4

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

- 1) $9x^5$
- 2) $9x^6$
- 3) $27x^5$
- 4) $27x^6$

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

- 1) $36x^6y^{12}$
- 2) $36x^5y^8$
- 3) $12x^6y^{12}$
- 4) $6x^6y^{12}$

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

- 1) $-16a^6b^2$
- 2) $16a^6b^2$
- 3) $16a^5b^2$
- 4) $8a^6b^2$

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

- 1) $-12x^6$
- 2) $-12x^5$
- 3) $-64x^6$
- 4) $-64x^5$

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

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

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

- 1) $24x^{12}y^2$
- 2) $24x^7y^2$
- 3) $48x^{12}y^2$
- 4) $48x^7y^2$

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

- 1) $-30a^6b^4$
- 2) $-30a^7b^4$
- 3) $-40a^6b^4$
- 4) $-40a^7b^4$

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

- 1) $1000x$
- 2) $1000 + x$
- 3) 1000
- 4) 0

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

- 1) $4x^4$
- 2) $4x^5$
- 3) $8x^4$
- 4) $8x^5$

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

- 1) $2w^5$
- 2) $2w^8$
- 3) $20w^5$
- 4) $20w^8$

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

- 1) $\frac{b^n}{2}$
- 2) b^n
- 3) b^{-3n}
- 4) b^{-3n+1}

15 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) $(-2a^2b^3)(3ab^2) = a^3b^5$

16 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) $\frac{t^3}{v^5} \div \frac{v}{t} = \frac{t^2}{v^2}$

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

- 1) x^3
- 2) $3 + x$
- 3) $3x$
- 4) $1,000x$

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Answer Section

1 ANS: 4

Each expression equals x^9 .

REF: 082311ai

2 ANS: 1

$$C = 8x^3y^5$$

REF: 012419ai

3 ANS: 2

REF: 061312ia

4 ANS: 4

REF: 080827ia

5 ANS: 1

REF: 010728a

6 ANS: 2

REF: 080824a

7 ANS: 3

REF: 062114ai

8 ANS: 3

REF: 062209ai

9 ANS: 4

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

REF: 010529a

10 ANS: 4

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

REF: 010506b

11 ANS: 1

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

REF: 060518a

12 ANS: 4

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

REF: 011216ia

13 ANS: 3

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

REF: 011124ia

14 ANS: 2

$$\frac{(b^{2n+1})^3}{b^n \cdot b^{4n+3}} = \frac{b^{6n+3}}{b^{4n+3}} = b^{2n}$$

REF: 080415b

15	ANS: 2	REF: 081318ia
16	ANS: 2	REF: 061625ia
17	ANS: 1	REF: 080811b