Practice Test
Exponents

1

$$\frac{2^{(a+b)^2}}{2^{(a-b)^2}}$$

Which of the following is equivalent to the expression shown above?

A) $8^{(a+b)}$

B) 8^{ab}

C) 16^{a+b}

D) 16^{ab}

2

$$2m^2n - mnp - 6m + 3p$$

Which of the following is equivalent to the expression shown above?

A) $(2m - n)(mp - 3)$

B) $(2m - p)(mn - 3)$

C) $(2m + p)(mn + 3)$

D) $(2m - n)(mn - 3p)$

3

$$(\frac{a+b}{2})^2 - (\frac{a-b}{2})^2 =$$

A) ab

B) $-ab$

C) $\dfrac{2ab + b^2}{2}$

D) $ab + b^2$

4

If $(x + \dfrac{1}{x})^2 = 9$, then $(x - \dfrac{1}{x})^2 =$

A) 3

B) 5

C) 7

D) 9

5

If $8^{\frac{4}{3}} \cdot 8^{-\frac{8}{3}} = \dfrac{1}{2^m}$, what is the value of m?

A) $-\dfrac{4}{3}$

B) -4

C) $\dfrac{4}{3}$

D) 4

6

If $xy \neq 0$, then $\dfrac{(-2xy^2)^3}{4x^4y^5} =$

A) $-\dfrac{xy}{2}$

B) $-\dfrac{2}{x}$

C) $-\dfrac{2y}{x^2}$

D) $-\dfrac{2y}{x}$

7

If $x^{12} = 32n^4$ and $x^9 = 4n$, then $x =$

A) $2n$

B) $2n^{\frac{1}{2}}$

C) $4n^{\frac{1}{2}}$

D) $4n$

8

$$(3x^3 - 2x^2 - 7) - (-2x^2 + 6x + 2)$$

Which of the following is equivalent to the expression shown above?

A) $3(x^3 + 2x - 6)$

B) $3(x^3 - 2x - 9)$

C) $3(x^3 + 2x - 3)$

D) $3(x^3 - 2x - 3)$

9

$$9x - (x - 3)(x + 12)$$

Which of the following is equivalent to the expression shown above?

A) $36 - 18x - x^2$

B) $36 + 12x - x^2$

C) $(6 - x)(6 + x)$

D) $(6 - x)^2$

10

If $\dfrac{(2.1 \times 10^{-3})(2 \times 10^5)}{7 \times 10^{-4}} = 6 \times 10^n$, what is the value of n?

11

If $a^{\frac{3}{4}} = 8$, what is the value of $a^{-\frac{1}{2}}$?

12

$$\frac{x^2 - x - a}{x - 2} = x + 1 - \frac{8}{x - 2}$$

In the equation above, what is the value of a?

2. B

$$2m^2n - mnp - 6m + 3p$$
$$= (2m^2n - mnp) - (6m - 3p)$$
$$= mn(2m - p) - 3(2m - p)$$
$$= (2m - p)(mn - 3)$$

3. A

$$(\frac{a+b}{2})^2 - (\frac{a-b}{2})^2 = \frac{(a+b)^2}{4} - \frac{(a-b)^2}{4}$$
$$= \frac{a^2 + 2ab + b^2}{4} - \frac{a^2 - 2ab + b^2}{4}$$
$$= \frac{4ab}{4} = ab$$

4. B

$$(x + \frac{1}{x})^2 = 9$$
$$x^2 + 2x \cdot \frac{1}{x} + (\frac{1}{x})^2 = 9$$
$$x^2 + 2 + \frac{1}{x^2} = 9$$
$$x^2 + \frac{1}{x^2} = 7$$
$$(x - \frac{1}{x})^2 = x^2 - 2x \cdot \frac{1}{x} + \frac{1}{x^2}$$
$$= x^2 - 2 + \frac{1}{x^2} = x^2 + \frac{1}{x^2} - 2$$
$$= 7 - 2 = 5 \qquad \text{Substitute 7 for } x^2 + \frac{1}{x^2} = 7.$$

5. D

$$8^{\frac{4}{3}} \cdot 8^{\frac{8}{3}} = 8^{\frac{4}{3} \cdot \frac{8}{3}} = 8^{\frac{4}{3}} = (2^3)^{\frac{4}{3}}$$
$$= 2^{-4} = \frac{1}{2^4}$$

If $8^{\frac{4}{3}} \cdot 8^{\frac{-8}{3}} = \frac{1}{2^m}$, then $m = 4$.

6. D

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

Chapter 10 Practice Test

1. B

$$\frac{2^{(a+b)^2}}{2^{(a-b)^2}}$$
$$= 2^{(a+b)^2 - (a-b)^2} \qquad \frac{a^m}{a^n} = a^{m-n}$$
$$= 2^{(a^2 + 2ab + b^2) - (a^2 - 2ab + b^2)}$$
$$= 2^{4ab}$$
$$= (2^4)^{ab} \qquad (a^m)^n = a^{m \cdot n}$$
$$= (16)^{ab}$$

7. A

Given $x^{12} = 32n^4$ and $x^9 = 4n$.

$$x^{12} = 32n^4$$

$$\frac{x^{12}}{x^9} = \frac{32n^4}{x^9} \qquad \text{Divide each side by } x^9.$$

$$x^3 = \frac{32n^4}{x^9} \qquad \text{Simplify.}$$

$$x^3 = \frac{32n^4}{4n} \qquad \text{Substitute } 4n \text{ for } x^9.$$

$$x^3 = 8n^3 \qquad \text{Simplify.}$$

$$(x)^3 = (2n)^3 \qquad 8n^3 = (2n)^3$$

Therefore, $x = 2n$.

8. D

$$(3x^3 - 2x^2 - 7) - (-2x^2 + 6x + 2)$$

$$= 3x^3 - 2x^2 - 7 + 2x^2 - 6x - 2$$

$$= 3x^3 - 6x - 9$$

$$= 3(x^3 - 2x - 3)$$

9. C

$$9x - (x-3)(x+12)$$

$$= 9x - (x^2 + 9x - 36)$$

$$= 9x - x^2 - 9x + 36$$

$$= 36 - x^2$$

$$= (6-x)(6+x)$$

10. 5

$$\frac{(2.1 \times 10^{-3})(2 \times 10^5)}{7 \times 10^{-4}}$$

$$= \frac{4.2 \times 10^2}{7 \times 10^{-4}}$$

$$= \frac{4.2 \times 10^2 \times 10^4}{7} \qquad \frac{1}{a^{-n}} = a^n$$

$$= 0.6 \times 10^2 \times 10^4$$

$$= 0.6 \times 10^6$$

$$= 6 \times 10^5$$

If $\dfrac{(2.1 \times 10^{-3})(2 \times 10^5)}{7 \times 10^{-4}} = 6 \times 10^n$, then $n = 5$.

11. $\dfrac{1}{4}$

$$a^{\frac{3}{4}} = 8$$

$$(a^{\frac{3}{4}})^{\frac{4}{3}} = (8)^{\frac{4}{3}}$$

$$a = (2^3)^{\frac{4}{3}}$$

$$a = 2^4$$

Therefore, $a^{-\frac{1}{2}} = (2^4)^{-\frac{1}{2}} = 2^{-2} = \dfrac{1}{2^2} = \dfrac{1}{4}$.

12. 10

$$\frac{x^2 - x - a}{x - 2} = x + 1 - \frac{8}{x - 2}$$

Multiply each side of the equation by $x - 2$.

$$(x-2)\left[\frac{x^2 - x - a}{x-2}\right] = (x-2)\left[x + 1 - \frac{8}{x-2}\right]$$

$$\Rightarrow x^2 - x - a = (x-2)(x+1) - 8$$

$$\Rightarrow x^2 - x - a = x^2 - x - 2 - 8$$

$$\Rightarrow x^2 - x - a = x^2 - x - 10$$

Since the constant terms have to be equal on both sides of the equation, $a = 10$.