

SAT Exponents and Radicals Worksheet

Name: _____ Date: _____

Circle one answer for each question. Use the blank space for calculations. A calculator is allowed.

1. For nonzero x , which expression equals x^3 multiplied by x^5 ?

- A. x^2
- B. x^8
- C. x^{15}
- D. $2x^8$

2. For nonzero a , which expression equals $\frac{a^7}{a^2}$?

- A. a^3
- B. a^5
- C. a^9
- D. a^{14}

3. Which expression equals $(2x^3)^2$?

- A. $2x^5$
- B. $2x^6$
- C. $4x^5$
- D. $4x^6$

4. What is $\sqrt{144}$?

- A. 12
- B. 24
- C. 72
- D. 144

5. Which expression equals $\sqrt{72}$?

- A. $6\sqrt{2}$
- B. $8\sqrt{2}$
- C. $3\sqrt{2}$
- D. 36

6. For positive x , which expression equals $\sqrt{x^6}$?

- A. x^2
- B. x^3
- C. x^6
- D. x^{12}

7. If $2^x = 32$, what is x ?

- A. 4
- B. 5
- C. 8
- D. 16

8. For nonzero x , which expression equals $\frac{1}{x^4}$?

- A. x^{-4}
- B. $-x^4$
- C. x^{-1}
- D. $\frac{4}{x}$

9. If $3^{2x} = 81$, what is x ?

- A. 1
- B. 2
- C. 3
- D. 4

10. Which expression equals $(x + 4)^2$?

- A. $x^2 + 16$
- B. $x^2 + 4x + 16$
- C. $x^2 + 8x + 16$
- D. $2x + 8$

11. Which expression equals $x^2 - 25$?

- A. $(x - 5)^2$
- B. $(x - 5)(x + 5)$
- C. $(x - 25)(x + 1)$
- D. $x(x - 25)$

12. For x not equal to 3, which expression equals $\frac{x^2 - 9}{x - 3}$?

- A. $x - 3$
- B. $x + 3$
- C. $x^2 + 3$
- D. 1

Answer key

1 B · 2 B · 3 D · 4 A · 5 A · 6 B · 7 B · 8 A · 9 B · 10 C · 11 B · 12 B

1. B: x^8

Multiplication of powers with the same base adds the exponents: $3 + 5 = 8$, giving x^8 .

2. B: a^5

For a quotient with the same nonzero base, subtract exponents: $7 - 2 = 5$.

3. D: $4x^6$

Square both factors: $2^2 = 4$ and $(x^3)^2 = x^6$. Their product is $4x^6$.

4. A: 12

The square root denotes the nonnegative number whose square is 144. Since $12^2 = 144$, the value is 12.

5. A: $6\sqrt{2}$

Factor 72 as 36 times 2. Taking the square root gives $6\sqrt{2}$.

6. B: x^3

The square root halves the exponent when x is positive: $(x^6)^{1/2} = x^3$.

7. B: 5

Repeated multiplication gives $2^5 = 32$. Therefore the exponent x is 5.

8. A: x^{-4}

A negative exponent means reciprocal: $x^{-4} = \frac{1}{x^4}$. It does not mean that the value itself must be negative.

9. B: 2

Since $81 = 3^4$, the exponents satisfy $2x = 4$. Dividing by 2 gives $x = 2$.

10. C: $x^2 + 8x + 16$

Multiplying $(x + 4)(x + 4)$ produces $x^2 + 4x + 4x + 16$, which combines to $x^2 + 8x + 16$.

11. B: $(x - 5)(x + 5)$

This is a difference of squares: $x^2 - 5^2 = (x - 5)(x + 5)$. The middle terms cancel.

12. B: $x + 3$

Factor the numerator as $(x - 3)(x + 3)$. Cancel $x - 3$ only when x is not 3, leaving $x + 3$.