

Name:
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Date:

RETURN TO EXPONENTS

Part 1:

1. Simplify the following. Your answers should have no negative exponents. Remember: when simplifying expressing turn radicals into fractional exponents.

a. $\frac{2x^2y^{-2}}{(2x)^{-2}y}$

b. $x^{1/2} \cdot x$

c. $(x^{1/2})^{-3} \cdot x^2$

d. $(2^{-2} \cdot 3^{-1})^0$

e. $\sqrt{x^{4/3}}$

f. $((2x)^{-1} + 4 \cdot (2x)^{-1})^{-2}$

2. Determine whether each of the following statements is true or false. If you think it is false, briefly explain the mistake.

a. $(x + 4)^{1/2} = \sqrt{x} + \sqrt{4}$

b. $x^{1/2} + x^{3/2} = x^2$

c. $(x - 5)^2(x - 5)^4 = (x - 5)^6$

d. $(2x)^2 \cdot (2x)^3 = (4x^2)^5$

e. $\frac{(2x - 1)^3}{(2x - 1)^6} = \frac{1}{2}$

f. $(x + 2)\sqrt{x + 2} = (x + 2)^{3/2}$

g. $3 \cdot 2^x = 6^x$

h. $\sqrt{x^{16}} = x^4$

$$i. \frac{(x-3)}{\sqrt{x-3}} = \sqrt{x-3}$$

$$j. (3 \cdot 2^a)^2 = 9 \cdot 2^{2a}$$

Answer the following multiple-choice questions. **More than one answer may be correct: circle all answers that apply.** They are hard—think carefully!

3. $x^{-1/2}$ can also be written as:

a. x^2 b. $\sqrt{\frac{1}{x}}$ c. $\frac{x^{-1}}{x^2}$ d. $\frac{1}{\sqrt{x}}$ e. $\frac{-1}{x^2}$

4. $2^a \cdot 2^b$ is the same as:

a. 2^{ab} b. 4^{ab} c. $2^a + 2^b$ d. 2^{a+b} e. 4^{a+b}

5. $(x^2 - 4)^{1/2}$ is the same as:

a. $\frac{1}{\sqrt{x^2 - 4}}$ b. $\sqrt{x^2 - 4}$ c. $x - 2$ d. $(x^2 - 4)^{-2}$ e. $x + 2$

6. $\frac{7^x}{7}$ can also be written as:

a. 1^x b. x c. 7^x d. 7^{x-1} e. $\frac{1}{7} \cdot 7^x$

7. $\frac{1}{2\sqrt[3]{x}}$ is the same as:

a. $2x^{1/3}$ b. $2^{-1}x^{-1/3}$ c. $(2x)^{-1/3}$ d. $2x^{-1/3}$ e. $0.5 \cdot x^{-1/3}$

8. $(x + y)^{-1/2}$ is the same as:

a. $\frac{1}{\sqrt{x + y}}$ b. $\sqrt{\frac{1}{x} + \frac{1}{y}}$ c. $x^{-1/2} + y^{-1/2}$ d. $\frac{1}{\sqrt{x + y}}$ e. $(x + y)^2$

9. $\frac{8^{80}}{8^{40}}$ is the same as:

a. $\frac{80}{40}$ b. 8^{40} c. 8^2 d. 1^2 e. 1^{40}

10. $\frac{1}{-\sqrt{2x}}$ is the same as:

- a. $(2x)^{-1/2}$ b. $(-2x)^{-1/2}$ c. $-2x^{-1/2}$ d. $-(2x)^{-1/2}$ e. $(2x)^{1/2}$

11. $\sqrt{25^{16}}$ is the same as:

- a. 25^4 b. 25^8 c. 5^4 d. 5^8 e. 5^{16}

12. 4^{x-1} may also be written as:

- a. $\frac{4^x}{4}$ b. 1^x c. $0.25 \cdot 4^x$ d. $\frac{1}{4^{1-x}}$ e. 2^{2x-1}

13. $(-2)^{-x}$ is the same as:

- a. $\frac{1}{-2^x}$ b. $\frac{1}{(-2)^x}$ c. $\frac{-1}{2^x}$ d. 2^x e. $(-2)^{1/x}$

14. $6^{x^2} \cdot 6^x$ is the same as:

- a. 6^{x^2+x} b. 6^{x^3} c. 36^{x^3} d. 6^{3x} e. none of these

15. $\frac{2^{2x}}{2^x}$ is the same as:

- a. 2 b. 2^2 c. 2^x d. 1^x e. x

16. $3^x \cdot 3^x$ is the same as:

- a. 3^{2x} b. 3^{x^2} c. 9^{2x} d. $2 \cdot 3^x$ e. 6^x

17. $\frac{1}{a^{-4/5}}$ is the same as:

- a. $-a^{4/5}$ b. $a^{5/4}$ c. $a^{-5/4}$ d. $a^{4/5}$ e. $a^{-4/5}$

Part 2: More Exponents

Directions: Carefully do each problem on a separate sheet of paper.

1. $\frac{(3x^4)^2(2x^{-1})}{6x^4}$

2. $\frac{[2(x-3)]^4(x+2)^{-1}}{(x-3)^2(x+2)^{-4}}$

3. $\left(\frac{1}{x} + 3\right)^2$

4. $(x-7)^{-2}$

5. $(x+5)\sqrt{x+5}$

6. $(x-8)^2\sqrt{x-8}$

7. $\frac{x+2}{\sqrt{x+2}}$

8. $(x^{-1} - x^{-2})^2$

Answers

1a. $\frac{8x^4}{y^3}$ b. $x^{\frac{3}{2}}$ c. $x^{\frac{1}{2}}$ d. 1 e. $x^{\frac{2}{3}}$ f. $\frac{4x^2}{25}$ 2a. F b. F c. T d. F e. F f. T g. F h. F i. T j. T

3. b, d 4. d 5. b 6. d, e 7. b, c, e 8. d 9. b 10. d 11. b, e 12. a, c, d 13. b 14. a 15. c 16. a 17. d

III. Answers

1. $3x^3$

2. $16(x-3)^2(x+2)^3$

3. $\frac{1}{x^2} + \frac{6}{x} + 9$

4. $\frac{1}{(x-7)^2} = \frac{1}{x^2 - 14x + 49}$

5. $(x+5)^{3/2}$

6. $(x-8)^{5/2}$

7. $\sqrt{x+2}$

8. $\frac{1}{x^2} - \frac{2}{x^3} + \frac{1}{x^4}$