Classroom Activity

Those Darn Exponents: Fifty Challenging True-False Questions

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Introduction

Are you excellent with exponents? A purveyor of the powers? Give these 50 true / false questions a try and test your skills. You can probably get at least half correct (I hope!). Solutions are listed upside down at the bottom of this page (no peeking, please!). These questions have been compiled over a career of mathematics teaching in the Winton Woods City School District.

The Questions

Directions: For each item, answer "T" if the statement is true in general. Answer "F" if the statement isn't true in general. For each task, assume the variables provided (e.g., *x*, *y*, *z*, and *n*) are arbitrary real numbers. *Note: you may assume that no variables have values that would cause you to multiply or divide by zero.*

1. $2x^2 \cdot 2x^2 = 4x^4$
2. $3x^3 \cdot 3x^3 = 6x^6$
3. $3x^3 \cdot 3x^3 = 9x^9$
4. $3x^3 \cdot 3x^3 = 9x^6$
5. $\frac{6x^6}{2x^2} = 3x^3$
6. $\frac{6x^6}{3x^3} = 2x^2$
7. $\frac{6x^6}{3x^3} = 2x^3$
8. $\frac{x^{-8}}{x^{-9}} = x$
9. $\frac{1}{x^{-1}} = x$
10. $\frac{1}{2^{-3}} = 8$
11. $\left(\frac{1}{4}xy\right)^{-2} = \frac{16}{x^2y^2}$
12. $x \geq \frac{1}{x^3}$
13. $7x^{-7} = \frac{1}{7x^7}$
14. $4x^{-1} = \frac{1}{4x}$
15. $4x^{-1} = \frac{4}{x}$
16. $\frac{x^5}{x^{-3}} = x^2$
17. $(xy)^4 = x^4y^4$
18. $x^3 \cdot y^4 = (xy)^7$
19. $x^5 \geq x^4$
20. $(x+y)^3 = x^3 + y^3$
21. $3 + 4^7 = 7^7$
22. $5^4 \times 3^4 = 15^4$
23. $59^0 = 1$
24. $5x^0 = 1$
25. $-9^0 = 1$
26. $\left(3xyz^4\right)^0 = 1$
27. $(x-y)^2 = x^2 - y^2$
28. $\frac{3}{x^{-1}} = \frac{x}{3}$
29. $\frac{3}{x^{-1}} = 3x$
30. $x^{-3} = \frac{1}{x^3}$
31. $\frac{x+1}{x^5} = \frac{1}{x^4}$
32. $\frac{1}{8}x^{-1}y^{-1})^{-1} = 8xy$
33. $x + x + x + x = x^4$
34. $\frac{1}{x^2} + \frac{1}{x^3} = \frac{1}{x^5}$
35. $\frac{1}{x^2} + \frac{1}{x^3} = \frac{2}{x^5}$
36. $\frac{1}{x^2} + \frac{1}{x^3} = \frac{x+1}{x^3}$
37. $\left(\frac{4x^4}{2x^{-2}}\right)^2 = 4x^{12}$
38. $\left(\frac{x^{-3}}{y^{-3}}\right)^{-1} = \frac{x^3}{y^3}$
39. $\left(\frac{x^2}{2x}\right)^{-4} = \left(\frac{4}{x^2}\right)^2$
40. $\left(4x^4y^4\right)^2 = 8x^8y^8$
41. $x^5 \cdot y^5 = (xy)^5$
42. $\left(10x^10\right)^2 = 20x^{20}$
43. $\sqrt[4]{4} = \sqrt{2}$
44. $\frac{2}{\sqrt{2}} = \sqrt{2}$
45. $\sqrt[9]{64} = \sqrt[3]{4}$
46. $\sqrt{-25} = -5$
47. $2\left(\sqrt{2}\right)^{-2} = 1$
48. $\frac{1}{4\left(\sqrt{4}\right)^{-4}} = 4$
49. $\sqrt{-x^2} = -x$
50. $\sqrt[y]{n^x} = \sqrt[x]{n^y}$

Solutions: TFFTF FTTTT TFFFT FTFFF FTTFF TFFTT FTF FTTTF TFTTT FTTFF