

“Erroneous Exponentry”

What the hay? ...How did they get that? ...

Please help our hapless mathematician correct the mistakes (which are all too commonly made) in going from the left side to the right side. Complete the correct version and provide a brief explanation of the mistake made.

1. $32^{-\frac{2}{5}} = 32^{\frac{5}{2}}$

2. $5^{\frac{1}{3}} \times 5^{\frac{1}{2}} = 5^{\frac{1}{6}}$

3. *when solving student writes:*

$$5(2^x) = 40$$

$$10^x = 40$$

4. $\left(5^{\frac{1}{3}}\right)^4 = 5^{\frac{1}{12}}$

5. *when solving student writes:*

$$-2x=3$$

$$x=-2/3$$

6. $3^{2x+4} 27^{4-x} = 81^{-2x^2+4x+16}$

7. $\frac{18a^4b^2}{(3ab^3)^2} = \frac{18a^4b^2}{6a^2b^6}$

8. $5^{\frac{1}{3}} \times 5^{\frac{1}{2}} = 5^{\frac{1}{5}}$

9. *when solving student writes:*

$$2^x = 8$$

$$x = 4$$

10. $\left(\frac{5^2}{5^2}\right)^4 = 0^4$

11. $\left(\frac{27}{8}\right)^{\frac{2}{3}} = \frac{27^2}{8^3}$

12. *when solving student writes:*

$$9^{4x} = 1$$

$$4x = 1$$

13. $x^{\frac{1}{2}} x^{\frac{3}{2}} = x^{\frac{4}{4}}$

14. *when solving student writes:*

$$6x^3 = 0$$

$$x^3 = -6$$

also:

$$x^3 = 2$$

$$x = \frac{2}{3}$$

15. $\left(\frac{x^{\frac{1}{2}} \sqrt{x^3}}{\sqrt{x}}\right)^{\frac{1}{5}} = \frac{x^{\frac{7}{10}} x^{\frac{17}{10}}}{x^{\frac{7}{10}}}$