

Algebra Book Answers

5 Negative Indices

$$1. a) 5^{4+(-2)} = 5^{4-2} = 5^2$$

$$b) 8^{-10+7} = 8^3$$

$$c) 3^{-1} = \frac{1}{3}$$

$$d) \frac{7}{2^3} = \frac{7}{8} \quad e) \frac{3^2}{5^2} = \frac{9}{25}$$

$$f) 6^{-4-(-2)} = 6^{4+2} = 6^{-2} = \frac{1}{6^2}$$

$$g) z^8 \times z^{4 \times (-2)} = z^8 \times z^{-8} \\ = z^{8+(-8)} = z^0 = 1$$

$$h) (9)^{-8} = \frac{1}{9^8} \text{ or } \frac{1}{3^{16}}$$

$$i) 9^{6-(-6)} = 9^{6+6} = 9^{12}$$

$$2. a) h^{-5 \times -1} = h^5$$

$$b) 9^2 \times -(5)^{-3} = -\frac{9^2}{5^3}$$

$$c) \frac{1}{7} \times 7^{-2} = \frac{1}{7} \times \frac{1}{7^2} = \frac{1}{7^3}$$

$$d) 17^9 \times \frac{1}{17^3} = \frac{17^9}{17^3} = 17^{9-3} \\ = 17^6$$

$$3. a) \frac{12^5}{12^{-5}} \times \frac{1}{12^{-8}}$$

$$= 12^{5-(-5)-(-8)} = 12^{5+5+8} \\ = 12^{18}$$

$$b) \frac{6^{-3+10}}{6^{4+(-5)}} = \frac{6^7}{6^{-1}} = 6^{7-(-1)} \\ = 6^8$$

$$c) \frac{7^4}{7^{7-8-(-2)}} = \frac{7^4}{7^1} = 7^{4-1} \\ = 7^3$$

$$d) \frac{n^{-4+1}}{n^{-3 \times 6}} = \frac{n^{-3}}{n^{-18}} = n^{-3-(-18)} \\ = n^{-3+18} = n^{15}$$

$$e) \frac{3^{-2 \times 3}}{3^{8+(-8)}} = \frac{3^{-6}}{3^0} = 3^{-6} = \frac{1}{3^6}$$

$$f) \frac{m^{7-(-3)}}{m^{-2-9}} = \frac{m^{10}}{m^{-11}} = m^{10-(-11)} \\ = m^{10+11} = m^{21}$$

$$g) \left(\frac{10^{7+(-11)}}{10^{9-4}} \right)^{-5} = \left(\frac{10^{-4}}{10^5} \right)^{-5} \\ = (10^{-4-5})^{-5} = (10^{-9})^{-5} = 10^{45}$$

$$i) 13^{-4} \div 13^{11} = 13^{-4-11} \\ = 13^{-15} = \frac{1}{13^{15}}$$

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$$4. a) i) 0.001 = \frac{1}{1000}$$

$$ii) 0.001 = \frac{1}{10^3}$$

$$iii) 0.001 = 10^{-3}$$

$$b) i) 10^{-1} \quad ii) 10^{-6}$$

$$iii) 10^{-3} \quad iv) 10^0$$

$$5. a^5 \times a^3 = a^{5+3} = a^8$$

$$\frac{6^7}{6^2} = 6^{7-2} = 6^5$$

$$\frac{w^8}{w^4} = w^{8-4} = w^4$$

$$6. \frac{15bc}{3b} \rightarrow 5c$$

$$\frac{15bc \times 2b}{3b^2} \rightarrow 10c$$

$$\downarrow$$

$$\frac{30b^2c}{3b^2} = 10c$$

$$\frac{15bc^2 \times 2b}{6b^2} \rightarrow 5c^2$$

$$7. \frac{8b}{4} = 2b$$

$$\frac{10b^8}{5b^7} = 2b$$

$$5(b+6) - 3(b+10)$$

How?

$$5(b+6) - 3 \boxed{} = 2b$$

$$3 \boxed{} = 5(b+6) - 2b$$

$$3 \boxed{} = 5b + 30 - 2b$$

$$3 \boxed{} = 3b + 30$$

$$\boxed{} = \frac{3b}{3} + \frac{30}{3}$$

$$= \underline{b+10}$$

$$\frac{2b^2 \times 4b}{4b^5} = 2b$$

$$8. b) 3 \quad c) 5$$

$$d) 4 \quad e) 7$$

$$f) 1$$

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