MPM1D0 Unit 1: Homework Quiz 6 Well done Mr. S.!! **Victim:** Mr. Solutions

Product Rule $a^x a^y = a^{x+y}$	Quotient Rule $\frac{a^x}{a^y} = a^{x-y}$	Power of a Power Rule $(a^x)^y = a^{xy}$	Power of a Product Rule $(ab)^x = a^x b^x$

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1. Write each expression in expanded form. Then simplify. (8 /8)

Expression	*Expanded Form*	*Simplified Form*
(a) a^5a^3	$a(a)(a)(a)(a)(a)(a)(a)$ ✓	a^8 ✓
(b) $\frac{a^5}{a^3}$	$\frac{a(a)(a)(a)(a)}{a(a)(a)}$ ✓	a^2 ✓
(c) $(a^5)^3$	$(a^5)(a^5)(a^5)$ ✓	a^{15} ✓
(d) $(a^5b^2)^3$	$(a^5b^2)(a^5b^2)(a^5b^2)$ ✓	$a^{15}b^6$ ✓

2. Use laws of exponents to simplify each of the following expressions ***fully***. (11 /11)

(a) $x^{12}x^3$
$= x^{12+3}$ ✓
$= x^{15}$ ✓

(b) $\frac{x^{12}}{x^3}$
$= x^{12-3}$ ✓
$= x^9$ ✓

(c) $(x^{12})^3$
$= x^{12(3)}$ ✓
$= x^{36}$ ✓

(d) $5(m^3)^4$
$= 5m^{3(4)}$ ✓
$= 5m^{12}$ ✓

(e) $(5m^3)^4$
$= 5^4(m^3)^4$ ✓
$= 625m^{12}$ ✓ ✓

3. Simplify the following expression ***fully***. (6/6)

Power of a Product

$$\frac{3a^3b^3(4ab^2)^3}{2ab^2(6a^2b^3)}$$

$= \frac{3a^3b^3[4^3a^3(b^2)^3]}{2(6)a^1a^2b^2b^3}$ ✓

$= \frac{3a^3b^3(64a^3b^6)}{12a^3b^5}$ ✓

$= \frac{3(64)a^3a^3b^3b^6}{12a^3b^5}$

$= \frac{192a^6b^9}{12a^3b^5}$ ✓

Like Factors grouped together (i.e. powers with same base, constants)

$= \frac{192}{12}\left(\frac{a^6}{a^3}\right)\left(\frac{b^9}{b^4}\right)$

$= 16a^{6-3}b^{9-5}$

$= 16a^3b^4$ ✓ ✓ ✓

Factors can be placed in any order because multiplication can be performed in any order.