

Name:

Math 10C Unit 1 Exponents and Radicals

Checkpoint 3: Exponents

1) Use the exponent laws to simplify the following. [24 marks]

a) $n^2 \cdot n^5$

b) $2^2 \cdot 2^3$

c) $(-2)^2 \cdot (-2)^5$

d) $z^{10} \cdot z^3$

e) $\frac{r^4}{r^3}$

f) $\frac{m^5}{m^2}$

g) $\frac{15^4}{15}$

h) $\frac{x^7}{x^{15}}$

i) $(2^4)^3$

j) $(x^6)^5$

k) $(3z^2)^2$

l) $(-5x)^2$

m) $(-3)^0$

n) $(-7y)^0$

o) $-7y^0$

p) $\left(\frac{x^2}{t}\right)^3$

q) $\left(\frac{5m}{3z^3}\right)^2$

r) $\left(\frac{3c}{2y^2}\right)^4$

s) w^{-6}

t) $\frac{1}{2^{-3}}$

u) $(2m)^{-3}$

v) $\frac{m^3}{n^{-2}}$

w) $\frac{a^{-2}b^4}{3a^{-3}}$

x) $(2x^2y)(5x^2y^3)$

Name:

2) Combine the laws of exponents to simplify the following: [5 marks]

a) $(-2x^4)(12x^9)$

b) $\left(\frac{12de^3}{6de}\right)$

c) $(-a^2b^3)^4$

d) $\left(\frac{2d^5 \times d^4}{4d^3}\right)^3$

e) $\left(\frac{-5k^3 \times k^2}{k}\right)^2 \left(\frac{k^5 \times k^2}{5k^2}\right)$

3) Simplify the following. Ensure your solution has positive exponents. [7 marks]

a) $a^{-3}a^{-3}$

b) $(5b^8b^{-12})(-10b^3b^{-12})$

c) $(-7x^3x^{-5})(x^2x^{-3})$

d) $(-2a^3)^{-3} (3a^{12})$

e) $\frac{16a^6b^{-3}}{-4a^6b^3}$

f) $(-3a^5b^{-3}c^0)^{-2}$

g) $\left(\frac{-12x^{-3}}{6y^{-8}}\right)^{-1}$

Math 10C Unit 1 Exponents and Radicals

Checkpoint 3: Exponents

1) Use the exponent laws to simplify the following. [24 marks]

a) $n^2 \cdot n^5$
 n^7

b) $2^2 \cdot 2^3$
 2^5
 32

c) $(-2)^2 \cdot (-2)^5$
 $(-2)^7$
 -128

d) $z^{10} \cdot z^3$
 z^{13}

e) $\frac{r^4}{r^3}$
 r^1

f) $\frac{m^5}{m^2}$
 m^3

g) $\frac{15^4}{15^1}$
 15^3
 3375

h) $\frac{x^7}{x^{15}}$
 x^{-8}
 $\frac{1}{x^8}$

i) $(2^4)^3$
 2^{12}

j) $(x^6)^5$
 x^{30}

k) $(3z^2)^2$
 $9z^4$

l) $(-5x)^2$
 $25x^2$

m) $(-3)^0$
 1

n) $(-7y)^0$
 1

o) $-7y^0$
 -7

p) $\left(\frac{x^2}{t}\right)^3$
 $\frac{x^6}{t^3}$

q) $\left(\frac{5m}{3z^3}\right)^2$
 $\frac{25m^2}{9z^6}$

r) $\left(\frac{3c}{2y^2}\right)^4$
 $\frac{81c^4}{16y^8}$

s) w^6
 $\frac{1}{w^6}$

t) $\frac{1}{2^{-3}}$
 2^3
 8

u) $(2m)^3$
 $\frac{1}{(2m)^3}$
 $\frac{1}{8m^3}$

v) $\frac{m^3}{n^{-2}}$
 $m^3 n^2$

w) $\frac{a^{-2}b^4}{3a^{-3}}$
 $\frac{ab^4}{3}$

x) $(2x^2y)(5x^2y^3)$
 $10x^4y^4$
 $10y^4$

Name:

2) Combine the laws of exponents to simplify the following: [5 marks]

a) $(-2x^4)(12x^9)$

$-24x^{13}$

b) $\left(\frac{12de^3}{6de}\right)$

$2e^2$

c) $(-a^2b^3)^4$
even negative goes
 a^8b^{12}

d) $\left(\frac{2d^5 \times d^4}{4d^3}\right)^3$

$\left(\frac{2d^9}{4d^3}\right)^3$

$\left(\frac{d^6}{2}\right)^3 = \frac{d^{18}}{8}$

e) $\left(\frac{-5k^3 \times k^2}{k}\right)^2 \left(\frac{k^5 \times k^2}{5k^2}\right)$

① $\left(\frac{-5k^5}{k}\right)^2 \left(\frac{k^7}{5k^2}\right)$

② $\left(\frac{-5k^4}{1}\right)^2 \left(\frac{k^5}{5}\right)$

③ $\frac{25k^8}{1} \times \frac{k^5}{5}$

④ $\boxed{5k^{13}}$

3) Simplify the following. Ensure your solution has positive exponents. [7 marks]

a) $a^{-3}a^{-3}$

$\frac{a^{-6}}{1} = \frac{1}{a^6}$

b) $(5b^8b^{-12})(-10b^3b^{-12})$

$-50b^{11}b^{-24}$

$\frac{-50b^{11}}{b^{24}} = -50b^{-13}$

$\boxed{\frac{-50}{b^{13}}}$

c) $(-7x^3x^{-5})(x^2x^3)$

$-7x^{-3}$

$\boxed{\frac{-7}{x^3}}$

d) $(-2a^3)^{-3}(3a^{12})$

$\frac{(-2)^{-3}a^{-9}(3a^{12})}{1}$

$\frac{3a^{12}}{(-2)^3 a^9} = \boxed{\frac{3a^3}{-8}}$

e) $\frac{16a^6b^{-3}}{-4a^6b^3}$

$\frac{-4b^{-6}}{1}$

$\boxed{\frac{-4}{b^6}}$

f) $(-3a^5b^{-3}c^0)^{-2}$

$\frac{1}{(-3a^5b^{-3})^2}$

$\frac{1}{9a^{10}b^{-6}}$

$\boxed{\frac{b^6}{9a^{10}}}$

g) $\left(\frac{-12x^{-3}}{6y^{-8}}\right)^{-1}$

$\left(\frac{-2x^8}{x^3}\right)^{-1}$

$\boxed{\frac{x^3}{-2118}}$