

**PART A**

1) Multiply.

- a)  $3 \times 2x$       b)  $5(4x)$       c)  $-2(7y)$       d)  $10 \times 3x^2$       e)  $x(9x)$   
 f)  $(5x)(3x)$       g)  $-2m(6m)$       h)  $y(8y^2)$       i)  $(-5p^2)(-3p^2)$       j)  $2(5x)(-3x^2)$

2) Divide.

- a)  $6x \div 2$       b)  $\frac{-12x}{4}$       c)  $\frac{15x}{x}$       d)  $\frac{14y}{7y}$       e)  $\frac{25n^2}{n^2}$       f)  $\frac{24h^2}{3h^2}$   
 g)  $\frac{9x^2}{x}$       h)  $\frac{-28x^3}{x}$       i)  $\frac{16x^4}{8x^2}$       j)  $\frac{-20r^6}{-4r^2}$       k)  $-\frac{75u^{10}}{15u^7}$       l)  $\frac{27x^{14}}{-3x^{10}}$

3) Multiply.

- a)  $4 \times 6xy$       b)  $(-2)(7xy)$       c)  $6a \times 2b$       d)  $(4m)(-3n)$   
 e)  $(8x)(9yz)$       f)  $9ab(4c)$       g)  $(-2pq)(-10r)$       h)  $17xy(-3z^2)$

4) Divide.

- a)  $16xy \div 2$       b)  $\frac{32ab}{8}$       c)  $\frac{24xy}{6x}$       d)  $\frac{-36pqr}{9r}$       e)  $\frac{60abc}{10ab}$       f)  $\frac{-22st^2}{-11t^2}$

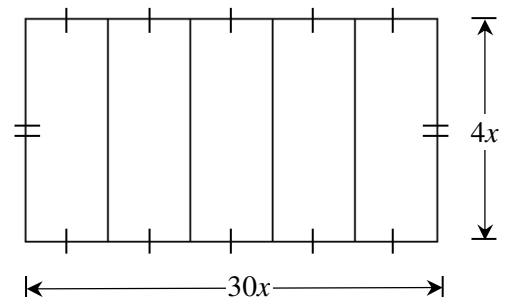
**PART B**

5) Simplify.

- a)  $\frac{4(3x)}{6}$       b)  $\frac{(5x)(6x)}{15}$       c)  $\frac{10(2x)}{5x}$       d)  $\frac{(-3y)(12y)}{9y}$       e)  $\frac{(12a)(4a)}{8a^2}$   
 f)  $\frac{(3x)(16y)}{4}$       g)  $\frac{-4(10xy)}{5xy}$       h)  $\frac{(16m)(2n)}{4m}$       i)  $\frac{(20q)(3r)}{(2q)(15r)}$       j)  $\frac{2x(-2y)(-12z)}{24xz}$

6) A rectangle is divided into 5 equal sections as shown on the right.

- a) Determine a simplified expression that represents the area of the entire rectangle.  
 b) Determine a simplified expression that represents the area of one section.



7) Simplify.

a)  $x^5(x^4)^2$     b)  $(x^2)^3(x^4)^2$     c)  $\frac{(k^4)^3}{k^2}$     d)  $\frac{(y^3)^5}{(y^2)^3}$     e)  $\frac{(a^4a^2)^3}{(a^3a^5)^2}$

f)  $\left(\frac{y^9}{y^5}\right)^4$     g)  $(5x^4 \times 6x^8)^2$     h)  $[(-2a)(5a^9)]^3$     i)  $(3x)^2(2x^4)^3$     j)  $\frac{(4p^5)^3}{(-2p^3)^4}$

8) Simplify.

a)  $x^7 \times x^6 \times y^4 \times y^3$     b)  $a^3b^8a^9b^2$     c)  $(x^4y^5)(x^2y^3)$     d)  $(9x^2y^3)(4x^4y^2)$

e)  $(-52ab^2)(3a^9b^{10})$     f)  $x^6(xy)^4$     g)  $-6m(2n)^3$     h)  $(2x)^4(3y)^2$

i)  $(3x^4)^2(2y^5)^3$     j)  $(2a^2)^4(3a^6b^5)^2$     k)  $-3x^2y(-2x^7y^4z^2)^3$     l)  $(-2p^2q^3)^4(4p^5q)^3$

9) Simplify.

a)  $\frac{x^5y^6}{x^2y^2}$     b)  $\frac{38a^2b^4}{2ab}$     c)  $\frac{-12xy^6}{3xy^2}$     d)  $\frac{(4m^5n^6)^2}{(2m^2n^3)^3}$     e)  $\frac{(-2xy^3)^4}{(-2y^4)^3}$     f)  $\frac{(-4a^5b^2)^2(2a^3b^2)^3}{(2a^3b)^4}$

## PART C

10) The length of a triangle's base is  $5x^2y^3$  cm and its height is  $4xy^2$  cm.

- Determine a simplified expression for the area of the triangle.
- If the triangle is the base of a prism with a length of  $x$  cm, find a simplified expression for the volume of the prism.
- If  $x = 4$  cm and  $y = 3$  cm, determine the area of the triangle and the volume of the triangular prism.

### Scientific Notation

- The numbers  $5.2 \times 10^9$  and  $2.0 \times 10^{11}$  are expressed in scientific notation. Express the product of these numbers in scientific notation.
- Evaluate  $(7.8 \times 10^{12})(5.6 \times 10^{14})$  and express the result in scientific notation.
- Approximately  $7.4 \times 10^{11}$  kg of rice is produced globally every year. If the population of the world is about  $7.6 \times 10^9$  people, approximately how many kilograms of rice is produced per person each year? Express your answer in scientific notation.
- Lisa is a photographer who uses an 8 TB hard drive to store her images. Typically, her images have a file size of about 4 MB each.
  - Using scientific notation, express the storage capacity of the hard drive in kilobytes.
  - Using scientific notation, express the image file size in kilobytes.
  - Approximately how many images can Lisa store on the hard drive? Express your answer using scientific notation.



**ANSWERS**

- 1) a)  $6x$  b)  $20x$  c)  $-14y$  d)  $30x^2$  e)  $9x^2$  f)  $15x^2$  g)  $-12m^2$  h)  $8y^3$   
i)  $15p^4$  j)  $-30x^3$
- 2) a)  $3x$  b)  $-3x$  c)  $15$  d)  $2$  e)  $25$  f)  $8$  g)  $9x$  h)  $-28x^2$  i)  $2x^2$   
j)  $5r^4$  k)  $-5u^3$  l)  $-9x^4$
- 3) a)  $24xy$  b)  $-14xy$  c)  $12ab$  d)  $-12mn$  e)  $72xyz$  f)  $36abc$  g)  $20pqr$   
h)  $-51xyz^2$
- 4) a)  $8xy$  b)  $4ab$  c)  $4y$  d)  $-4pq$  e)  $6c$  f)  $2s$
- 5) a)  $2x$  b)  $2x^2$  c)  $4$  d)  $-4y$  e)  $6$  f)  $12xy$  g)  $-8$  h)  $8n$  i)  $2$   
j)  $2y$
- 6) a)  $120x^2$  b)  $24x^2$
- 7) a)  $x^{13}$  b)  $x^{14}$  c)  $k^{10}$  d)  $y^9$  e)  $a^2$  f)  $y^{16}$  g)  $900x^{24}$  h)  $-1000a^{30}$   
i)  $72x^{14}$  j)  $4p^3$
- 8) a)  $x^{13}y^7$  b)  $a^{12}b^{10}$  c)  $x^6y^8$  d)  $36x^6y^5$  e)  $-156a^{10}b^{12}$  f)  $x^{10}y^4$   
g)  $-48mn^3$  h)  $144x^4y^2$  i)  $72x^8y^{15}$  j)  $144a^{20}b^{10}$  k)  $24x^{23}y^{13}z^6$  l)  $1024p^{23}q^{15}$
- 9) a)  $x^3y^4$  b)  $19ab^3$  c)  $-4y^4$  d)  $2m^4n^3$  e)  $-2x^4$  f)  $8a^7b^6$
- 10) a)  $10x^3y^5 \text{ cm}^2$  b)  $10x^4y^5 \text{ cm}^3$   
c) area of triangle =  $155520 \text{ cm}^2$ , volume of prism =  $622080 \text{ cm}^3$
- 11)  $10.4 \times 10^{20}$  12)  $4.4 \times 10^{27}$  13)  $9.7 \times 10^1 \text{ kg/person}$
- 14) a)  $8 \times 10^9 \text{ KB}$  b)  $4 \times 10^3 \text{ KB}$  c)  $2 \times 10^6 \text{ images}$