

# UNIT 1 NOTES

## Unit 1.1: Numeracy

Mult & Div: Left to right  
Add & Sub: Left to right

### 1. Order of Operations: PEMDAS

a)  $(3 + 1)^3 - 10 \div 2$

$$(4)^3 - 10 \div 2$$

$$64 - 5 = \boxed{59}$$

b)  $4(6 + 2) - 6 - 1$

$$4(8) - 6 - 1$$

$$32 - 7 = \boxed{25}$$

c)  $4 - (5 \cdot 2) \div (2 + 3)$

$$4 - (10) \div (5)$$

$$4 - 2 = \boxed{2}$$

d)  $\frac{9}{2 \cdot (-1) - 1^3} = \frac{9}{-2 - 1} = \frac{9}{-3} = \boxed{-3}$

e)  $(2 - 1)^2 + -6 - \left(\frac{4 - (-2)}{3} - 5\right)$

$$(1)^2 + -6 - \left(\frac{4+2}{3} - 5\right)$$

$$1 + -6 - \left(\frac{6}{3} - 5\right)$$

$$1 - 6 - (2 - 5) = 1 - 6 - (-3)$$

$$= 1 - 6 + 3 = \boxed{-2}$$

f)  $-4 \cdot 3 + (|2| + (-2)^2)$

$$-12 + (2 + 4)$$

$$-12 + 6 = \boxed{-6}$$

### 2. Solving Equations:

a)  $2(-6x + 4) - 8x = 168$

$$-12x + 8 - 8x = 168$$

$$-20x + 8 = 168$$

$$-20x = 160$$

$$\boxed{x = -8}$$

c)  $-2(7 + 5n) = 28 + 4n$

$$-14 - 10n = 28 + 4n$$

$$-28 + 10n - 28 + 10n$$

$$-42 = 14n$$

$$\boxed{-3 = n}$$

e)  $-2(2 + v) = 31 + 3v$

$$-4 - 2v = 31 + 3v$$

$$-31 + 2v - 31 + 2v$$

$$-35 = 5v$$

$$\boxed{-7 = v}$$

b)  $-5(1 + 7b) = -5 - 5b$

$$-5 - 35b = -5 - 5b$$

$$+5 + 5b + 5 + 5b$$

$$-30b = 0$$

$$\boxed{b = 0}$$

Solve: Get x by itself;

$$x = \underline{\hspace{2cm}}$$

d)  $\frac{3x+5}{4} \times \frac{4x}{5}$

$$5(3x+5) = 4(4x)$$

$$15x + 25 = 16x$$

$$-15x \quad -15x$$

$$\boxed{25 = x}$$

Fraction = Fraction  
Cross multiply

f)  $\frac{4(x+3)}{2(x+1)} = 3$

Multiply bottom over

$$(2x+2) \cdot \frac{4x+12}{2x+2} = 3(2x+2)$$

$$4x+12 = 6x+6$$

$$-4x - 6 \quad -4x - 6$$

$$6 = 2x$$

$$4x+12 = 3(2x+2)$$

$$\boxed{3 = x}$$

### 3. Fractions Rules:

Use a calculator! ⚠

Add or subtract TI Calculators	Math 1: ▸ Frac Enter Enter
Multiply Scientific/Casio	OR F↔D
Divide	

a)  $\frac{2}{5} + \frac{3}{10} \quad (2/5) + (3/10)$   
 $= \boxed{\frac{7}{10}}$

b)  $\frac{5}{12} - \frac{1}{18} \quad (5/12) - (1/18)$   
 $=$

c)  $\frac{12}{25} + \frac{13}{10}$

d)  $\frac{15}{6} \cdot \frac{3}{10} \quad (15/6) \cdot (3/10)$   
 $=$

e)  $\frac{5}{2} \cdot \frac{24}{25}$

f)  $\frac{2}{5} \div \frac{3}{10} \quad (2/5) \div (3/10)$

g)  $\frac{12}{15} \div \frac{3}{10}$

h)  $\frac{\frac{2}{5}}{\frac{14}{15}}$

i)  $\frac{\frac{2}{5}}{2}$

### 4. Exponent Rules:

Property	Rule	Example
Zero Property	Anything with exponent 0 is 1	<ul style="list-style-type: none"> <li><math>a^0 = 1</math></li> <li><math>12^0 = 1</math></li> </ul>
Negative Exponent Property	Flips its spot in a fraction * exponent applies to what it is directly attached to	<ul style="list-style-type: none"> <li><math>(\frac{1}{a})^{-1} = \frac{a}{1} = a</math></li> <li><math>(2a)^{-2} = \frac{1}{(2a)^2} = \frac{1}{2^2 a^2} = \boxed{\frac{1}{4a^2}}</math></li> <li><math>2a^{-3} = \frac{2}{a^3}</math></li> <li><math>a^4 \cdot a^3 = a^7</math></li> </ul>
Product of Powers Property	Add exponents	<ul style="list-style-type: none"> <li><math>5a^2 \cdot 2a^9 = 10a^{11}</math></li> <li><math>\frac{a^7}{a^2} = a^5</math></li> <li><math>\frac{6a^{10}}{2a^{-1}} = 3a^{11}</math> ← <math>\frac{10 - (-1)}{10 + 1}</math></li> </ul>
Quotient of Powers Property	Subtract exponents	
Power of a Power Property	Multiply exponents	<ul style="list-style-type: none"> <li><math>(a^3)^2 = a^6</math></li> <li><math>(2x^2)^5 = 2^5 x^{10} = \boxed{32x^{10}}</math></li> </ul>

Ask: Will I add, subtract, or multiply exponents?

Simplify: Your answer should contain only positive exponents.

a)  $2r^2 \cdot 2r$   
 $= 4r^2 \cdot r$   
 $= \boxed{4r^3}$

b)  $3k^2 \cdot k^{-3}$   
 $3k^{-1} = \boxed{\frac{3}{k}}$

c)  $(2b^5)^2 = 2^2 b^{10}$   
 $= \boxed{4b^{10}}$

d)  $\frac{2x^{-4} \cdot x^{-2}}{(x^{-4} \cdot x^3)^2} = \frac{2x^{-6}}{(x^{-1})^2}$   
 $= \frac{2x^{-6}}{x^{-2}} = 2x^{-4} = \boxed{\frac{2}{x^4}}$   
-6 - (-2)  
-6 + 2

e)  $\frac{(k^{-1})^2 \cdot (2k^{-1})^0}{4k \cdot k^4}$   
 $= \frac{k^{-2}}{4k^5} = \frac{k^{-7}}{4} = \boxed{\frac{1}{4k^7}}$

f)  $\frac{2y^{\frac{3}{4}}}{2y} = y^{\frac{3}{4}-1}$   
 $= y^{-\frac{1}{4}} = \boxed{\frac{1}{y^{\frac{1}{4}}}}$

5. Radicals. Simplify each radical.

a)  $\sqrt{720}$

b)  $\sqrt{256x^4}$

c)  $\sqrt[3]{16x^6}$

d)  $\sqrt[4]{8x^{18}}$

e)  $\sqrt{600}$

f)  $\sqrt[3]{216x^7}$

Tips to help me

### Exponent tips

- start with what is easiest

• is it easier to deal with numbers or variables first?

- save flipping for last

\* Always ask yourself: Will I add, subtract, or multiply the exponents?

- tackle top & bottom of fractions separately before looking at them together