

# ***Grade 10 Essentials Math***

## ***Weekly Quiz Debrief Week 4***

23-09 - 28



**MRF**

# Grade 10 Essential Week 4 Quiz

A Regular Weekly Thursday Quiz.

**Time Limited!** Submit it by 12:00 (no later) if stuck at home. It will be shut off by then.

**Open book;** (since teacher cannot police it anyway) however with a **Time Limit** you will find having a **cheat sheet** will have been much more useful in learning, retaining, and readily finding information. You are expected to have a cheat sheet for the **Final Exam**. Here is [MY Cheat Sheet](#).

You will certainly need some a scrap piece of paper and pencil to solve a couple of these problems. Each question needs response, guess if necessary!

Ensure you include units in any written response! There are two bonus questions, do them too in case you need them! [2 marks each]

Have your [Yellow] [Conversion Tables](#) at the ready or on your device.

It was made available as an on-line quiz too this time in case anyone needed that service or wanted to experiment with it

# My cheat sheet

Start to  
tweak up  
your cheat  
sheet!

**GRADE 10 ESSENTIAL REFERENCE NOTES (SKELETON)**  
 This is my teacher version of Grade 10 Essential Reference Notes. You will want to definitely prepare your own! I do not explain these notes!  
 They are mine. Use them at your own risk!  
**Unit A - GAMES AND NUMBERS (PROBLEM SOLVING)**  
 To solve many 'math' problems (and those of life too), try a few of these  
 List (and Count), Draw a Diagram, Guess and Check, Model the problem, Use a Table, See if you are missing any information, Solve a simpler version, Look for a Pattern, use Logic  
**THINK! Explore**

## UNIT B - PERSONAL FINANCE

**GROSS Income:** All Income. **Bi-Weekly** = every two weeks  
**NET INCOME:** Income after deductions  
**NET = GROSS - (Income Taxes + CPP contributions + EI Contributions + Other Deductions)**  
 To calculate income taxes:  
**Taxable income = Gross - (Company Pension Contribution + RRSP Contribution + Union Dues Paid)**  
**Income tax(es) = tax rate(s) \* Taxable income**

## UNIT C - MEASUREMENT (See conversion tables)

Mega = 1,000,000; Kilo = 1,000; Centi =  $1/100^{th}$ ; Milli =  $1/1,000^{th}$

Should be familiar with many of these conversions (memorize)		
Metric ↔ Metric	'Old' System	Metric ↔ Old System
1 kilometre [km] = 1,000 m	1 ft = 12 in	1 in = 2.54 cm
1 metre [m] = 100 cm	1 yd = 3 feet = 36 in	1 m = 3.28 ft
1 centimeter = $1/100^{th}$ metre	1 mi = 5280 ft = 1760 yd	1 kg = 2.205 lb
1 centimetre [cm] = 10 mm	1 pound [lb] = 16 ounces [oz]	1 mi = 1.609 km
1 kg = 1,000 g	1 ton = 2,000 lb	1 Imp Gallon = 4.55 L
1 gram [g] = 1,000 milligram [mg]	1 quart [qt] = 2 pints [pt]	1 US Gallon = 3.79 L
1 L = 1,000 mL	4 quarts = 1 gallon [gal]	$\text{°F} = (\frac{9}{5})\text{°C} + 32$
1 kL = 1,000 L		$\text{°C} = \frac{5}{9} \cdot (\text{°F} - 32)$

## Unit D: Two-Dimensional Geometry

Selected Formulae (See also separate full formulae sheet)  
**Perimeter** = distance around a shape; **Area** = amount of squares inside surface of shape  
**circumference** = Distance around a circle; **diameter** = dist across circle;  
**radius** = distance from centre to circumference (half of diameter)

**Rectangle and Parallelogram**

Perimeter =  $2a + 2b$   
 Area =  $b \cdot h$

**Pythagoras - Right Triangle**

$c^2 = a^2 + b^2$

$3^2 + 4^2 = 5^2$   
 $9 + 16 = 25$

**Any Triangle**

**Any Triangle**

diameter

MEASUREMENT CONVERSIONS

**Lots of conversion factors. A few of the basics should be memorized!**

**12 in = 1 ft; 100 cm = 1 m; 1 kilobling = 1,000things, 2.54 cm = 1 in; 1 kg = 2.2 lb**

1 litre [L]	=	1,000 millilitre [mL]
1 litre [L]	=	100 centilitres [cL]
1 litre [L]	=	1,000 cc (or 1,000 cm <sup>3</sup> )
1 millilitre [mL]	=	1 cc (or 1 cm <sup>3</sup> )

'cc' stands for cubic centimetre which is really just cm<sup>3</sup>. Notice also that a cube of dimensions 10cm by 10 cm by 10 cm is a litre

Conversions SI Met	
1 square metre	= 10.0
1 hectare	= 10.0
1 cm <sup>2</sup>	= 100 t

So a square 100 m by 100 m is Used for measuring land area.

1 gallon (English)	=	4,546 litres
1 gallon (US)	=	3,785 litres
1 gallon (English)	=	4,546 cc <sup>3</sup>
1 gallon (US)	=	3,785 cc <sup>3</sup>

Conversions Non-SI Imperial - Mass		
1 kilogram kg	=	2,205 pounds lb
1 tonne	=	1.1 ton

Conversions SI to Non-SI Area		
1 sq mile	=	259 hectares
1 sq mile	=	2,589,988 m <sup>2</sup>
1 square metre	=	10.76 ft <sup>2</sup>
1 square metre	=	1,550 in <sup>2</sup>

Imperial to Imperial (and American) Conversions		
Conversions Non-SI (Imperial) for Length		
1 mile [mi]	=	1,760 yards [yd]
1 yard [yd]	=	3 feet [ft]
1 mile [mi]	=	5280 ft
1 foot [ft]	=	12 inches [in]
1 yard [yd]	=	36 inches [in]

Conversions Non-SI Imperial		
1 ton [t]	=	2,000 pounds [lb]
1 pound [lb]	=	16 ounces [oz]

Note: No such thing as 2.75 pound it is 2 lbs 12 oz

Conversions Non-SI (Imperial) for Volume		
8 gallon [gal]	=	1 bushel
4 quarts [qt]	=	1 gallon [gal]
or 1 quart [qt]	=	0.25 gal
2 pints	=	1 quart [qt]
8 pints	=	1 gallon [gal]
20 ounces [oz]	=	1 pint

Conversions Non-SI Imperial for (USA)		
1 gallon (US)	=	0.832 gallon (English)
1 gallon (US)	=	128 ounces (US)

Really gets confusing with two different depending on your country!

Caution Ounces of weight are different from ounces of volume.

Conversions Non-SI Imperial for Area		
1 acre	=	43,560 ft <sup>2</sup>
1 acre	=	4,840 yd <sup>2</sup>
1 square foot [ft <sup>2</sup> ]	=	144 square inches [in <sup>2</sup> ]
1 square yard [yd <sup>2</sup> ]	=	9 ft <sup>2</sup>
1 square mile	=	640 acres

So a square having sides of 208 feet would be an acre. An acre originally was supposed to be the amount of farmland a man could work in one day, so it depended on how strong the man was!

CONVERT BY PROPORTIONS:

12 feet is how many inches??

$$\frac{12 \text{ ft}}{1 \text{ ft}} = \frac{x}{6 \text{ ft}}; \quad \text{so: } \frac{12 \cdot 6}{1} = x$$

so: **x = 72 inches**

Just like grandma's secret recipe for muffins

16 lbs is how many kg?

$$\frac{x \text{ kg}}{16 \text{ lb}} = \frac{1 \text{ kg}}{2.205 \text{ lb}}; \quad \text{so: } \frac{16}{2.205} = x$$

so: **x = 7.26 kg**

CONVERT BY FACTORS:

5 years is how many hours?

$$5 \cancel{\text{yr}} \cdot \frac{365 \text{ days}}{1 \cancel{\text{yr}}} \cdot \frac{24 \text{ hr}}{1 \cancel{\text{day}}} = \frac{5 \cdot 365 \cdot 24}{1 \cdot 1} = 43,800 \text{ hours}$$

Units in top and bottom cancel until you are left with what you want!

units not want \*  $\frac{\text{units want}}{\text{units not want}}$

16 lbs is how many kg?

$$16 \cancel{\text{lb}} \cdot \frac{1 \text{ kg}}{2.205 \cancel{\text{lb}}} = \frac{16}{2.205} \text{ kg} = 7.26 \text{ kg}$$

*Example Calculations!*

2. **Solve Proportion.** If 4 bananas cost \$2.50, then state below how much 18 bananas will cost.

→ →

$$\frac{\$2.50}{4 \text{ bananas}} = \frac{\$x}{18 \text{ bananas}}$$

$$\begin{array}{c} \text{---} \\ \downarrow \\ \$ \\ x \end{array}$$

"Cross multiply"

$$\frac{\$2.50 \cdot 18 \text{ bananas}}{4 \text{ bananas}} = \$x$$

$$x = \$11.25 \text{ for 18 bananas}$$

Had some pretty unrealistic answers from students!!

~~\$40?~~ lol  
~~3.45?~~

**Guys and gals! Show the *units* in the calculations!**  
**Half of the students still just randomly fling numbers down and in the wrong arrangement**

3. Convert 3.2 kg into \_\_\_\_\_ grams. [Select the one best answer] \*

Mark only one oval.

Conversion factor:  $1 \text{ kg} = 1,000 \text{ g}$

3,200 g

0.032 g

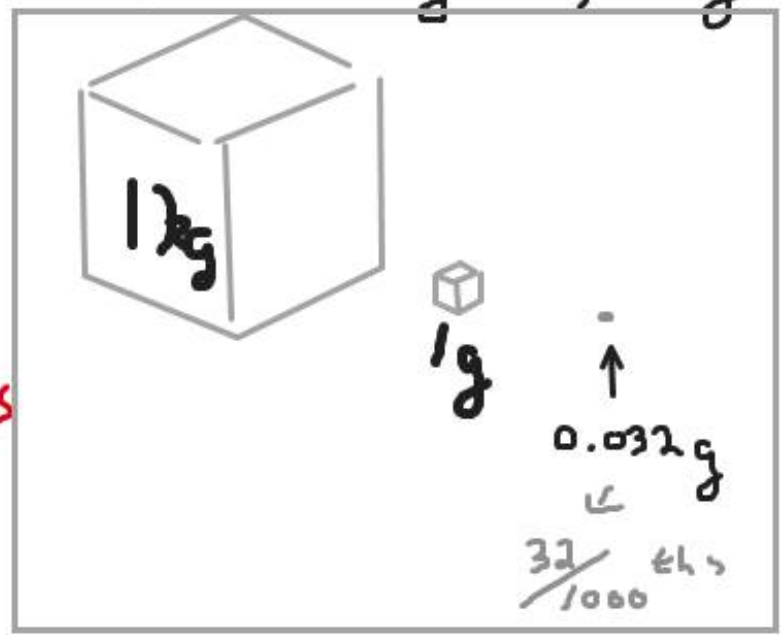
1,000 g / kg

the answer is 'x'

320 g

→ picture it! Doesn't make sense

→ what unit is a g/kg?



$$3.2 \text{ kg} \cdot \left( \frac{1,000 \text{ g}}{1 \text{ kg}} \right) = 3,200 \text{ g}$$

or

$$\frac{x \text{ g}}{3.2 \text{ kg}} = \frac{1,000 \text{ g}}{1 \text{ kg}} ; x = \frac{3.2 \text{ kg} \cdot 1,000 \text{ g}}{1 \text{ kg}} = 3,200 \text{ g}$$

4. 456 cm = \_\_\_\_\_?\_\_\_\_\_ m \*

$$456 \text{ cm} \cdot \left( \frac{1 \text{ m}}{100 \text{ cm}} \right) = 4.56 \text{ m}$$

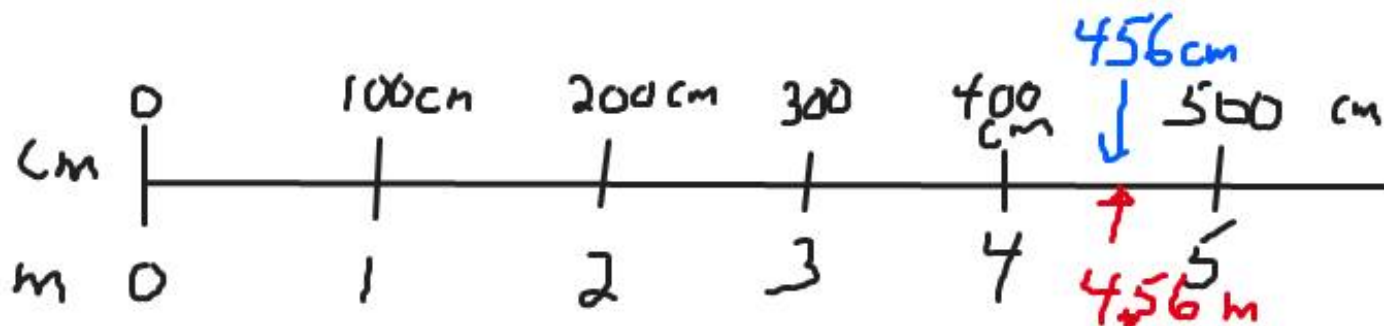
Mark only one oval.

~~4560 m~~ lol

4.56 m

~~45.6 km~~ lol

~~45,600 m~~ lol



5. Convert 6 ft 3 in into  $\overline{75}$  inches \*

Mark only one oval.

$$6 \text{ ft} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 72 \text{ in} + 3 \text{ more in} = 75 \text{ in}$$

6.3 ft

75 in

$6.3 \cdot 10 = 63$  inches

$6.3 \cdot 12 = 75.6$  in  $\times \rightarrow$

None of these other choices

No such thing as a decimal inch

6. The doctor says a newborn weighs 6 lb. Determine the newborn's weight in proper metric kilograms rounded to the nearest 0.01 of a kg.

$$6 \text{ lb} \cdot \left( \frac{1 \text{ kg}}{2.205 \text{ lb}} \right) = 2.72 \text{ kg}$$

Sounds about

right. 1 kg is  
about twice as heavy  
as one pound

OR Solve as proportion:

$$\frac{1 \text{ kg}}{2.205 \text{ lb}} = \frac{x \text{ kg}}{6 \text{ lb}}$$

$$\frac{1 \text{ kg} \cdot 6 \text{ lb}}{2.205 \text{ lb}} = x \text{ kg} \quad ; \quad x = 6 \div 2.205 = 2.72 \text{ lb}$$



7. The product (when you multiply) of two numbers is 54, the difference of the two numbers is 3. The two numbers are:

Mark only one oval.

{9, 6}

$3 \cdot 18 = 54$

{7, 10}

No possible solution

Guess and check!

1 <sup>st</sup> nbr	2 <sup>nd</sup> nbr	Product	Difference
3	18	= 54	18 - 3 = 15
6	9	= 54 ✓	9 - 6 = 3 ✓

$$3 \cdot 18 = 54$$

$$18 - 3 = 15$$

$$6 \cdot 9 = 54 \checkmark$$

$$9 - 6 = 3 \checkmark$$

The two numbers are 6 and 9

OR MAYBE

1 <sup>st</sup> nbr	2 <sup>nd</sup> nbr	diff	product
<del>15</del>	<del>12</del>	3	$15 \cdot 12 = 180$
<del>10?</del>	$10 - 3$ 7	3	$10 \cdot 7 = 70$
9?	6	= 3 ✓	$9 \cdot 6 = 54 \checkmark$

$$\times 15 \quad \times 12 \quad 3 \quad 15 \cdot 12 = 180$$

$$\times 10? \quad 10 - 3 \quad 3 \quad 10 \cdot 7 = 70 \quad \text{Getting close}$$

$$\textcircled{9}? - \textcircled{6} = 3 \checkmark \quad 9 \cdot 6 = 54 \checkmark \quad \text{Yes!}$$

The two numbers are 9 and 6

8. If you have ten '2's all multiplied together what is the result? [ie: the product of all of them]

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 2^{10} \text{ } \uparrow \text{ exponent}$$

$2^{10}$   
 $= 1024$

 $(= 1,024)$

9. Add the following measures:

$6 \text{ lb } 9 \text{ oz} + 2 \text{ lb } 9 \text{ oz}$

Mark only one oval.

- ~~8 lb 18 oz~~
- 9 lb 2 oz
- 6.9 oz + 2.9 oz = 9.8 oz
- ~~6.9 lb + 2.9 lb = 9.8 lb~~

$$\begin{array}{r} 1 \text{ lb} \\ 6 \text{ lb } 9 \text{ oz} \\ + 2 \text{ lb } 9 \text{ oz} \\ \hline 9 \text{ lb } 2 \text{ oz} \end{array}$$

18 oz = 1 lb + 2 oz

no such thing as decimal lb!

10. A normal class lasts for 2 h 30 min. Josh arrives 1 hr 40 min late. Determine how much time Josh spent in the class.

$$\begin{array}{r} 1 \text{ hr} \quad \overset{60 \text{ min}}{\curvearrowright} \quad 40 \text{ min} \\ \cancel{2 \text{ hr}} : \cancel{30 \text{ min}} \\ - 1 \text{ hr} : 40 \text{ min} \\ \hline 0 \text{ hr} : 50 \text{ min} \end{array}$$

He spent 50 minutes  
in class

11. **BONUS. Problem Solving – Logic / Guess and Check.** If three hot dogs and one coke cost \$4.50, and three hot dogs and two cokes cost \$5.25. State the cost of one hot dog

Logic! one extra coke cost an extra \$0.75  
 $\$5.25 - \$4.50 = \$0.75$

So if one coke is \$0.75 then 3 hot dogs are \$3.75 since  $\$3.75 + \$0.75 = \$4.50$

Therefore  $\$4.50 / 3 \text{hd} = \$1.50 / 1 \text{hd}$

one hot dog costs \$1.50

or guess and check? →

11. BONUS. Problem Solving – Logic / Guess and Check. If three hot dogs and one coke cost \$4.50, and three hot dogs and two cokes cost \$5.25. State the cost of one hot dog

ONE Hotdog \$1?   
 $3 \text{ hot Dogs } 3 \cdot 1 = \$3$    
 $\$4.50 - 3 = \$1.50$  1 coke

Then 3 hot + 2 cokes   
 $3 \cdot \$1 + 2 \cdot \$1.50 = \$6$    
 $\times$  Nope! Should be \$5.25

\$2?  $\$6$   $\times$  only spent \$4.50

\$1.50?  $3 \cdot 1.50 = \$4.50$    
 $\$4.50 - 4.50 = \text{Free!}$

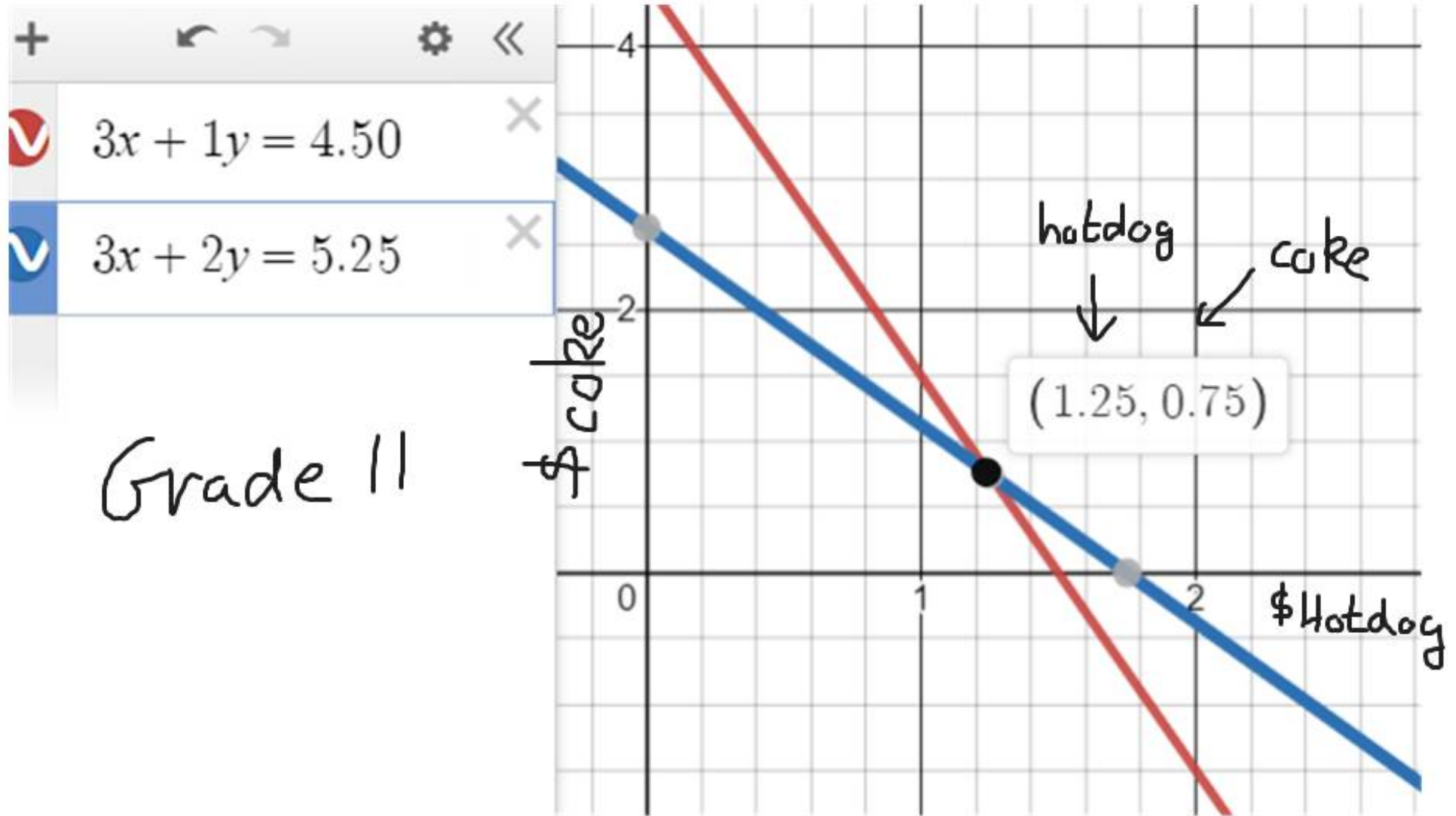
$3 \cdot \$1.50 + 2 \cdot \text{free} = \$4.50$    
 $\times$  should be \$5.25

\$1.25?  $3 \cdot 1.25 = \$3.75$    
 $\$4.50 - 3.75 = \$0.75$  ✓

$3 \cdot \$1.25 + 2 \cdot \$0.75 = \$5.25$  ✓

Yes! ONE Hot dog is \$1.25

In Grade 11 you will find way simpler ways to solve these types of problems



12. **BONUS Problem Solving.** Determine the **sum** (ie: if you add them all up) of all the counting numbers from 1 to 40. (ie:  $1 + 2 + 3 \dots + + \text{etc} + + + \dots 38 + 39 + 40$ ). [You may enter your own calculation if none of the given choices are correct]

Mark only one oval.

41

lots

820

idk

Other: \_\_\_\_\_

$$1 + 2 + 3 + + + \text{etc} + + 38 + 39 + 40 =$$

$1 + 40 = 41$   
 $2 + 39 = 41$   
 $3 + 38 = 41$

**It's a pattern, it is math.**

OMG! Done this  
5 or 6 times now!

See a pattern?  
How many 41's?  
20!

$$41 \cdot 20 = \textcircled{820}$$



**LOAD CLEAR!**



**DETERMINED TO DELIVER,  
Baby!**