Grade 11 Essential Week Two Quiz Debrief

17 Nov 2022

MrF

GRADE 11 ESSENTIAL
WEEKLY QUIZ - WEEK 2

*←

- Open book **THIS** time if necessary. Use your one-page 'cheat sheet' reference notes that you are slowly compiling. Or use mine for now.

- Use a calculator to its full effect. Use the issued loan tables for the unit

- Time limit 40 Mins

Round all decimal answers to nearest 0.01

- Tick here: ☐ if you read these instructions (1 Mark)

I will show you how to be 'tactical' on Multiple choice questions

Make sure you have a cheat sheet, will not always be open book!

Here is mine you can use, you can tweak up mine for now

GRADE 11 ESSENTIAL – BASIC REFERENCE NOTES MrF

A basic selection of Grade 11 Essential Concepts and Formulae. Of course you are likely to have more and to have examples on your doubled-sided study sheet.

Algebra. If $y = ax + b$, then $x = \dfrac{y - b}{a}$

Proportions, solve by cross multiply (lazy algebra): If $\dfrac{x}{a} = \dfrac{b}{c}$; then $x = \dfrac{ab}{c}$

Interest and Credit

$A = P + I$, the Final Amount an investment or loan is worth is the Principal plus the Interest earned or owing.

Simple: $I = P*r*t$; where I is the Interest [$], P is Principal [$], r is yearly Annual Percentage Rate (APR)[%], and t is time in years. *Hint!!*: 3 months = 3/12^{ths} or 0.25 of a year, etc!

Compound: $A = P*\left(1 + \dfrac{r}{s}\right)^{n*s}$; where P is Principal [$], r is the yearly interest rate as a decimal (eg: 8.5% = 0.085), s is the number of periods per year the interest is compounded, and n is the time in years.

Periods: *Monthly:* s = 12. *Quarterly:* s = 4. *Semi-Annual:* s = 2. *Weekly:* s = 52. *Bi-Weekly:* s = 26; etc

If $r\% \cdot n = 72$ then P doubled ~

Simple and Compound Interest pretty are very close over short period or low interest rate. Much better to pay off a loan monthly rather than at end of loan term!

Monthly Loan tables: *payment amounts in table are for each thousand you borrow*
(loan tables will be provided)

Geometry

Formulae .You will have a separate substantial and familiar sheet of Geometry Formulae provided.

Conversions. You have a separate substantial and familiar sheet of unit Conversion Factors provided.

Names of shapes: prisms: rectangular faces joining edges of two congruent base shapes; ...gles faces connected to edges of base shape and meeting at a point.

MULTIPLE CHOICE

Circle the letter of the one best or **closest answer** [2 marks each]

1. 16% of $2,300 is:

   a. $69.56   b. $368   ~~c. $36,800~~ d. $143.75

   [handwritten: → I may round to nearest whole $]

   [handwritten: doesn't make sense]

2. If you do something 'quarterly' you do it how many times per year:

   a. 4   b. 12   c. 2   d. once

   [handwritten: 4 quarters in a $]
   [handwritten: 4 quarters in a foot ball game]

[handwritten work:]

① $\frac{16}{100} \cdot 2,300 = 368$

$$\frac{16}{100} \cdot 2300$$

$$= 368$$

$$\begin{array}{r} 16 \\ \times 23 \\ \hline 48 \\ 3\,1\,\text{-} \\ \hline 3\,6\,8 \end{array}$$

3. $4,000 dollars invested at 6% compounded monthly for 15 years should amount to a total amount of:

a. $36,000   (b.) $9,816   ✗ $3,600   ✗ $7,600

?

How could it be less?

would it not be double after just 12 yrs?

$$A = P \cdot \left(1 + \frac{r}{s}\right)^{n \cdot s}$$

$$A = 4{,}000 \cdot \left(1 + \frac{0.06}{12}\right)^{(15 \cdot 12)}$$

$$A = \$9{,}816.37$$

$12 \cdot 6 = 72$

$$4000 \cdot \left(1 + \frac{0.06}{12}\right)^{(15 \cdot 12)} = 9816.3742$$

4. The two numbers that sum to a total 15 and have a product of 54 are:

a. {5, 3}   b. {11, 4}   c. {27, 2}   d. {6, 9}

Guess & check?

1st nbr	2nd nbr 15-1st	Sum 1st + 2nd = 15	Product 1st · 2nd = 54
✗ 10	5	15 ✓	10·5 = 50 ✗
Guess again ✗ 11 ?	15-11 4	15 ✓	11·4 = 44 ✗ Getting further away!
⑨ ? Yes	15-9 ⑥	9+6 =15 15 ✓	9·6 = 54 ✓ Yes

The two numbers are 9 & 6

{6, 9}

4. The two numbers that sum to a total 15 and have a product of 54 are:

a. $\{5, 3\}$ b. $\{11, 4\}$ c. $\{27, 2\}$ d. $\{6, 9\}$

But wait!, Already gave
you 4 choices!
why invent your own?
Just check each of the choices!

a. $\{5, 3\}$ b. $\{11, 4\}$ c. $\{27, 2\}$ d. $\{6, 9\}$ Gee! wonder if this works

$5+3 = 8$ $11+4 = 15$ ✓ $27+2$ $6+9 = 15$ ✓
NOT 15   But $= 29$ $6 \cdot 9 = 54$ ✓
                   $11 \cdot 4 = 44$ ✗
                   Want 54

5. Mike cashed in his GIC (Guaranteed Investment Certificate) for a total amount of $3,277.23 It had earned 10% interest compounded quarterly for 5 years. How much was his initial investment (the Principal, P)?

a. $3,000   ✗ $3,516.18   ✗ $6,554   (d.) $2,000

You lost money ?

ONLY Two Feasible Solutions
Test each one!

$$3,\overset{?}{0}00 \cdot \left(1+ \frac{0.1}{4}\right)^{(5 \cdot 4)} \approx 4915 \quad \text{NoT } 3277$$

↑
Doesn't work

$$\underset{?}{\textcircled{2,000}} \cdot \left(1+ \frac{0.1}{4}\right)^{(5 \cdot 4)} = 3277.23 \checkmark$$

Yes, it works ↗

5. Mike cashed in his GIC (Guaranteed Investment Certificate) for a total amount of $3,277.23 It had earned 10% interest compounded quarterly for 5 years. How much was his initial investment (the Principal, P)?

a. $3,000   b. $3,516.18   c. $6,554   d. $2,000

OF Course some students like to do it the ~~hard~~ fun way!!

$$A = P \cdot \left(1 + \frac{r}{s}\right)^{(n \cdot r)}$$
$$3{,}277.23 = P \cdot \left(1 + \frac{0.1}{4}\right)^{(5 \cdot 4)}$$

← WRITE The Formula

← Plug in numbers

This gaggle is just one number!

$$\left(1 + \frac{0.1}{4}\right)^{(5 \cdot 4)} = 1.63861644$$

$$\frac{3277.23}{1.63861644} = 1999.998242$$

Do not round

So $2,000

OPEN RESPONSE
Show work!

1. Romeo borrows **$6,500** from his aunt for **10** months. His aunt charges him **simple interest** of **5%** annual percentage rate (APR).
    a. Calculate how much *interest*, **I**, Romeo pays for the use of his aunt's money, **and**
    b. Calculate the total amount, **A**, Romeo pays back to his aunt.

a) $I = P \cdot r \cdot t = 6,500 \cdot \frac{5}{100} \cdot \frac{10}{12}$

$I = \$270.83$ interest

6500*5/100*10/12

270.8333333

b) $A = P + I$

$A = \$6,500 + \$270.83$

$A = \$6,770.83$ to pay back total

Amount total =
Principal +
Interest

2. Alexie's uncle bought Alexie a **$4,500** Canada Savings Bond (CSB) from the government on the day she was born. It paid **6%** annual interest **compounded** monthly. On her **18th** birthday her uncle gave it to Alexi to cash in at the bank.

   a. Determine the total value amount, **A**, of her CSB after that **18** years.

   b. Using the **Rule of 72**, *approximately* how many years would it have taken for the CSB to double in value?

a) $$A = P\left(1 + \frac{r}{s}\right)^{(n \cdot s)} = 4,500 \cdot \left(1 + \frac{0.06}{12}\right)^{(18 \cdot 12)}$$

$$A = \frac{4500*(1+0.06/12)}{^(18*12)}$$

13215.44687

$$= \$13,215.45 \quad \text{after } 18 \text{ years}$$

b) Rule of 72   If $\overset{years}{n} \cdot \overset{\%}{r} = 72$ then P doubles

$$n \cdot 6 = 72; \quad n = 72/6 = 12 \text{ years}$$

Her money would have doubled after 12 years

3. Complete the **simple interest** table:

$$A = I + P$$

	A [$]	I [$]	P [$]	r [%/yr)	t [yrs]
①	(1,300)	(300)	$1,000	6%	5 years
②	$2,400	400	$2,000	5%	4 years
③	$512.67	$12.67	$500	3.8%	8 months

[WORK AREA ↓]

①

$$I = P \cdot r \cdot t$$
$$I = \$1000 \cdot 6/100 \cdot 5\,yr$$
$$I = \boxed{\$300}$$
per year

②

$$A = P + I$$
$$2400 = 2000 + I \; ; \; I = 400$$

$$I = P \cdot r \cdot t$$
$$400 = (1,000 \cdot 5/100) \cdot t$$
$$\frac{400}{100} = \frac{100 \cdot t}{100}$$
$$t = \frac{400}{100} = 4\,yr$$

Checks?
$$2,000 \cdot 5/100 \cdot 4 \stackrel{?}{=} 400 \checkmark$$
Yes $\frac{4}{works}$!

③

$$I = P \cdot r \cdot t$$
$$I = 500 \cdot 3.8/100 \cdot 8/12$$
$$\boxed{I = \$12.67}$$

4. Carla borrowed $600 from a Pay Day Loan. She paid back the principal of the loan plus $40 in interest after two months. Determine the Interest Rate, r, (APR) she was charged. *Use simple interest, since compound and simple interest are very close for short durations anyway.*

$$I = P \cdot r \cdot t$$

combine

$$40 = 600 \cdot r \cdot \frac{2}{12}$$

$$\frac{2}{12} = \frac{1}{6} = 0.16666667$$

$$\frac{40}{100} = \frac{100 \cdot r}{100}$$

$$r = \frac{40}{100} = 40 \text{ per hundred} \equiv 40\%$$

5. Trevor took a loan for a car from the local used car dealer. The loan was for $26,500 at an annual percentage rate of 25% for 5 years.
   a) Determine his monthly loan payments (from tables)
   b) Determine the cost of the loan (ie: the interest paid on the loan)

a) $\frac{29.35}{1000} \cdot 26,500 = \$777.78$ per month!

Do Not
Do 25%!!

b) $\$777.78/\text{month} \cdot 60 \text{ months}$

$= \$46,666.80$

It cost $\$20,166.80$ interest

$\begin{array}{r} 46,666.80 \\ -26,500.00 \\ \hline \$20,166.80 \end{array}$

5 year $\cdot \frac{12 \text{ mon}}{1 \text{ yr}} = 60 \text{ mon}$

MONTHLY LOAN PAYMENT TABLE FOR A LOAN OF $1,000 !

Annual Rate	1 Year Monthly	2 Years Monthly	3 Years Monthly	4 Years Monthly	5 Years Monthly	10 Years Monthly	15 Years Monthly
2%	$84.24	$42.54	$28.64	$21.70	$17.53	$9.20	$6.44
3%	$84.69	$42.98	$29.08	$22.13	$17.97	$9.66	$6.91
20%	$92.63	$50.90	$37.16	$30.43	$26.49	$19.33	$17.56
25%	$95.04	$53.37	$39.76	$33.16	$29.35	$22.75	$21.36

BONUS QUESTIONS [2 marks each] *Takes a lot of work!!*
So you will appreciate the better ways!!

1. If three hot dogs and one coke costs $12.00 and one coke is $2 less than a hot dog, how much does a hot dog cost?

Lots of ways to solve these!!
Logic, algebra, guess and check, ..graphing, ...

Guess and check!

1 Hd	3 Hd	1 Coke	3Hd + 1 Coke
✗ $2 ?	$6	$6 (12−6)	$12
✗ $3 ?	$9 (3·3)	$3 (12−9=)	$12 (9+3)
✗ $4 ?	$12	Free	12
✓ ($3.50) ?	$10.50 (3·3.50)	$1.50 (12−10.50)	$12 ✓ (10.50+1.50)

$Coke = Hd - \$2$

$6 = 2 - 2$? **No!**

$\$3 = \$3 - \$2$? ✗ **No!**

$\$0 = 4 - 2$? ✗ **No!**

$1.50 = 3.50 - 2$? **Yes!!**

So a hot dog costs $3.50,
So a coke costs $1.50   and   3 hot dogs and 1 coke
= 3·3.50 + 1·1.50 $12 ✓

$$\underset{\substack{\text{price} \\ \downarrow \text{hd}}}{3x} + \underset{\substack{\text{price} \\ \swarrow \text{coke}}}{1y} = 12 \quad , \quad \underset{\substack{\text{price} \\ \text{coke} \\ \downarrow}}{y} = \underset{\substack{\text{hot dog price} \\ \swarrow \\ \$}}{x - 2}$$

$$3x + \textcolor{green}{x - 2} = 12$$

$$\underset{\textcolor{red}{+2}}{4x - 2} = \underset{\textcolor{red}{+2}}{12}$$

"Algebra"

Fancy!!

Not Essential math

$$4x = 14$$
$$x = {}^{14}/_4 = \overset{\$}{3.50}$$
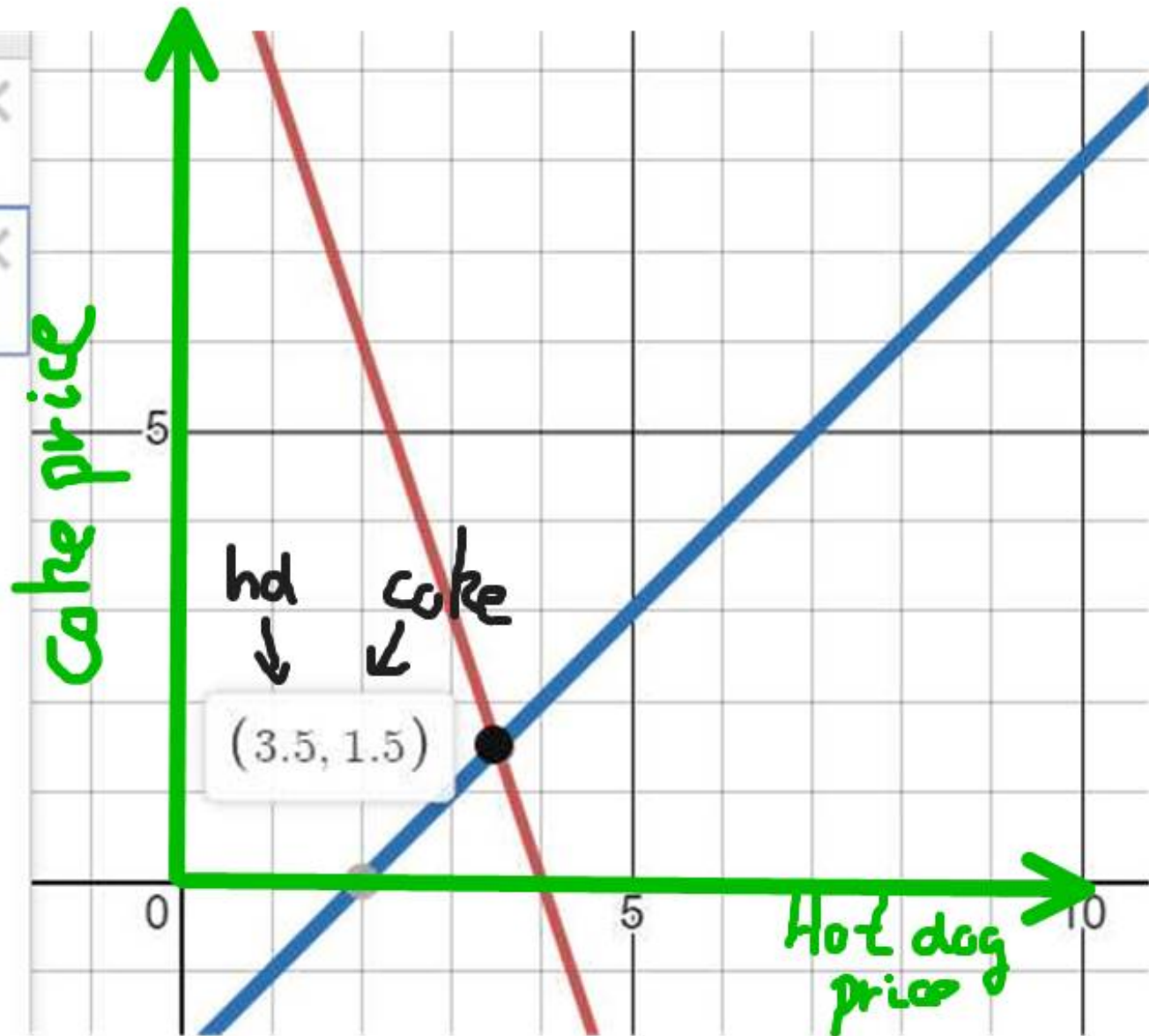$$\uparrow$$
price of hd

price coke
$$\swarrow$$
$$y = x - 2$$
$$y = 3.50 - 2 = \overset{\$}{1.50}$$

We will be just graphing it later in the course to see the solution

$3x + y = 12$

$y = x - 2$

Cake price

Hot dog price

hd   coke

$(3.5, 1.5)$
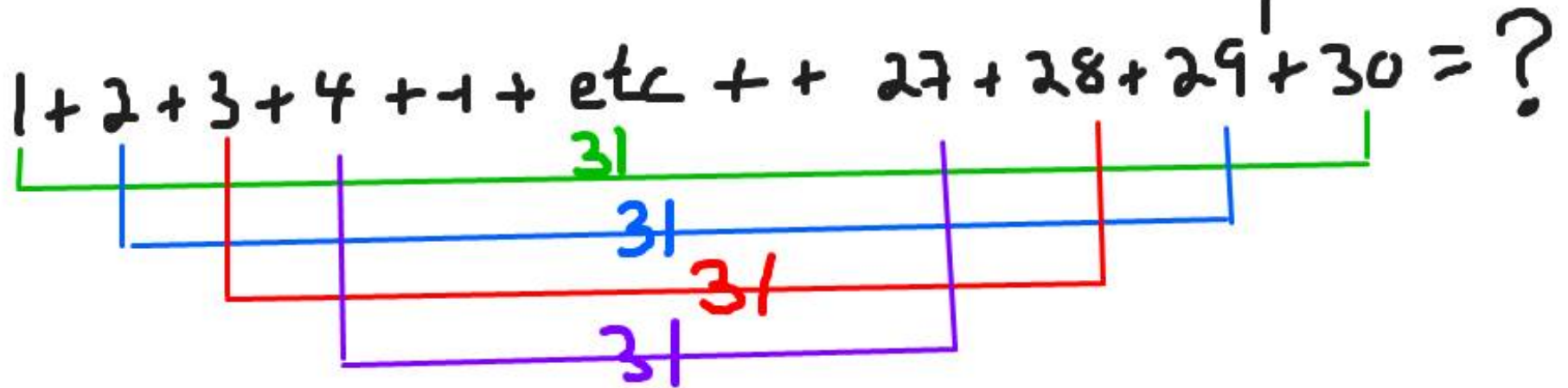
5

0   5   10

2. Determine the sum of all the (whole) counting numbers from 1 to 30.

Add'em up!! Classic problem! Look for a pattern!

$$1 + 2 + 3 + 4 + \text{--} + \text{etc} + \text{+} \ 27 + 28 + 29 + 30 = ?$$

31

31

31

31

See the pattern?
How many 31's?

15 thirty ones

$15 \cdot 31 = \boxed{465}$

We did this often in Grade 10!

*or you might have done it
on a calculator without
making a mistake!*

$$1+2+3+4+5+6+7+8+9+10+11+12+13+14+15+16+17+18+19+20 \quad = 210$$

$$210+21+22+23+24+25+26+27+28+29+30 \quad = 465$$

3. The area of a circle is given by the Grade 10 formula:
$Area = \pi r^2$. Determine the approximate *diameter* of a circle having an area of 120 cm².

$$A = \pi r^2 \qquad \leftarrow \text{WRITE THE FORMULA}$$

$$\downarrow$$

$$120 = \pi \cdot r^2 \qquad \leftarrow \text{Plug in numbers}$$

use the real π

$$38.1971... = \frac{120}{\pi} = r^2 \qquad \leftarrow \text{Solve, isolate the } r^2$$

$$r = \sqrt{38.1971....} \quad \cong 6.18 \checkmark$$
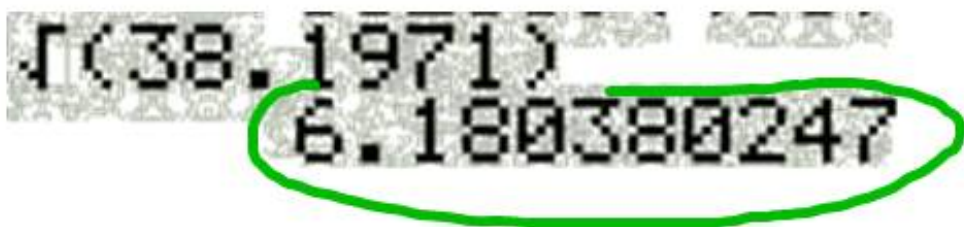
√(38.1971)
6.180380247

Check the solution

$$120 \stackrel{?}{=} \pi \cdot 6.18^2$$

π*6.18²
119.98496

6.18 works   Yes

So that was it

I tried to show you some test tactics

I tried to show you some of what we **will** be doing to make the problems more easy to solve too

LOAD CLEAR !