

Grade 11 Essentials

Quiz Debrief ***Week 3***

MrF



MrF

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**GRADE 11 ESSENTIAL
WEEKLY QUIZ – WEEK 3 - 221125**

Name: _____

Date: _____

Weekly quiz.

Closed book. Use your cheat sheet (use mine for now if necessary)

Geometric Formulae Sheet and Loan Tables are allowed.

Round all decimal answers to the nearest 0.01 unless otherwise indicated

Each individual question is worth two marks unless otherwise indicated

Show work.

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

Annual Rate	1 Year Monthl y	2 Years Monthl y	3 Years Monthl y	4 Years Monthl y	5 Years Monthl y	10 Years Monthly	15 Years Monthly	20 Years Monthly	25 Years Monthly
2%	\$84.24	\$42.54	\$28.64	\$21.70	\$17.53	\$9.20	\$6.44	\$5.06	\$4.24
3%	\$84.69	\$42.98	\$29.08	\$22.13	\$17.97	\$9.66	\$6.91	\$5.55	\$4.74
4%	\$85.15	\$43.42	\$29.52	\$22.58	\$18.42	\$10.12	\$7.40	\$6.06	\$5.28
5%	\$85.61	\$43.87	\$29.97	\$23.03	\$18.87	\$10.61	\$7.91	\$6.60	\$5.85
6%	\$86.07	\$44.32	\$30.42	\$23.49	\$19.33	\$11.10	\$8.44	\$7.16	\$6.44
7%	\$86.53	\$44.77	\$30.88	\$23.95	\$19.80	\$11.61	\$8.99	\$7.75	\$7.07
8%	\$86.99	\$45.23	\$31.34	\$24.41	\$20.28	\$12.13	\$9.56	\$8.36	\$7.72
9%	\$87.45	\$45.68	\$31.80	\$24.89	\$20.76	\$12.67	\$10.14	\$9.00	\$8.39
10%	\$87.92	\$46.14	\$32.27	\$25.36	\$21.25	\$13.22	\$10.75	\$9.65	\$9.09
12%	\$88.85	\$47.07	\$33.21	\$26.33	\$22.24	\$14.35	\$12.00	\$11.01	\$10.53
14%	\$89.79	\$48.01	\$34.18	\$27.33	\$23.27	\$15.53	\$13.32	\$12.44	\$12.04
16%	\$90.73	\$48.96	\$35.16	\$28.34	\$24.32	\$16.75	\$14.69	\$13.91	\$13.59
18%	\$91.68	\$49.92	\$36.15	\$29.37	\$25.39	\$18.02	\$16.10	\$15.43	\$15.17
20%	\$92.63	\$50.90	\$37.16	\$30.43	\$26.49	\$19.33	\$17.56	\$16.99	\$16.78
25%	\$95.04	\$53.37	\$39.76	\$33.16	\$29.35	\$22.75	\$21.36	\$20.98	\$20.88
30%	\$97.49	\$55.91	\$42.45	\$36.01	\$32.35	\$26.36	\$25.30	\$25.07	\$25.02
35%	\$99.96	\$58.52	\$45.24	\$38.97	\$35.49	\$30.12	\$29.33	\$29.20	\$29.17

← **ALWAYS** allowed the loan tables!

Notice they include examples of how to use them!

EXAMPLES of loan payments

Example A. You borrow \$120,000 for 10 years at 14% Annual Rate. Your monthly payments are \$13.22 for each thousand you borrow. So your monthly payment on \$120,000 is 120 times as much or \$1,586.40 per month. So your loan is paid off after 120 payments of \$1,586.40 so a total of \$190,368 in payments. So your \$120K loan cost you \$190K.

Example B. You borrow \$200,000 for 25 years at 6% Annual Rate to buy a house. Your monthly payments are \$6.44 for each thousand you borrow. So your monthly payment on \$200,000 is 200 times as much or \$1,288 per month. So your loan is paid off after 300 payments of \$1,288 so a total of \$386,400 in payments. So your \$200K house cost you \$386K over 25 years. Of course, hopefully you will be able to sell it for at least \$350K, so it really only cost you \$36K to live in a house for 25 years. Mind you now you need another place to live... but the kids are gone so you can get a smaller place!

Interpolation of Payment. If you want interest rates such 6.5% or 7.75% a linear interpolation should be sufficiently accurate. For example 6.5% would be halfway between \$6.44 and \$7.07, so $(6.44 + 7.07) / 2 = \$6.755$ per thousand per month for a 6.5% interest rate.

GRADE 11 ESSENTIAL – BASIC REFERENCE NOTES

*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 $x = \frac{y-b}{a}$

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

You are expected to use a "cheat sheet"

Interest and Credit

A = P + I, the Final **A**mount an investment or loan is worth is the **P**rincipal 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 = $3/12^{\text{th}}$ or 0.25 of a year, etc!*

Compound: $A = P * \left(1 + \frac{r}{s}\right)^{n*s}$; 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

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)

This is my cheat sheet, tweak up your own!

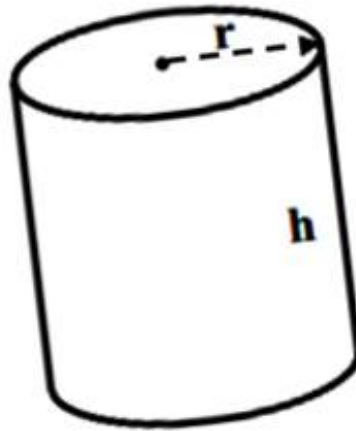
Always allowed the Geometry Formula sheet!

GRADE 11 E
UNIT C - 3-D GEOMETRY
APPENDIX - GEOMETRIC FORMULAS

Shape

Cylinder

(Two congruent circles connected with a rectangle wrapped around circumference)



Surface Area; SA
 $SA = 2\pi r^2 + 2\pi r h$
 (top & bottom circles + lateral side tube)

Volume; V:

$$V = \text{Base area} * h$$

$$= A * h$$

$$= \pi r^2 h$$

Square

(all four sides same length, 90° corners)

(a rectangle with all sides same length)

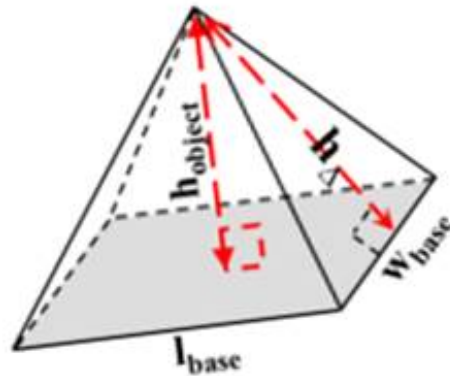
Rectangle

(Four sides, square corners)



Rectangular Pyramid or Square Pyramid

(A rectangle connected to an apex point by triangles on its edges)



Surface Area; SA

SA = add up area of all the faces (Base area plus four triangles)

Volume; V:

$$V = \frac{1}{3} * \text{Base area} * h_{\text{pyramid}}$$

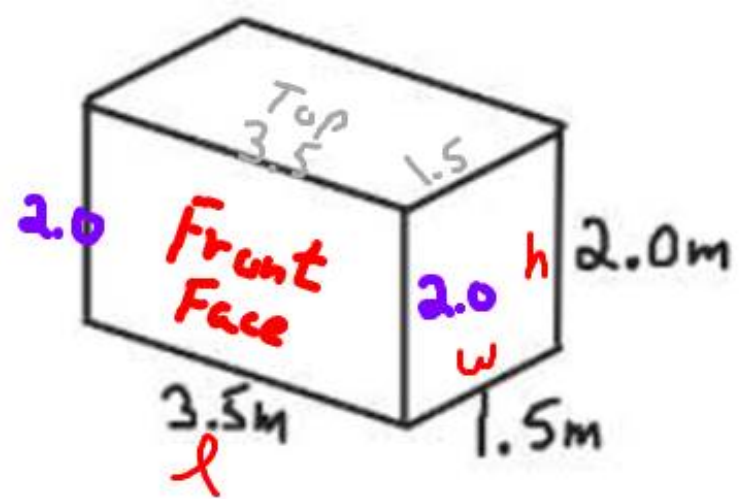
$$= \frac{1}{3} * (l * w) * h_{\text{pyramid}}$$

caution the pyramid has a height, and the triangular faces each have a height

And we had no calculators!

When I was in school we had to memorize them!

1. Determine the surface area of the rectangular prism. [4 marks]



Find the area of all six faces total:

Front & Back:

$$(3.5\text{m} \cdot 2.0\text{m}) \cdot 2 = 14\text{m}^2$$

Top and Bottom

$$(3.5\text{m} \cdot 1.5\text{m}) \cdot 2 = 10.5\text{m}^2$$

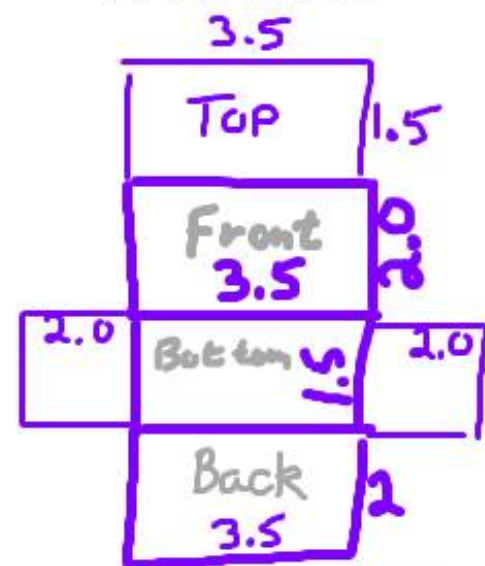
L & R Sides

$$(2.0\text{m} \cdot 1.5\text{m}) \cdot 2 = 6\text{m}^2$$

$$\text{Total SA} = 30.5\text{m}^2$$

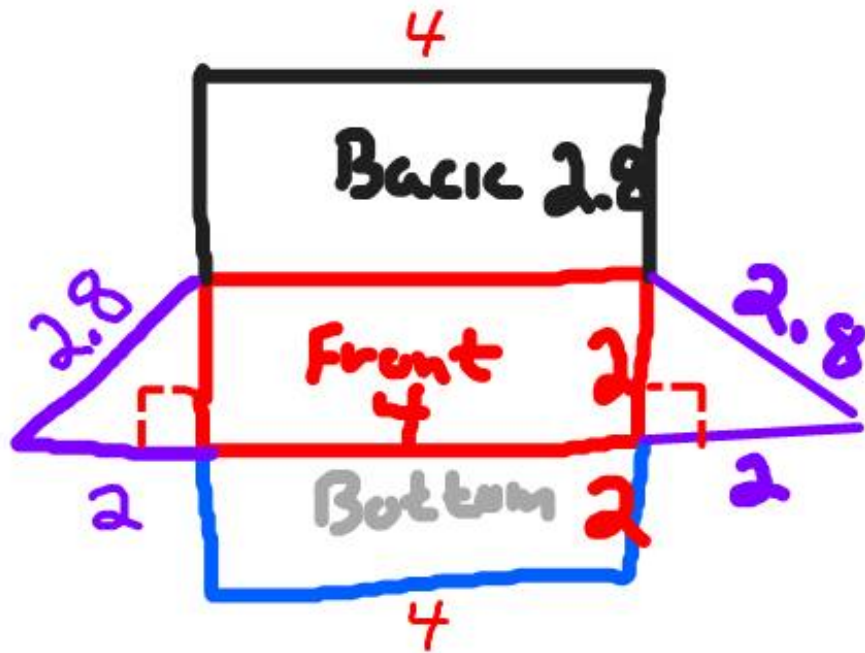
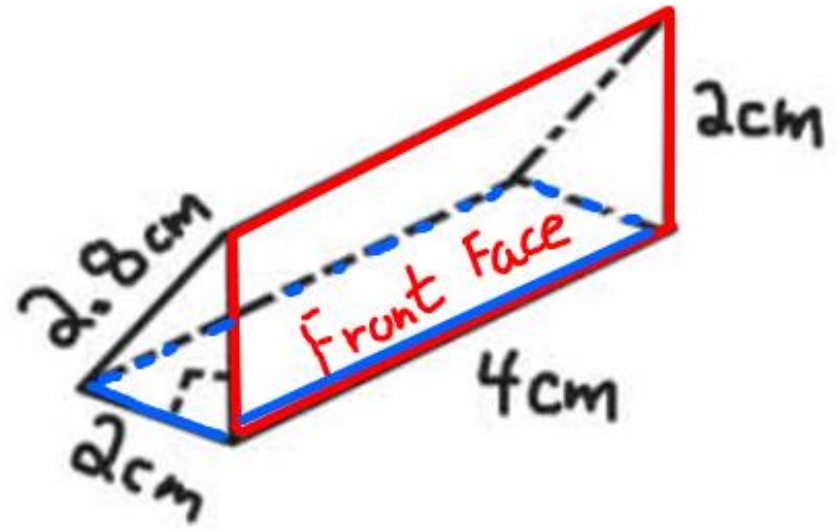
Did you notice the formulae sheet has a more elegant formulae?

I like a net



It did not say you had to do a net But don't forget you get part marks!

2. Sketch the net, and label the dimensions on the net, of this Triangular Prism. [1 mark]



3. Trevor buys a \$5,000 piano at Ruby's Piano Emporium. He finances a loan with Ruby for 9.5 % Annual Interest Rate with monthly loan payments for five years.

$$a) \frac{\$21.005}{\$1,000} \cdot \$5,000 = \$105.03 \text{ monthly payments}$$

a. determine Trevor's monthly payments

b. determine how much interest Trevor ended up paying by the end of the loan.

$$b) \$105.03/\text{month} \cdot 60 \text{ months} = \$6,301.80 \text{ Total Payments}$$

$$6,301.80 \text{ Total Amt}$$

$$- 5,000.00 \text{ Principal}$$

$$\underline{\$1,301.80 \text{ Interest}}$$

Don't round off numbers in the middle of a calculation unless you don't care about accuracy!

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4%	\$85.15	\$43.42	\$29.52	\$22.58	\$18.42	\$10.12	\$
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6%	\$86.07	\$44.32	\$30.42	\$23.49	\$19.33	\$11.10	\$
7%	\$86.53	\$44.77	\$30.88	\$23.95	\$19.80	\$11.61	\$
8%	\$86.99	\$45.23	\$31.34	\$24.41	\$20.28	\$12.13	\$
9%	\$87.45	\$45.68	\$31.80	\$24.89	\$20.76	\$12.67	\$1
10%	\$87.92	\$46.14	\$32.27	\$25.36	\$21.25	\$13.22	\$1
11%	\$88.39	\$46.60	\$32.74	\$25.84	\$21.74	\$13.77	\$1

$$\frac{(20.76 + 21.25)}{2} = 21.005$$

9% = 20.76
9.5% = 21.005
10% = 21.25

→ half way in between "interpolate"

The loan table gives an example!!

4. Serena invests her \$1,200 tax refund into a GIC (Guaranteed Investment Certificate) at the bank. The GIC pays 7.4% (compounded quarterly). Serena locks it in for three years. Determine the value of the GIC after three years when she cashes it in.

Compound interest investment!

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

$$A = \$1,200 \cdot \left(1 + \frac{0.074}{4}\right)^{(3 \cdot 4)}$$

$$A = \$1,495.25$$

$$7.4\% = 7.4/100$$

$$= 0.074$$

$$1200 \cdot \left(1 + \frac{0.074}{4}\right)^{(3 \cdot 4)} = 1495.25$$

Have tried this Desmos calculator yet?

Bonus Question(s). Extra marks if you need them

1. Determine the surface area of the Triangular Prism in Question 2

Add area of 5 faces

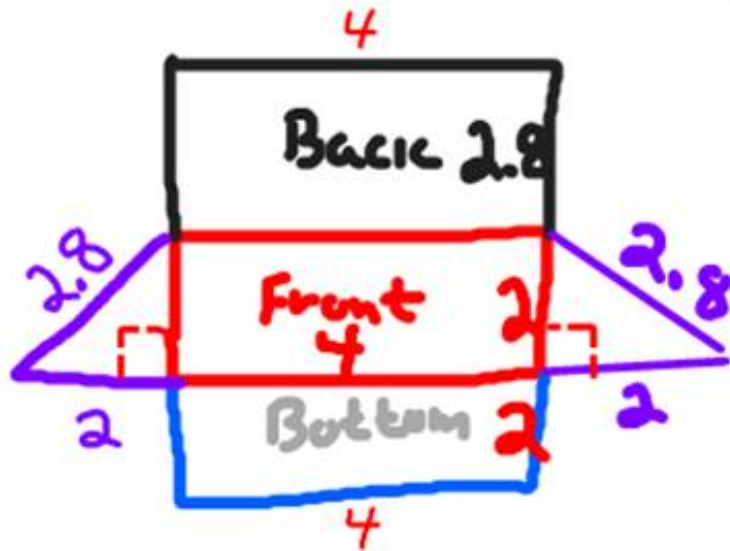
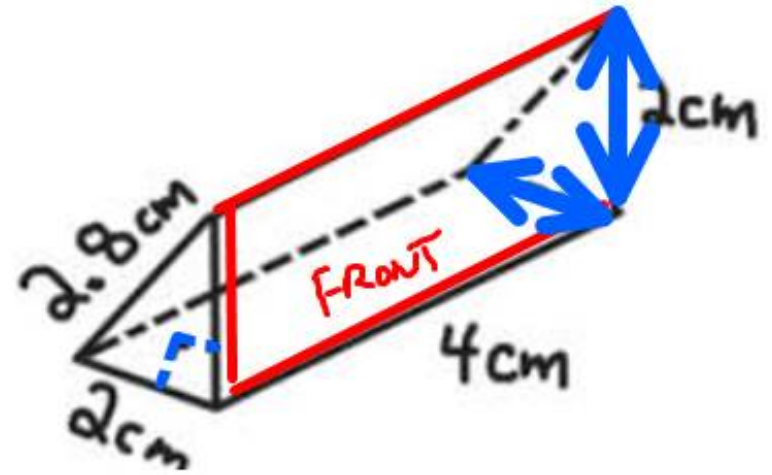
Front: $4\text{cm} \cdot 2\text{cm} = 8\text{cm}^2$
"Back": $4\text{cm} \cdot 2.8\text{cm} = 11.2\text{cm}^2$
Bottom: $4\text{cm} \cdot 2\text{cm} = 8\text{cm}^2$

2 "Base" Triangles

$$2 \cdot \left(\frac{1}{2} \cdot 2 \cdot 2 \right) = 4\text{cm}^2$$

Total

$$31.2\text{cm}^2$$



2. Farmer brown has 30 animals. Some chickens and cows. He is not sure how many of each he has. He knows they have a total of 100 legs. How many chickens does Farmer brown have? [Hint: Guess and Check]

# of Chickens	# of cows	Total Animals	# of LEGS Total
X 5?	25	30	$5 \text{ chickens} \cdot 2 \text{ legs/chicken} = 10 \text{ legs}$ $+ 25 \text{ cows} \cdot 4 \text{ legs/cow} = 100 \text{ legs}$ $= 110 \text{ legs}$
Guess again (10)?	+ 20	= 30 ✓	$10 \cdot 2 = 20 \text{ legs}$ $20 \cdot 4 = 80 \text{ legs}$ $\left. \begin{array}{l} 20 \text{ legs} \\ 80 \text{ legs} \end{array} \right\} \text{ Total } 100 \text{ legs!}$ That works ✓

Yes! 10 works

(The farmer has 10 chickens)

We will soon learn a much more efficient way to solve these types of Simultaneous Equations!

***That was it. A 20 - 30 minute quiz that
some folks stretched into more than an
hour!!!***



LOAD CLEAR !!

