

**Grade 11  
Essential Mathematics**

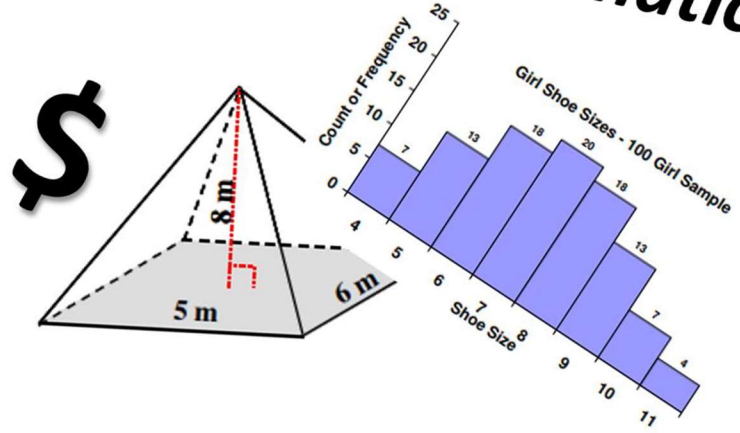
**Grade 11 Essential**

**Week 5 Quiz**

**DEBRIEF**

**Geometry & Finance**

23 Feb 2023



**MrF**

MrF

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**GRADE 11 ESSENTIAL  
WEEK 5 QUIZ**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**CLOSED BOOK.** My and/or your adjusted Study Notes (Cheat Sheet) are permitted. Use issued loan tables and geometric formulae sheet.

**Time Limit!** 45 minutes Max. **Round** all decimal and % answers to the nearest 0.01. Simplify all fractions.

Each individual question is worth two marks unless otherwise indicated.

**SHOW WORK** for best mark. Use separate paper if necessary and attach

Get YOUR cheat sheet  
tweaked up !

1. Josh takes a loan for \$12,500 to renovate his kitchen. The loan is for a term of 5 years with an APR of 14%.

a. Determine Josh's monthly payment.

b. Determine how much Josh paid for interest by the end of the loan.

a)  $23.27 / 1,000 = 12,500 = \$290.88$  monthly payment

b.  $290.88 / \text{month} \times 60 \text{ months} = \$17,452.80$  Total Paid

$5 \text{ yr} \cdot \left( \frac{12 \text{ month}}{1 \text{ yr}} \right) = 60 \text{ months}$

$17,452.80$  Total Amount Paid  
 $- 12,500.00$  Principal (Loan)  
 $= \$4,952.80$  Interest

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
2%	\$84.24	\$42.54	\$28.64	\$21.70	\$17.53	\$14.01
3%	\$84.69	\$42.98	\$29.08	\$22.13	\$17.97	\$14.11
4%	\$85.15	\$43.42	\$29.52	\$22.58	\$18.42	\$14.21
5%	\$85.61	\$43.87	\$29.97	\$23.03	\$18.87	\$14.31
6%	\$86.07	\$44.32	\$30.42	\$23.49	\$19.33	\$14.41
7%	\$86.53	\$44.77	\$30.88	\$23.95	\$19.80	\$14.51
8%	\$86.99	\$45.23	\$31.34	\$24.41	\$20.28	\$14.61
9%	\$87.45	\$45.68	\$31.80	\$24.89	\$20.76	\$14.71
10%	\$87.92	\$46.14	\$32.27	\$25.36	\$21.25	\$14.81
12%	\$88.85	\$47.07	\$33.21	\$26.33	\$22.24	\$15.01
14%	\$89.79	\$48.01	\$34.18	\$27.33	\$23.27	\$15.21
16%	\$90.73	\$48.96	\$35.16	\$28.34	\$24.32	\$15.41

2. Debbie inherits \$8,300 from an uncle. Debbie invests the \$8,300 in a financial product that guarantees a growth of 7.5% interest compounded monthly.

a. Determine the value of her investment at the end of 10 years.

b. Using Rule of 72, approximately how long did the investment take to double?

$$a) A = P \cdot \left(1 + \frac{r}{s}\right)^{(n \cdot s)} = 8,300 \cdot \left(1 + \frac{0.075}{12}\right)^{(10 \cdot 12)}$$

← yr  
↑  
← 12 months per year

$$A = 8300 \cdot \left(1 + \frac{0.075}{12}\right)^{(10 \cdot 12)}$$

$$A =$$

$$A = \$17,530.14$$

$$= 17530.1364$$

makes sense!

b) IF  $n \cdot r = 72$  then investment doubles

$$n \cdot 7.5 = 72 ; n = \frac{72}{7.5} = 9.6 \text{ years to double}$$

3. Olivia goes to a pow wow. She buys three bison burgers and a \$2.50 coke. The total cost is \$12.70. Determine the price of one burger.

*Guess and Check, although Work Backwards with Algebra is better*

<u>Price one Burger</u>	<u>Price 3 Burgers</u>	<u>plus \$2.50 Coke</u>	<u>TOTAL</u>
\$2 <del>x</del>	<sup>3·2</sup> \$6	+ 2.50	\$8.50 <del>x</del>
\$3? <i>closer</i> <del>x</del>	<sup>3·3</sup> \$9	+ 2.50	= \$11.50 <del>x</del>
\$4? <del>x</del> <i>Too High</i>	\$12	+ 2.50	= 14.50 <i>Too High!</i>
\$3.50?	<sup>3·3.50</sup> \$10.50	+ 2.50	= \$13.00 <i>Close enough?</i>
<u>\$3.40</u>	\$10.20	+ 2.50	= \$12.70 <i>Yes!!</i>

*↑ one Burger costs \$3.40*

check:  $3 \cdot 3.40 + 2.50 = 12.70$

**A good calculator would help too!**

$3 \cdot (2) + 2.50$	<del>x</del>	= 8.5
$3 \cdot (3) + 2.50$	<del>x</del>	= 11.5
$3 \cdot (4) + 2.5$	<del>x</del>	= 14.5
$3 \cdot (3.5) + 2.5$	<del>x</del>	= 13
$3 \cdot (3.4) + 2.5$	✓	= 12.7

3. Olivia goes to a pow wow. She buys three bison burgers and a \$2.50 coke. The total cost is \$12.70. Determine the price of one burger.

*Guess and Check, although Work Backwards with Algebra is better*

Algebra is much more useful

Three times the price of a burger plus \$2.50 equals \$12.70  
 $3 \cdot x + 2.50 = 12.70$

$$\begin{array}{r} 3x + 2.5 = 12.7 \\ - 2.5 \quad - 2.5 \\ \hline \end{array}$$

$$\begin{array}{r} \cancel{3x} \quad = 10.2 \\ \cancel{3} \quad \quad \quad 3 \end{array}$$

$$x = \frac{10.2}{3} = 3.4$$

The price of one burger is \$3.40

$$\begin{array}{r} 3 \cdot 3.40 + 2.50 \\ = 12.70 \end{array}$$

Take away the coke

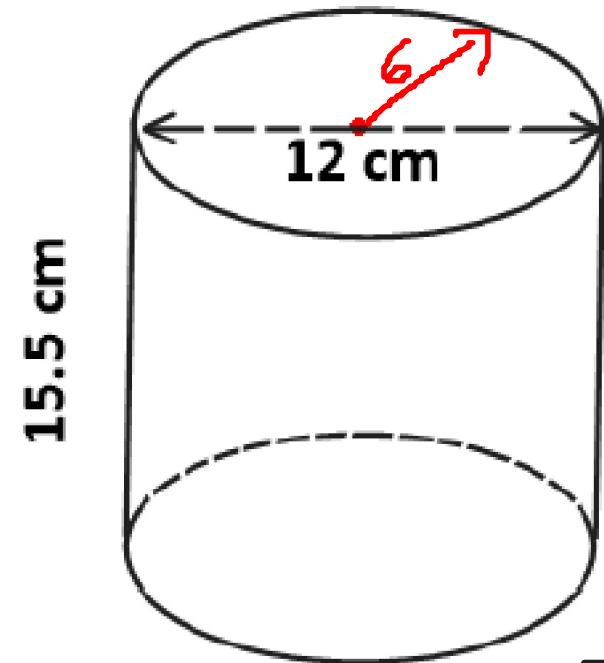
Un-multiply the 3 (divide)

Divide both sides of equation by 3, still equal!

4. For the cylinder, determine:

a. the area of the lateral side (the tube part)

b. the volume.



$$a) SA_{\text{cyl}} = \underbrace{2\pi r^2}_{\text{top \& bottom}} + \underbrace{2\pi r h}_{\text{side (tube)}}$$

$$2\pi r h = 2 \cdot \pi \cdot 6 \text{ cm} \cdot 15.5 \text{ cm} = 584.34$$

The tube has an area of 584.34 square cm ( $\text{cm}^2$ )

$$b) Vol = (\pi r^2) \cdot h = \pi \cdot (6 \text{ cm})^2 \cdot 15.5 \text{ cm}$$

$$= \pi \cdot (6)^2 \cdot 15.5$$

$$= 1753.00871$$

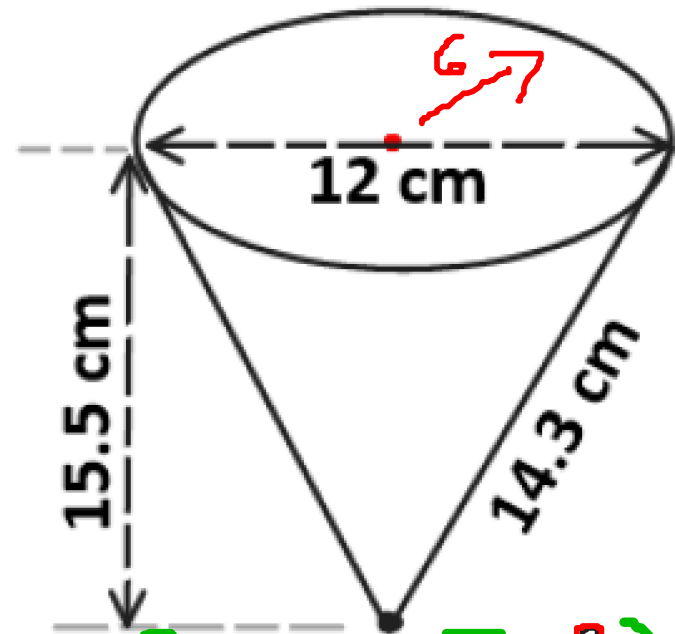
$$= 1,753.01 \text{ cm}^3$$

cubic cm  
(ie: ml)

5. For the cone, determine:

a. the volume

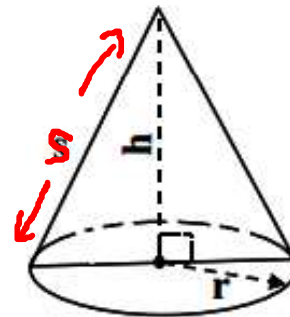
b. the surface area



$$\begin{aligned}
 a) \text{ Vol}_{\text{cone}} &= \frac{1}{3} \cdot \text{Vol}_{\text{cyl}} \\
 &= \frac{1}{3} \cdot (\pi \cdot r^2) \cdot h_{\text{cone}} \\
 &= \frac{1}{3} \cdot \pi \cdot 6^2 \cdot 15.5 = \underline{584.34 \text{ cm}^3}
 \end{aligned}$$

coincidence same as cylinder question

$$\begin{aligned}
 b) \text{ SA}_{\text{cone}} &= \pi \cdot r^2 + \pi \cdot r \cdot s \\
 &= \pi \cdot (6 \text{ cm})^2 + \pi \cdot (6 \text{ cm}) \cdot 14.3 \text{ cm} \\
 &= \underline{382.65 \text{ cm}^2} \text{ to cover entire cone}
 \end{aligned}$$



**Surface Area; SA**

$\text{SA} = \pi r^2 + \pi r s$   
 ('s' here is 'slant range' along the side of the cone)

**Volume; V:**

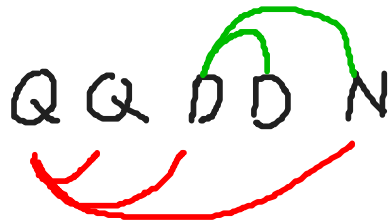
$$\begin{aligned}
 V &= \frac{1}{3} \cdot \text{Base}_{\text{area}} \cdot h_{\text{cone}} \\
 V &= \frac{1}{3} \cdot (\pi r^2) \cdot h_{\text{cone}}
 \end{aligned}$$



**BONUS.** (2 extra marks)

Carol has two quarters, two dimes, and a nickel in her wallet. If she reaches into the wallet and pulls out just two coins, determine how many different amounts of money she can make.

Draw it! Model it!



QQ 50¢  
QD 35¢  
QN 30¢

DD 20¢  
DN 15¢

That is it!  
5 possible amounts  
with two coins

Have done this  
same question a  
couple times!  
before!

No formula!  
No calculator!  
Just as thinking!  
Doodling  
Drawing



Good job!