

**GRADE 11 ESSENTIAL
PRACTICE FINAL EXAM 2024-03-18**

*

You will need a ruler and a protractor. (provided)

Show work for best marks!

Use your one-page '*cheat sheet*' reference notes that you are slowly compiling

Use a calculator to its full effect (**no smart phones**)

Geometric Formulae, Conversions ratios, and loan tables will be provided

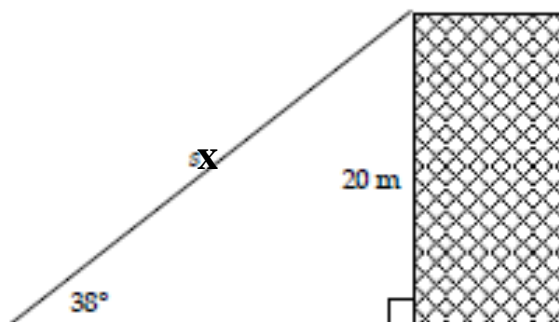
Reduce all fractions. Round decimal answers to nearest 0.01 unless otherwise indicated.

If you see items in here that are unfamiliar it is possible we had omitted that unit.

3. The Cosine Law for triangles can be used when:
- three sides are known and a corner angle is required
 - a side and its angle opposite are used to find another side given that other side's angle opposite it.
 - one side and the angle across from it are known
 - there is at least one 90° square corner.
6. You measure the picture of a bug. In the book the picture is 3.5 cm in length. The actual bug is really only 7 mm long. Determine the scale ratio of the picture of the bug:
- 5:1
 - 1:5
 - 2:1
 - 1/2

7. Select the trigonometric ratio you would use to solve for x.

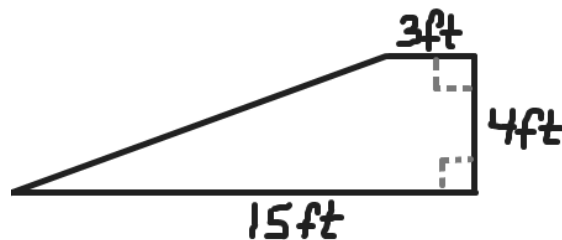
- tangent ratio
- cosine ratio
- sine ratio
- Pythagorean theorem



8. Calculate the angle of the ramp.

It makes an angle of:

- 45°
- 18°
- 15°
- none of these



MATCH THE DEFINITIONS

Match some definitions with the correct term from the list below. Write the correct term on the line below each definition. Not all terms have a definition provided.

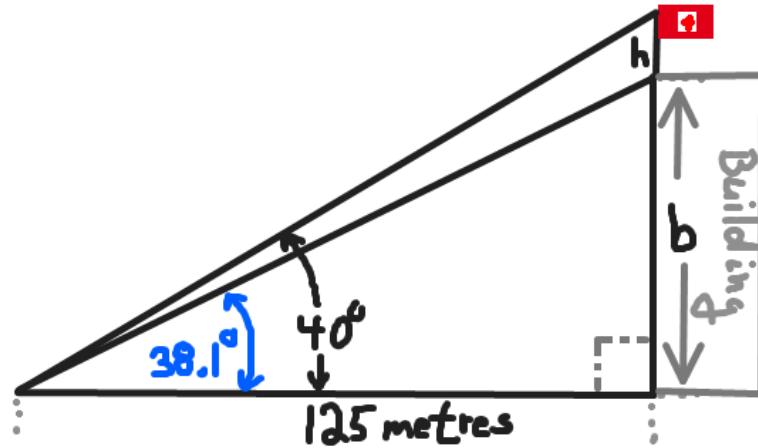
angle of depression angle of elevation	cosine ratio dependent variable	independent variable interpolation one-point perspective	scale factor scatterplot sine ratio tangent ratio variable
---	------------------------------------	---	--

3. Estimating values outside the set of data.
5. A ratio that compares the sides opposite and adjacent to an angle in a right triangle.
6. A symbol or letter that represents an unknown value.
8. A graph of plotted points that shows the relationship between two sets of data.
Example: age vs income. Height vs time for a falling body.
9. Measuring an angle downward from the horizontal.
10. A method to represent scale that involves no units.
11. the measure of the 'pointiness' of a right triangle by comparing the side opposite from the angle to the length of the 'hypotenuse'.

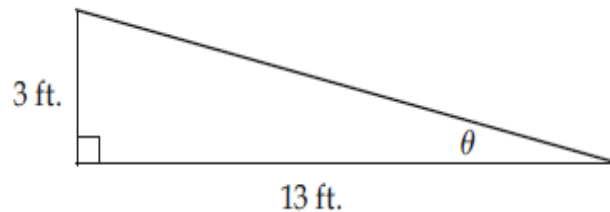
OPEN RESPONSE**Show work**

6. Sam's car has a broken speedometer, and so he is using his GPS to determine his speed. According to the GPS, his speed is 40 metres per second. The speed limit is 110 km/h. Is Sam speeding? Show how you arrive at your answer.

7. From a point 125 m from the foot of a building, the angles of elevation of the top and bottom of the flagpole are 40.0° and 38.1° respectively. The flagpole is set on the roof of the building.



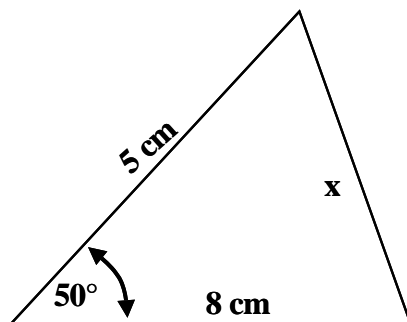
- Calculate the height of the building, b
 - Calculate the height of the flagpole, h .
8. Calculate the measure of θ in degrees. Write your answer rounded to one decimal place



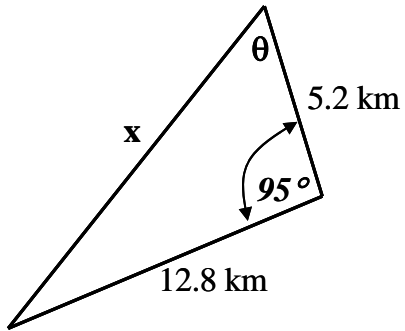
[Use trigonometric tables to see if you get about the same answer]

Draw it to scale with a ruler and protractor and measure it and see if you get about the same answer

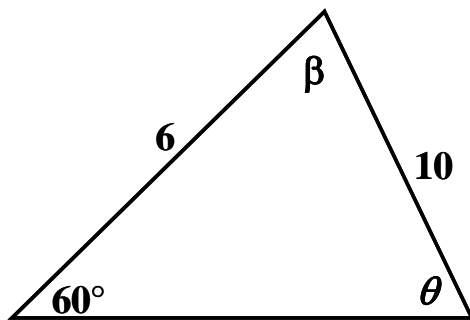
9. Find the value of x .



10. Find the value of x and θ .

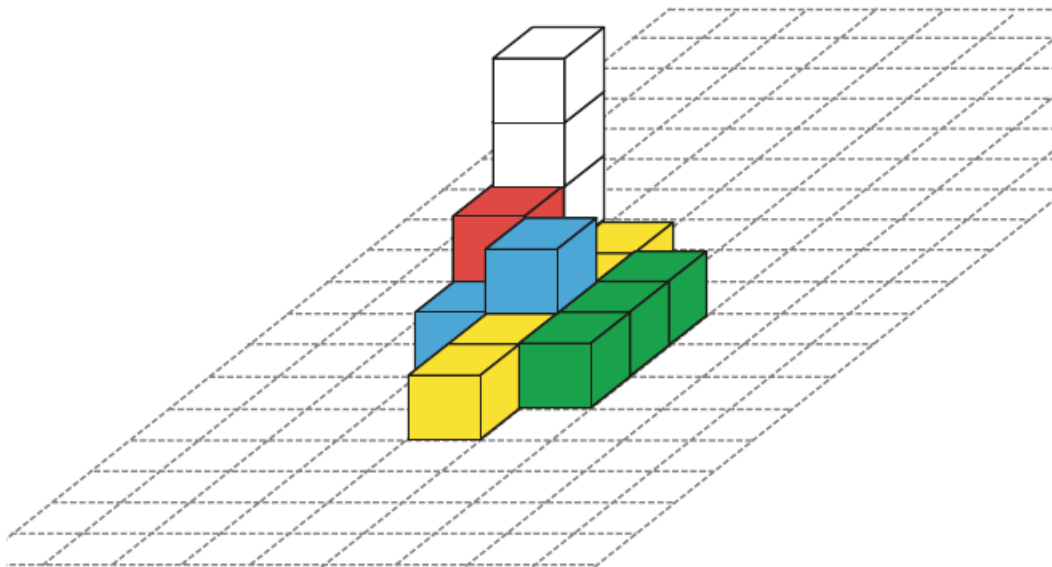


11. Find the value of angles Theta, θ , and Beta, β

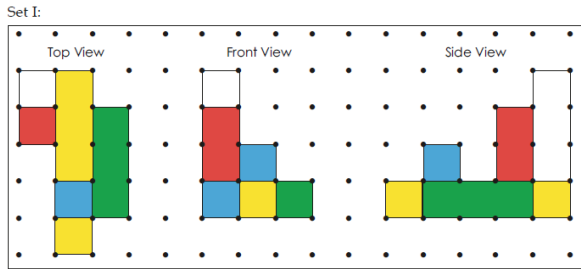


Design Modelling

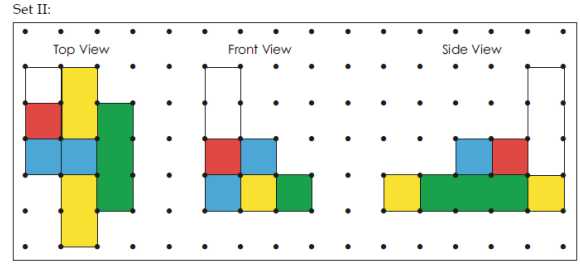
1. Use the 3-D drawing below to answer the questions that follow.



- a. Select the 2-D view below that matches the drawing above.

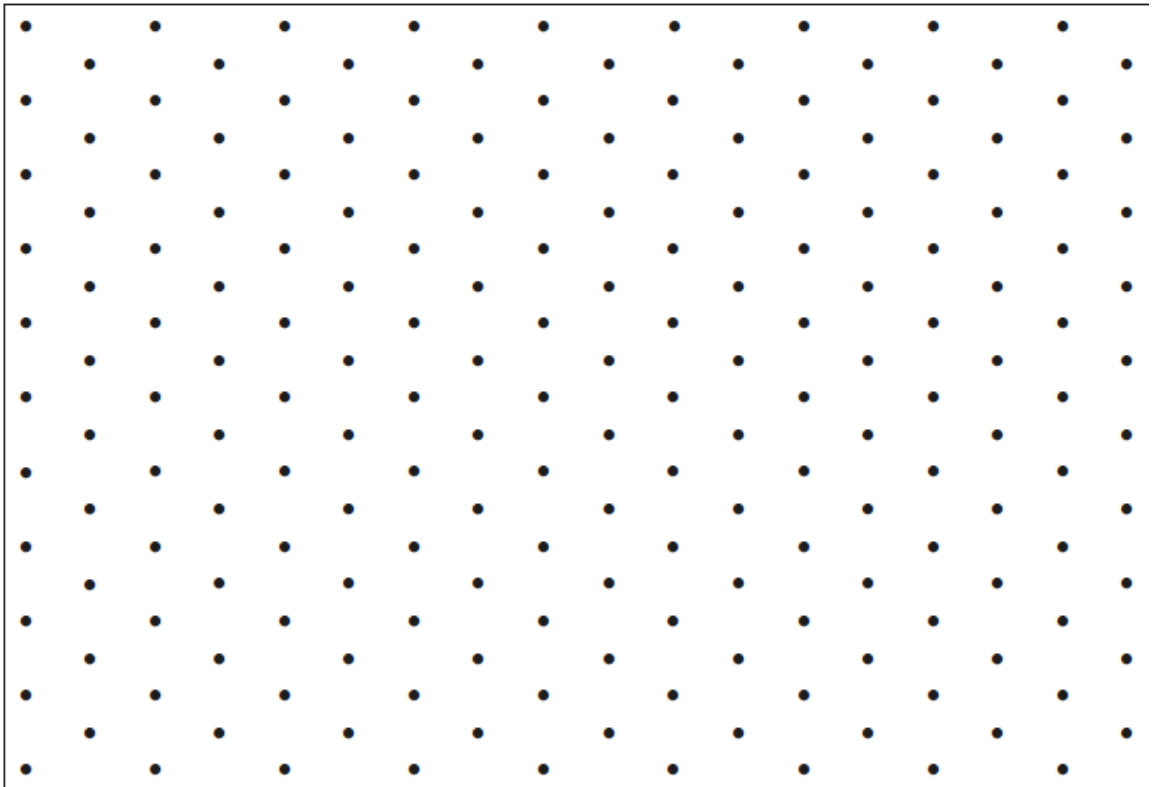


Set 1

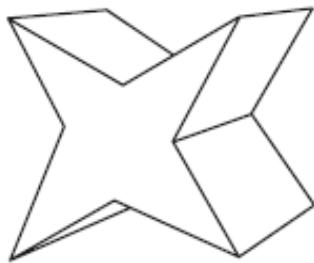


Set 2

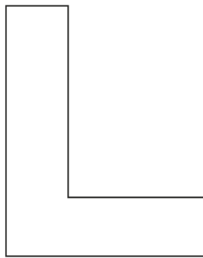
b. Use the isometric dot paper below to draw a 3-D representation for the Set 1 of the 2-D view.



3. a) Where is the vanishing point for the drawing shown below?



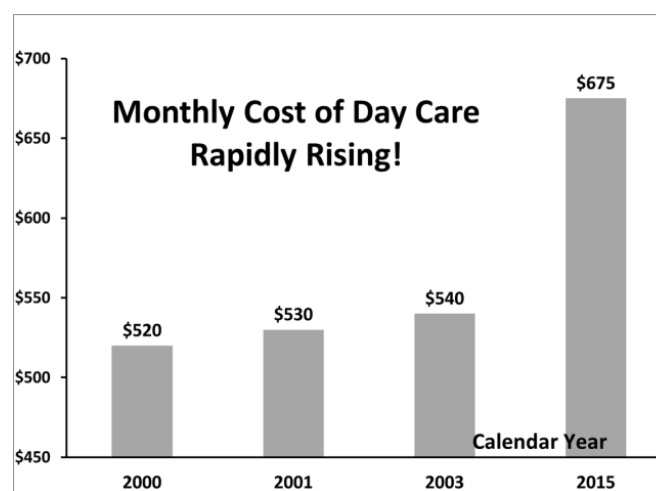
b) Complete a one-point perspective drawing of the object below, if the vanishing point is below and to the right.



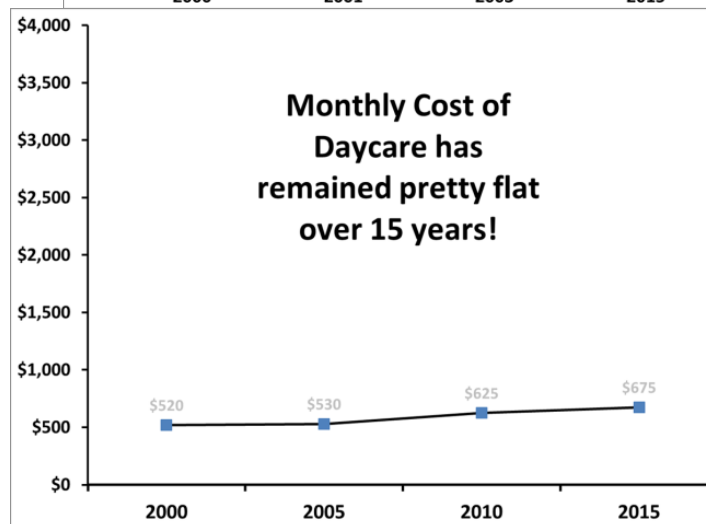
4. How is the graph here misrepresenting information? There are two ways!

First Deception: _____

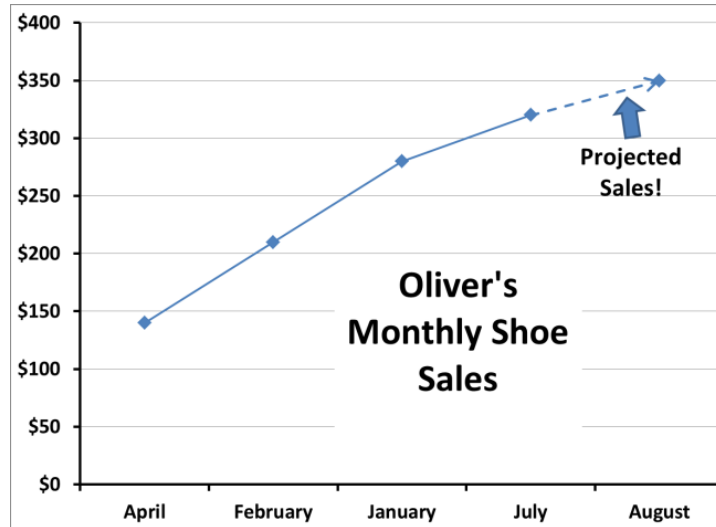
Second Deception:



5. How is the graph misrepresenting the cost of day care?



6. Would you accept this report from one of your branch managers about their steadily increasing sales of shoes at their outlet?



Some Mid-Term Stuff

Show work for best marks!

Use your one-page 'cheat sheet' reference notes that you are slowly compiling

Use a calculator to its full effect (**no smart phones**)

Geometric Formulas will be provided

Bonus questions are provided in the event you want or need them! They will not get you above **100%** though.

MULTIPLE CHOICE (2 marks each)

Circle the letter of the best or closest answer

- 54% of a 360° circle is how large a central angle?
 - 194°
 - 6.67°
 - $\frac{0.54}{100}$
 - 0.54
- The volume of sphere of diameter 12 cm is:
 - 452.39 cm^2
 - 1728 cm^3
 - 905 cm^3
 - 30.63L
- Approximately how long will it take a compounding interest investment to double if the percentage rate (APR) is 6%.
 - 12 years
 - 10 years
 - 6 years
 - $\frac{1}{2}$ of a year
- What is the value of a \$4,000 investment that earns compound interest quarterly if it earns 6% for 12 years?
 - \$8,174
 - \$8,203
 - \$2,880
 - \$6,880

5. A good way to misrepresent *the display* of vertical bar graph data is:
- use wrong and made-up numbers
 - do not start the vertical axis at zero
 - use wonky colours
 - use a horizontal bar graph instead of a vertical bar graph
6. If $2x + 7 = 8$; what is the value of x ?
- a. 3 b. 0.5 c. 0 d. none of these
7. An investment that has interest compounded quarterly has the interest calculated:
- Twice per year
 - 4 times per year
 - daily
 - every Sunday
8. 10,000 square cm (cm^2) is the same area as:
- A football field
 - the volume of a box of popcorn
 - 1 square metre
 - Amount of tooth paste in a tube of tooth paste
9. A cube with a square base of area 16 in^2 has a corresponding square pyramid with the same base and height that has a volume of:
- a. 21.33 in^3 b. 4 ft^3 c. 64 in^3 d. $4x$
10. The surface area of a sphere of radius 5 cm is:
- a. 314.16 cm^3 b. 314.16 cm^2 c. 1257 cm^2 d. 25 cm^2

OPEN REPONSE

Show Work for best mark.

Round answers to nearest 0.01 where appropriate.

1. Wanda borrows **\$2,200** from her aunt for **six** months. Her aunt charges her simple interest of **10%** annual interest rate (APR).

- a. How much interest does Wanda have to pay for the use of her aunt's money, **and**
- b. what is the total amount Karen pays back to her aunt?

4

2. Kyle wants to borrow some money from a Pay Day loan company. He borrows **\$600** for two months. Normally compound interest is used, but for a short period the simple interest calculation gives the same answer within a couple dollars. He pays them back a total of **\$700**. What annual interest rate (%), **r**, was Kyle paying for the use of that money (use simple interest)?

3

3. Alyssia's uncle bought her a **\$2,500** Canada Savings Bond (CSB) from the government on the day she was born. It pays **10%** annual interest **compounded** monthly. On her **21th** birthday her uncle gave it to her. What is the total value amount, **A**, of her CSB after that **21** years?

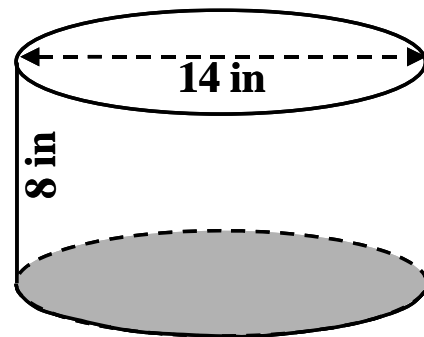
3

4. Josh wants to take a loan to buy a car. The total cost he is going to finance with a loan is \$24,000. He negotiates an Annual Percentage Rate [APR] of 20% over a term of three years with regular monthly payments. (*btw*: 20% is a very bad and predatory rate if you are borrowing!)

- a. how much are Josh's monthly payments?
- b. how much interest does Josh end up paying on the \$24,000 loan over the three years? What does his car cost after all the payments?
- c. Josh's favourite uncle says that is silly! He is confident in Josh and trusts him and will loan Josh the \$24,000 at 10% APR compounded monthly and Josh can just pay him back the loan plus interest after **five** years in one lump sum payment. How much interest does Josh pay to borrow from his uncle? What does Josh's car end up costing overall?

5. Find the **volume** and **surface** area of the cylinder

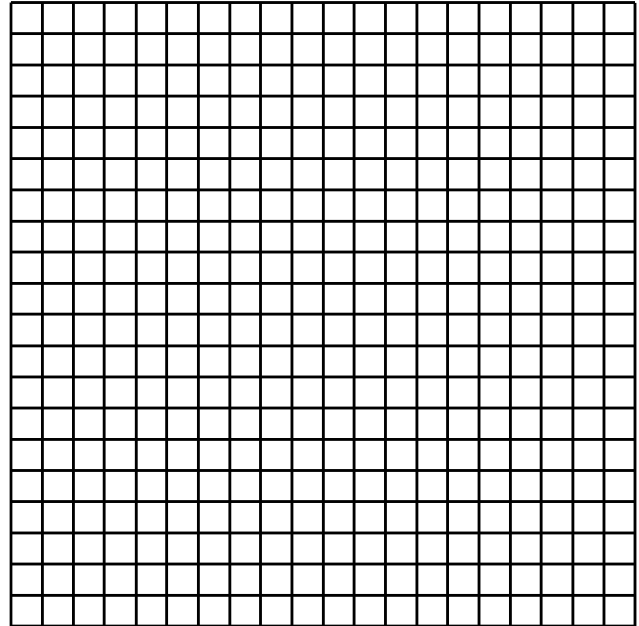
- a. Volume: _____ in^3
- b. Volume: _____ ft^3 (*tricky!*)
- b. SA: _____ in^2



6. Here is a table of some observed bus arrival times at a bus stop.

Bus Arrival Time	08:25	08:26	08:27	08:28	08:29	08:30	08:31	08:32	08:33	08:34	08:35
Frequency	2	2	6	9	11	14	14	11	6	4	1

- a. Plot a **properly labelled** histogram. (scale the vertical axis if necessary)
- b. what percentage of the observed arrival times does the bus arrive **at or after** 08:31?

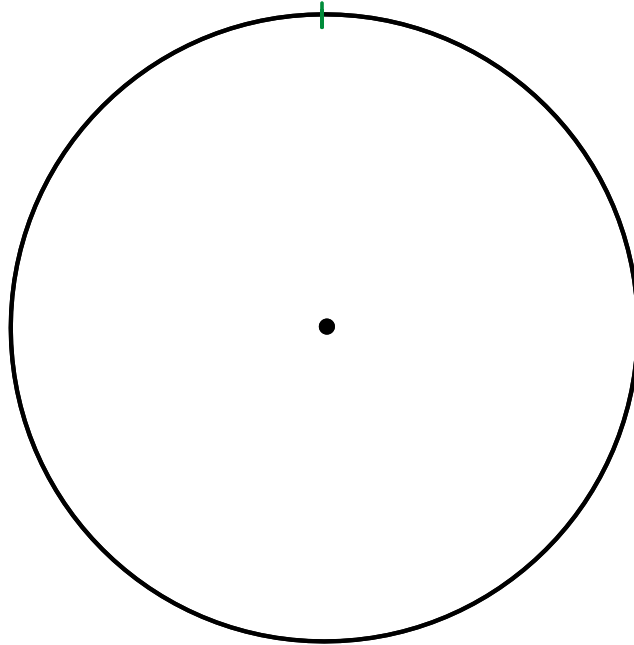


5

7. Erick did a survey of students' favourite math subject. Here are his results.

Favourite Subject	Count	%	Degrees
Geometry	8		
Trig	3		
Finance	5		
Fractions	8		
Algebra	26		

Graph and properly Label a circle graph (pie graph)



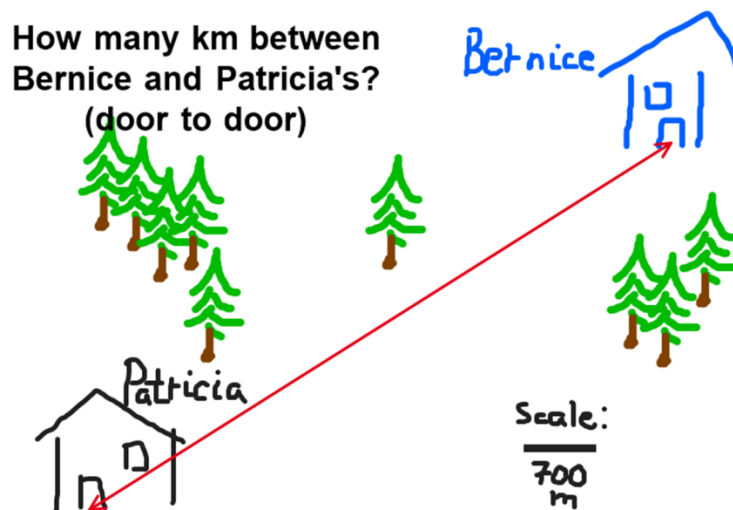
8. There are six rezs (not in a line) that are being connected by roads, **each rez to each rez** with a single separate road. How many roads will there be? [hint: Draw! and/or Use Formula]

9. If three (of the same) pizzas and a \$4 two-litre of coke costs a total of \$41.20. How much does one pizza cost?

10. Cheryl has two quarters, two dimes, and a nickel. If she randomly selects just two coins how many different sums (amounts) of money can she make?

11. If a pizza and **one** can of coke costs \$15 and a pizza and **two** cans of coke costs \$17. Then how much does a pizza cost? [Logic, and/or Work Backwards, and/or Guess and Check]

12. From the map below find the distance from Bernice's house to Patricia's house, **Distance** = _____ km. Find the **scale** as : 1 cm = _____ km. Find the **scale ratio**: **1**: _____



13. Complete the Simple Interest table (fill in the blanks):

A [\$]	I [\$]	P [\$]	r [%/yr]	t [years]
		10,000	7.5%	3
	500	2,000	10%	
	800	4,000		0.5
6,000		4,500		2
400		400		5

[work area]

14. Complete the table for **Compound Interest** using the compound interest formula. Do the last one recursively as well (ie: step by step, year by year).

A Total amount [\$]	P Principal [\$]	r APR [%/yr]	Compounding period	n time [years]	I Interest [\$]
	5,000	8%	monthly	9 years	
	750	12%	weekly	6 months	
	1,000	1.5%	daily	3 years	
	4,000	10%	annually	2 years	

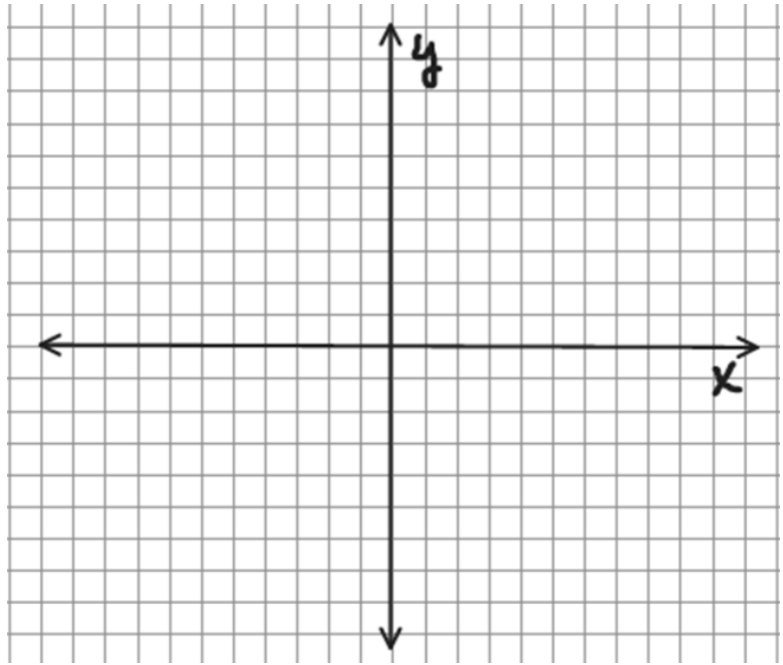
[work]

15. Make a table and graph the three lines:

a. $y = x + 4$

b. $y = 2x - 6$

c. $y = 7$



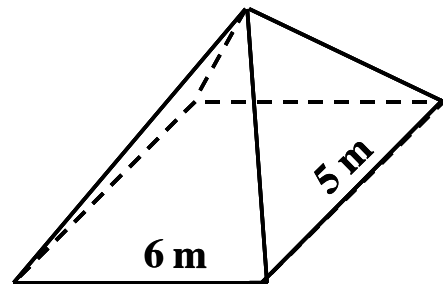
16. Fractions (use a calculator if you really must, hopefully not!)

OMIT?

a. $1\frac{3}{4} * 6 =$	b. $1\frac{3}{4} \div 6 =$	c. $1\frac{3}{4} + 6\frac{1}{2} =$
d. $6\frac{3}{4} - 4\frac{3}{8} =$	e. $5 \div 4\frac{3}{8} =$	f. $\frac{2}{3} * \frac{7}{8} * \frac{3}{7} =$

BONUS (2 marks if you need them)

Calculate the volume of this rectangular pyramid that is **320** cm high.



Bonus (2 marks if you need them)

$$5\frac{1}{5} - 2\frac{1}{8} =$$

Calculate the scale ratio:

Model size (Map, picture, model)	Actual Size	Scale Ratio (to 2 significant figures)
<i>This line is an example</i> 10cm on a map	20 km	1:200,000 scale ratio
8 cm on a map	160 m on a map	
1.7 cm on your google maps	50 km on a map	
6 cm picture of a mosquito	12 mm on the actual bug	
A 30 foot statue of your teacher	6 feet	
1.7 cm on a map's scale bar	200 metres in the real world	

Using a T-Table,

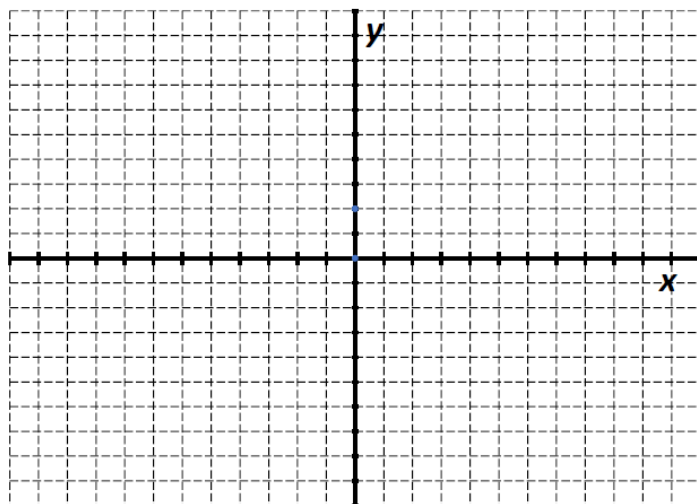
Graph and label the lines:

A. $y = 2x - 3$

B. $y = -0.5x + 6$

OMIT

C. $y = 3$



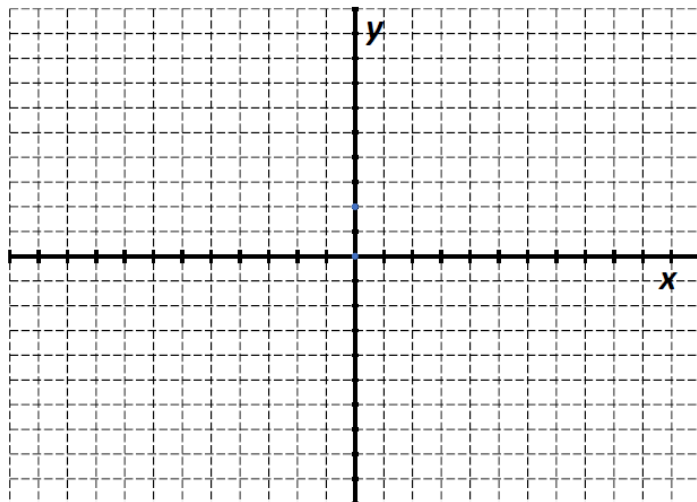
Graph and label the lines using the slope and intercept method

A. $y = \frac{3}{5}x$

B. $y = \frac{7}{4}x - 5$

OMIT

C. $y = -3x + 8$



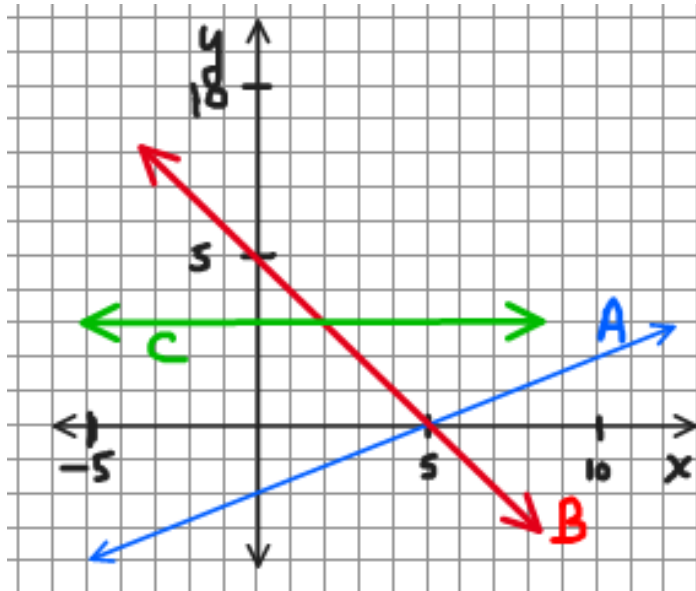
Determine the slope of the lines at the right.

Slope_A =

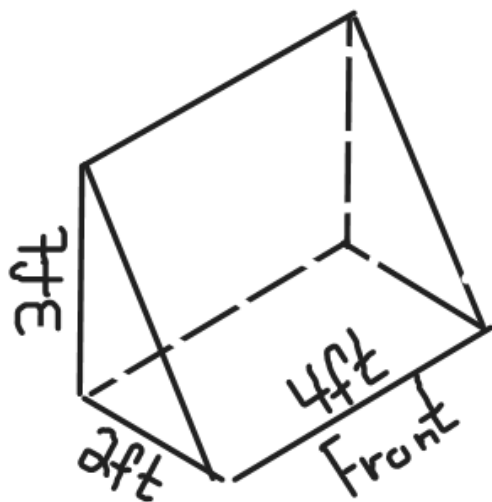
OMIT

Slope_B =

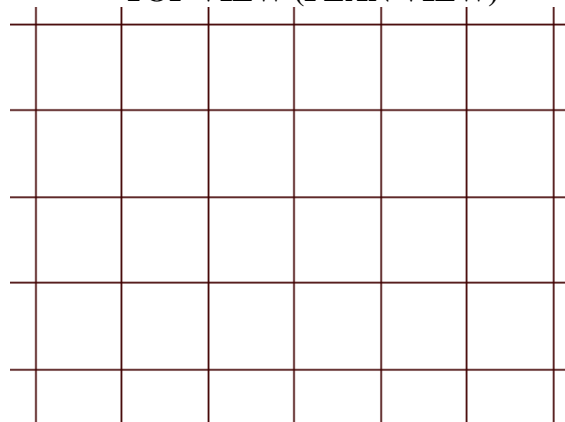
Slope_C =



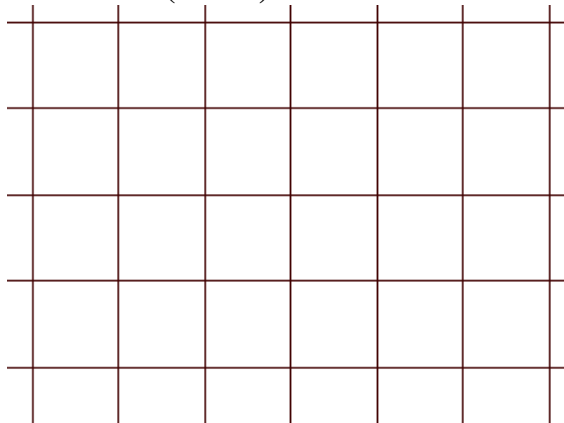
Given this object below draw the orthographic views indicated.



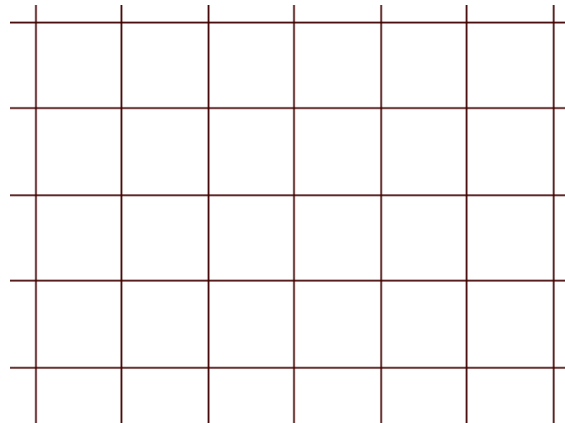
TOP VIEW (PLAN VIEW)



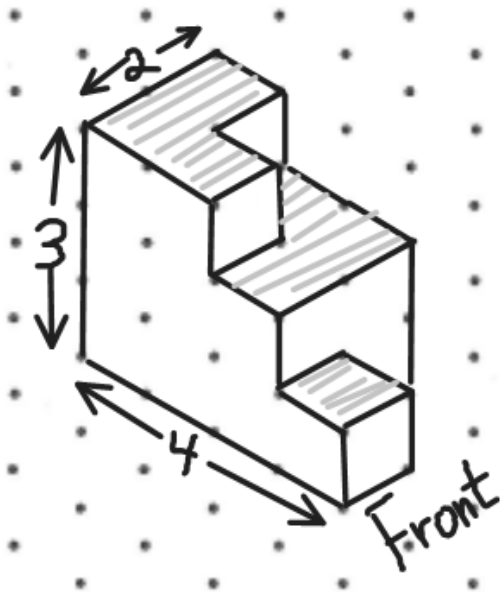
(LEFT) SIDE VIEW



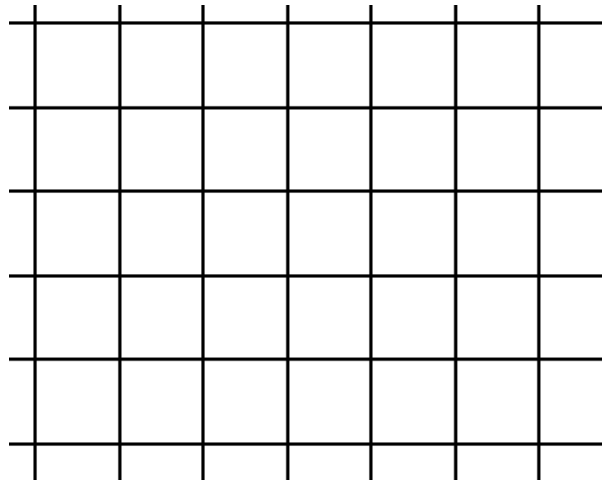
FRONT VIEW



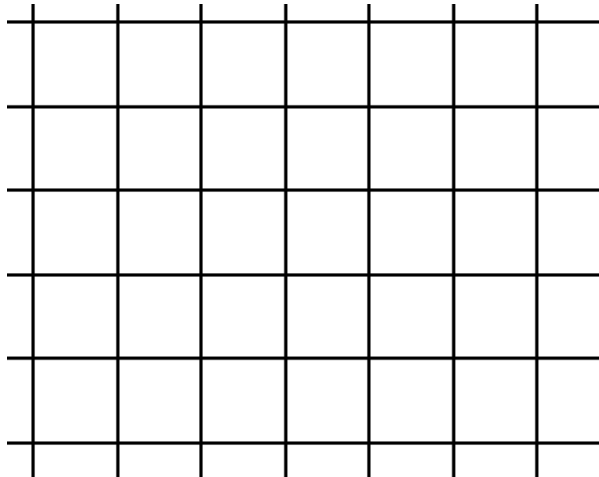
For the given object, draw its orthographic views
(Best to start with the Front View)



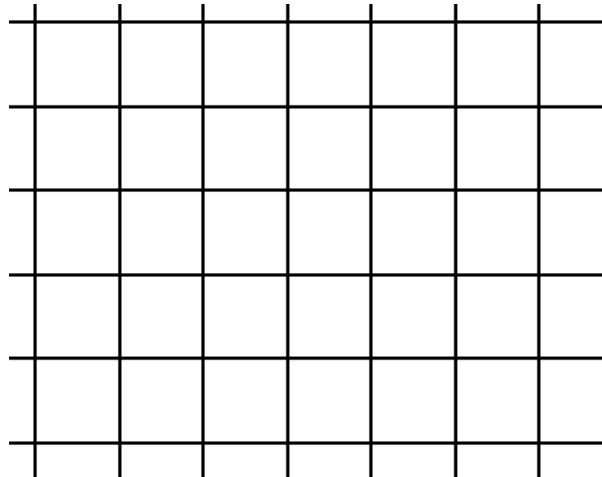
TOP VIEW



Side View



Front View



Money Formulae:

$A = P + I$; the value of a loan or investment is the **P**incipal plus the **I**nterest that was earned

Simple Interest. $I = Prt$; where **I** is the interest, **P** is the Principal amount, **r** is the annual (yearly) interest rate, and **t** is the time in years. Combined: $A = P*(1+rt)$

Compound Interest: $A = P \left(1 + \frac{r}{s}\right)^{ns}$; where **A** is the final amount; **P** is the principal investment or loan; **r** is the interest rate (%) annually (APR); and 's' is the number of times per year the interest is calculated (compounded), and 'n' is the number of years of the investment or loan.

Geometric Formulae

Area of a square = length * width = $l * w$ or just side * side so s^2 .

Area of a triangle = one half * base of triangle * height of triangle = $\frac{1}{2} * b * h$; where b and height are perpendicular.

Area of a circle = πr^2

SA_{cylinder} = $2\pi r^2 + 2\pi rh$ **Vol_{cylinder}** = $\pi r^2 h$

Volume_{prism} = Area_{base} * height_{prism}

Volume_{pyramid} = $\frac{1}{3} * \text{Area}_{\text{base}} * \text{height}_{\text{pyramid}}$

Sphere Volume: **V_{sphere}** = $\frac{4}{3} \pi r^3$; Sphere Surface Area: **SA_{sphere}** = $4\pi r^2$

1 foot = 12 inches

Slope = $\frac{\Delta y}{\Delta x} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$

MONTHLY LOAN REPAYMENT TABLE FOR EACH \$1,000 BORROWED

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