Solutions to:
GR11ESS_EndTermPracticeExam2.pdf

Some of questions
we not have fully covered
in class!

1. Calculate the value slope of a line if it goes up from 3 units to 8 units as you move 4 units to the right.

$Slope = \frac{change\ in\ y}{change\ in\ x} = \frac{\Delta y}{\Delta x}$

so $m = \frac{8-3}{4} = \frac{5}{4} = 1.25$

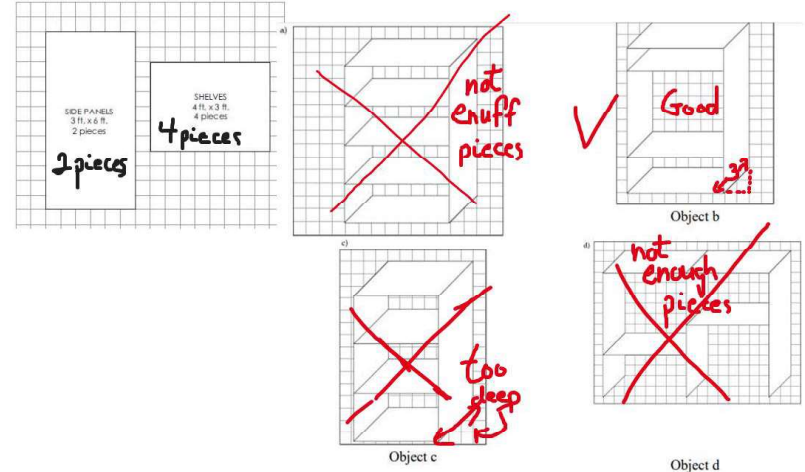a. $m = \frac{3}{8}$ b. $m = \frac{\Delta y}{\Delta x}$ c. $m = \frac{5}{4}$ or 1.25   d. $m = \frac{8}{4}$ or 2

Not sure why we sometimes give slope the letter "m"

2. The slope of a horizontal line is:

horizontal does not rise! No change in y!
So slope = $\frac{0}{\Delta x}$ = 0 for horizontal line

a) undefined   b) 1   c) 0   d) –1

3. The Cosine Law for triangles can be used when:

a. three sides are known and a corner angle is required   cosine law to find angles!

b. a side and its angle opposite are used to find another side given that other side's angle opposite it.   X sine law!

c. one side and the angle across from it are known   X need 3 parts

d. there is at least one 90° square corner.   X weird

4. Which of the following objects is made up of these component parts?

SIDE PANELS
3 ft. x 6 ft.
2 pieces   2 pieces

SHELVES
4 ft. x 3 ft.
4 pieces   4 pieces

not enuff pieces

Good

Object b

too deep

Object c

not enough pieces

Object d

5. Which of the following is not an example of a linear relation or pattern?

a) **NOT Linear** ← (handwritten, boxed in green)

Age (yrs)	5	10	15	20	25
Weight (lbs)	60	110	150	185	185

(handwritten above: 5, 5, 5; below: 50, 40, 35)

b) **Linear** (handwritten)

Sam's Age	2	4	6	8	10
Jay's Age	1	3	5	7	9

(handwritten: 2, 2, 2 above and below)

c) the number sequence

1 step 1 step (handwritten)

2, 10, 18, 26, 34, 42

+8 +8 (handwritten)

goes up 8 every number
Linear ✓ (handwritten)
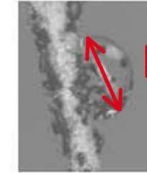
d) The scatterplot graph

Yes! Linear trend! (handwritten)
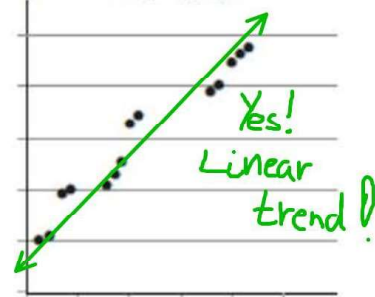
6. The scale of the bug picture is 1 cm : 5 mm. What is the actual length of the ladybug (Tail to nose)?

a) 1 cm (circled)
b) 2 cm
c) 9 cm
d) 3 cm

1.5 cm on picture (handwritten)

Not a good question! (handwritten in red)

$$\frac{model}{actual} \rightarrow \frac{1.5cm}{x} \quad \frac{1\,cm}{5\,mm}$$

$$\frac{1.5cm \cdot 5mm}{1cm} = x$$
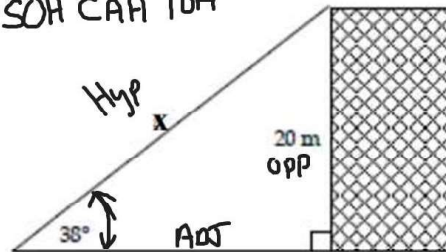
7.5 mm = x (boxed in green)

so 1 cm is the closest answer (handwritten)

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

a) tangent ratio
b) cosine ratio
c) sine ratio (circled)
d) Pythagorean theorem

SOH CAH TOA (handwritten)

Hyp, x, 20 m Opp, 38°, Adj (handwritten labels)

$$\sin 38° = \frac{x}{20}$$

$$Sin = \frac{Opp}{Hyp} \;;\; cos = \frac{Adj}{Hyp} \;;\; tan = \frac{Opp}{Adj}$$

8. Calculate the slope of the ramp.

a. $\frac{1}{3}$
b. 3
c. $\frac{4}{15}$
d. $\frac{1}{5}$

slope = $\frac{4}{12} = \frac{1}{3}$ (boxed in green)

properly reduced! (handwritten)

$$Slope = \frac{rise}{run\ right} = \frac{\Delta y}{\Delta x}$$

(handwritten on diagram: 3 ft., 4 ft., 4 Δy, Δx, 15 ft.)
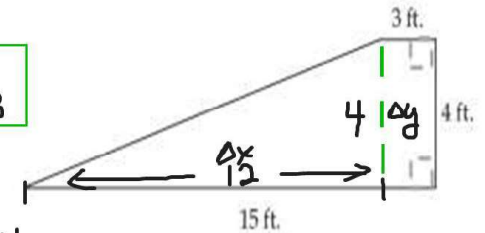
Match some definitions with the correct term from the list below. Write the correct term on the line below each definition. Not all terms have a definition provided.

angle of depression	cosine ratio	fixed value	scale factor
angle of elevation	dependent variable	geometric sequence	scatterplot
arithmetic sequence	direct variation	independent variable	sine ratio
component view	exploded view	interpolation	slope
constant of variation	extrapolation	linear relation	tangent ratio
		one-point perspective	variable
		partial variation	

1. The view of an object that shows all the parts, and how they are oriented to each other.

exploded view

2. A set of numbers such that each successive number is a certain fixed amount larger/smaller than the previous number.

linear relation or arithmetic sequence

3. Estimating values outside the set of data.

extrapolation

4. The ratio that compares the change in the dependent and the change in the independent variables of a linear relation.

slope or constant of variation

5. A ratio that compares the sides opposite and adjacent to an angle in a right triangle.

tangent ratio

6. A symbol or letter that represents an unknown value.

variable

7. A variable in a math relationship that is not affected by the other variable.

constant

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.

scatterplot

9. Measuring an angle downward from the horizontal.

angle of depression

10. A method to represent scale that involves no units.

scale factor or scale ratio
eg: 1/50,000 map

11. the measure of the 'pointiness' of a right triangle by comparing the side opposite from the angle to the length of the 'hypotenuse'.

opp/hyp is the sine ratio

OPEN RESPONSE

Show work

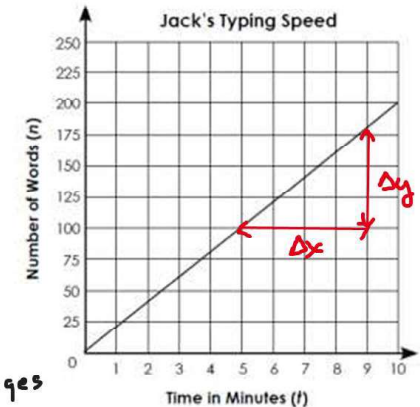1. The graph shows Jack's typing speed.

a. State the independent and dependent variables and units.

Independent variable: *the x horizontal axis "time"*

Dependent variable: *the y axis the thing we are measuring as it changes with time*

2. How can you tell whether a set of numbers represents a linear pattern? Use an example as part of your answer.

If a change in the one set has a constant corresponding $\lor$ change in the other proportional

If you work twice as hard you make twice as much

If I go a rate (slope) of 30 km/h then
I go 90 km in 3 hours

hrs: 1 (up 1) 2 (up 1) 3
dist: 30 (up 30) 60 (up 30) 90

3. Does the table of values represent a linear relation? Explain your answer.

$\Delta x \rightarrow$ +3   +12   +9

Number of Fish	3	6	15
Profit ($)	10	20	50

$\Delta y \rightarrow$ +10   +40   +30

$\dfrac{10}{3} = \dfrac{30}{9}$ they are proportional the same slope

$= \dfrac{50-10}{15-3} = \dfrac{40}{12} = \dfrac{10}{3} = \dfrac{30}{9}$

4. During the second week of November, Emma works the following hours: Monday, 2; Tuesday, 6; Wednesday, 3; Thursday, 8; Friday, 7. Emily's hourly **rate** is $15/hr.

a) Express the relation between daily gross pay and hours worked with an equation.

Pay = Rate of pay per hour × hours
    = $15/hr · x hours

b) Complete the following table of values for the relation between daily gross pay and hours worked.

	Mon.	Tues.	Wed.	Thurs.	Fri.
TOTAL Hours Worked	2	8	11	19	26
TOTAL Gross Pay ($)	$30	$120	$165	$285	$390

c. Draw a graph to show the relation between gross pay and the number of hours worked. Write the appropriate scales and labels onto the graph.
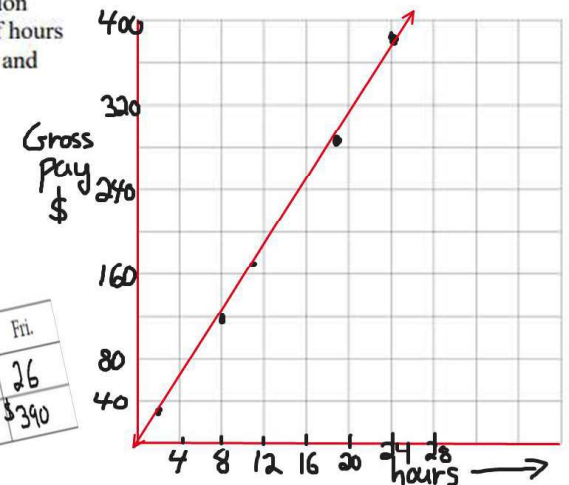
	Mon.	Tues.	Wed.	Thurs.	Fri.
TOTAL Hours Worked	2	8	11	19	26
TOTAL Gross Pay ($)	$30	$120	$165	$285	$390

d. Explain how the hourly rate is related to the slope of the graph. For example, if she were paid only $10 per hour, how would this affect the graph?

The slope would be lower, less steep! A high rate is a quick change, steeper slope

e. If Emily were paid $20 per shift plus her wage of $15 per hour, how would this affect the graph?

She earns at a higher "rate". The line would be steeper; rise more quickly
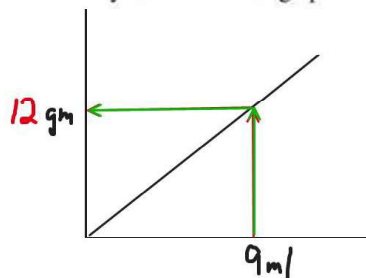
5. The relation between the mass (m) of a substance and its volume (V) is expressed by the graph.

a) Choose *any* two points on the graph and use the coordinates of these points to calculate the slope.

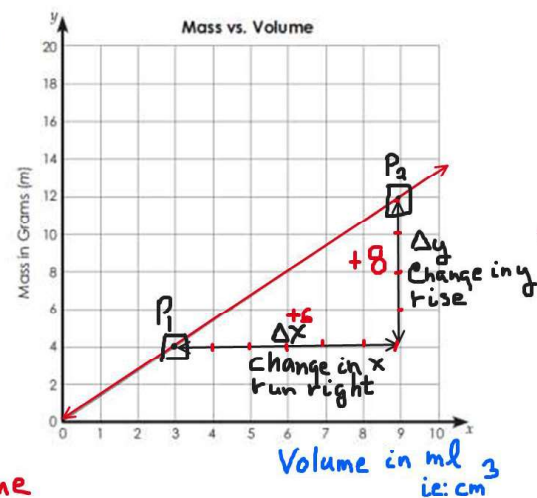$$\frac{\Delta y}{\Delta x} = \frac{+8}{+6} = \frac{4}{3} \cong 1.33$$

b. Express this relation as an equation. Be sure to identify the variables.

$$MASS = \frac{4}{3} \cdot Volume$$

or

$$MASS = 1.33 \cdot Volume$$

Mass vs. Volume

Mass in Grams (m)

P_2

+8 Δy Change in y rise

P_1 +6 Δx change in x run right

Volume in ml ie: cm³

c. Find the volume of this substance with a mass of 18 g. Use the formula from part b. Write your answer rounded to one decimal place.

$$m = \frac{4}{3}V \;; \qquad 18 = \frac{4}{3} \cdot V \qquad \frac{18 \cdot 3}{4} = V \;; V = 13.5 \, ml$$

or 13.5 cm³

d. Find the mass of this substance with a volume of 9 cm³. Show your work on the graph

$$m = \frac{4}{3} \cdot V$$

$$So \quad m = \frac{4}{3} \cdot 9 = 12 \, grams$$

12 gm

9 ml

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.

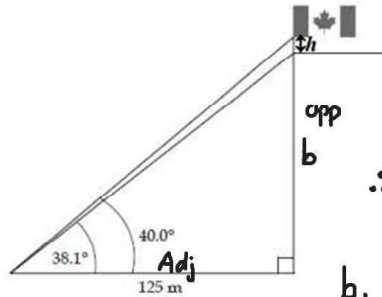*Grade 10 "convert!"*

Show units and it is easy

$$40 \, m/sec = \frac{?}{} \, km/hr$$

$$\frac{40 \, m}{1 \, sec} \cdot \frac{1 \, km}{1000 \, m} \cdot \frac{3600 \, sec}{1 \, hr} = \frac{40 \cdot 3600}{1000} \frac{km}{hr}$$

Sam is speeding

$$= 144 \, km/hr$$

1 hr = 60 sec/min · 60 min = 3600 sec

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.
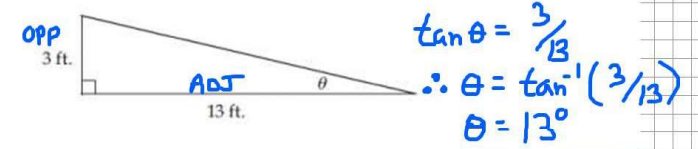

opp
b

40.0°
38.1°
Adj
125 m

a. Calculate the height of the building, b

b. Calculate the height of the section of the flagpole, h.

a.
$$\tan 38.1° = \frac{b}{125}$$
$$\therefore \boxed{b = 125 \tan 38.1°}$$
$$= 98.01 \text{ metres}$$

b. $\tan 40 = \frac{b+h}{125}$
$$\therefore b+h = 125 \cdot \tan 40$$
$$= 104.89$$
So h = 6.88 m

8. Calculate the measure of θ in degrees. Write your answer rounded to one decimal place

OPP
3 ft.
ADJ
13 ft.
θ

$\tan θ = \frac{3}{13}$
$\therefore θ = \tan^{-1}(3/13)$
$θ = 13°$

Use trigonometric tables too to see if you get about the same answer ✓

Draw it to scale and measure it and see if you get about the same answer

$\frac{3}{13} \cong 0.231$

Yep!
13°
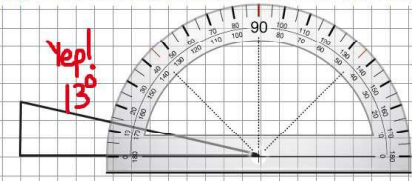
Angle [Degrees]	Sin	Cos	Tan
0	0.000	1.000	0.000
1	0.017	1.000	0.017
2	0.035	0.999	0.035
3	0.052	0.999	0.052
4	0.070	0.998	0.070
5	0.087	0.996	0.087
6	0.105	0.995	0.105
7	0.122	0.993	0.123
8	0.139	0.990	0.141
9	0.156	0.988	0.158
10	0.174	0.985	0.176
11	0.191	0.982	0.194
12	0.208	0.978	0.213
13	0.225	0.974	0.231

9. Find the value of x.

B
5 cm
c
x
a
50°
8 cm
A
b
C
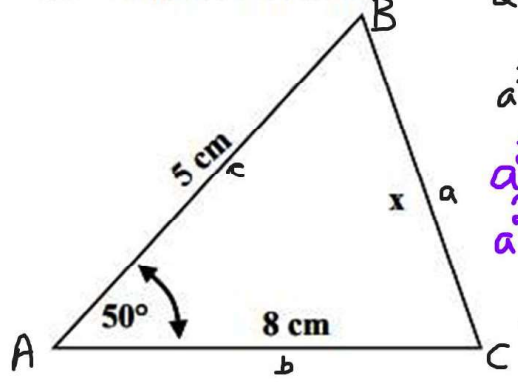
2 Sides and included angle
So cosine law!
$$a^2 = b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos A$$
$$a^2 = 8^2 + 5^2 - 2 \cdot 8 \cdot 5 \cdot \cos 50°$$
$$a^2 =$$

8²+5²−2*8*5*cos(50)
    37.57699123
√(Ans)
    6.130007441

a= 6.13 cm

10. Find the value of x and θ.

θ
5.2 km
x
95°
12.8 km
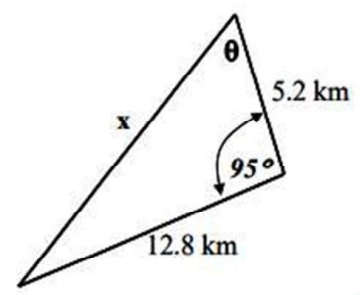
2 sides and angle in between
so cosine law ✓
angle across from x

Find length x
$$x^2 = 5.2^2 + 12.8^2 - 2 \cdot 5.2 \cdot 12.8 \cdot \cos 95°$$

5.2²+12.8²−2*5.2 *12.8*cos(95)
    202.4821725
√(Ans)
    14.22962306

x = 14.22962306
x ≅ 14.23 km

10. Find the value of x and θ.
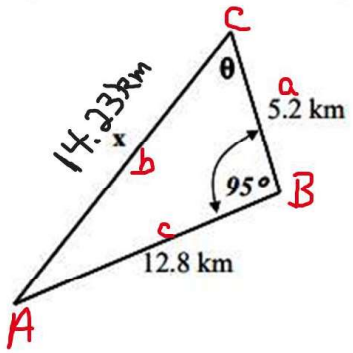
$x \cong 14.23 \text{ km}$

Find angle θ

$$\angle C = \cos^{-1}\left(\frac{a^2 + b^2 - c^2}{2 \cdot a \cdot b}\right)$$
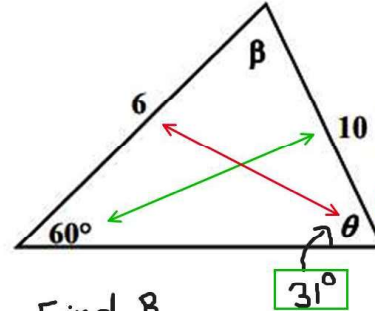
$$\angle C = \cos^{-1}\left(\frac{5.2^2 + 14.23^2 - 12.8^2}{2 \cdot 5.2 \cdot 14.23}\right)$$

$$\angle C = \cos^{-1}\left(\frac{65.6929}{147.992}\right)$$

$\angle C = 63.64734098...$

$\angle C = 64°$

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

cos law?
Does not work!
So sine law!!

Find θ

$$\frac{\sin 60}{10} = \frac{\sin θ}{6}$$

$$0.5196 = \frac{6 \cdot \sin 60°}{10} = \sin θ$$

SO $θ = \sin^{-1}(0.5196)$

$θ = 31.30542411$

$θ = 31°$

31°

Find β
So! Triangle sum = 180°
So: $β = 180 - 91 = 89°$

Design Modelling

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

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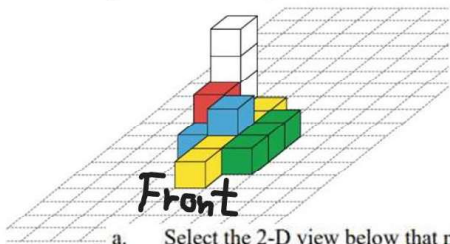
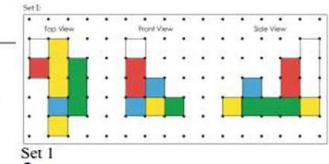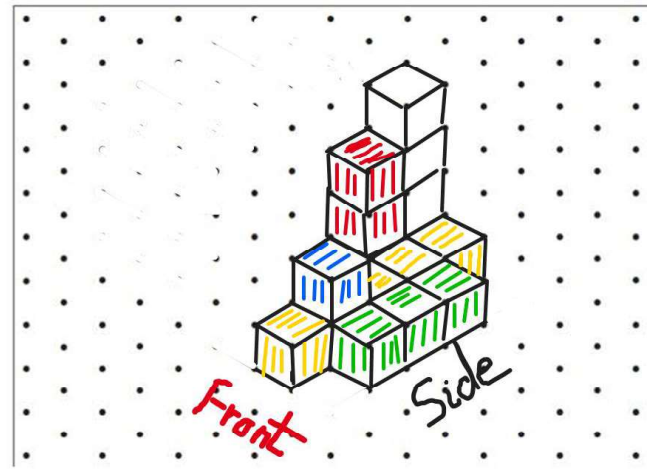a. Select the 2-D view below that matches the drawing above.

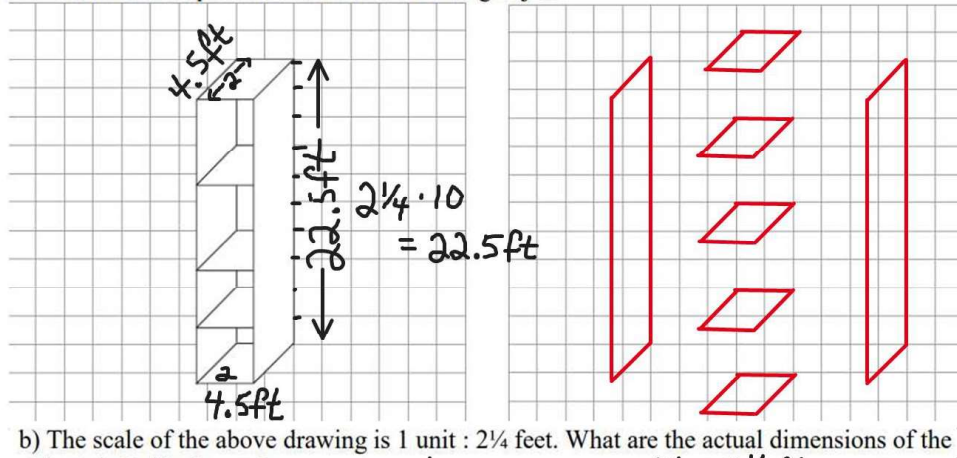Set 1

wrong!

Good match

Set 1 ✓ ✗

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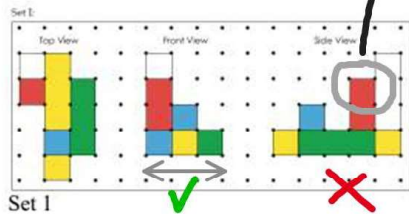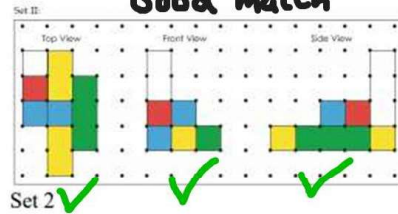
b. Use the isometric dot paper below to draw a 3-D representation for the Set 1 of the 2-D view.

Set 1

Front Side

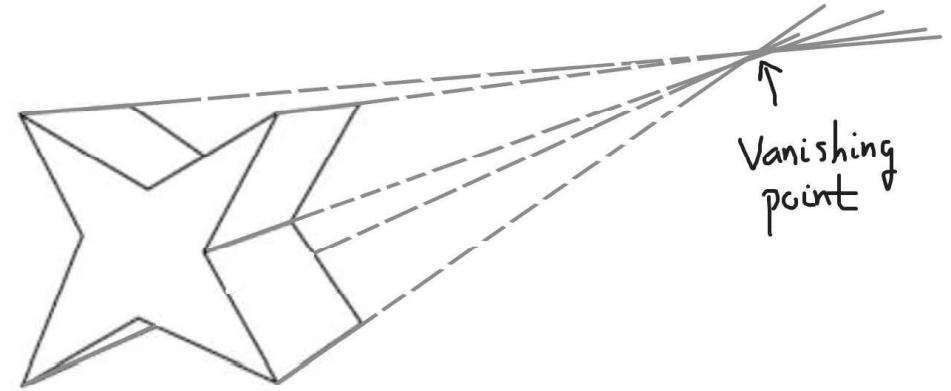OMG!
Crazy!

Wow!

Hope
this
is right

2. Sketch the exploded view of the following object

4.5ft
$2\frac{1}{4} \cdot 10$
= 22.5ft
22.5ft
4.5ft
2

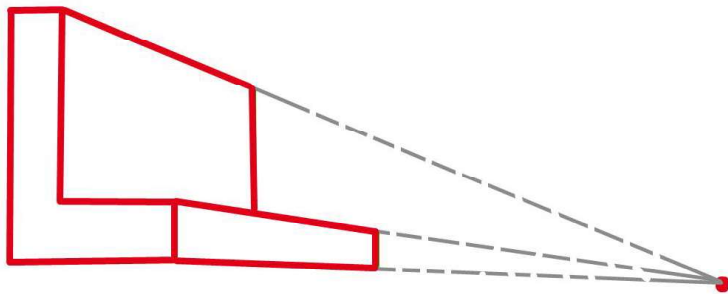b) The scale of the above drawing is 1 unit : 2¼ feet. What are the actual dimensions of the objects individual parts?

$\frac{1}{2\frac{1}{4}}$

So width = 4½ft   height =
length = 4½ft   22½ft

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

Vanishing point

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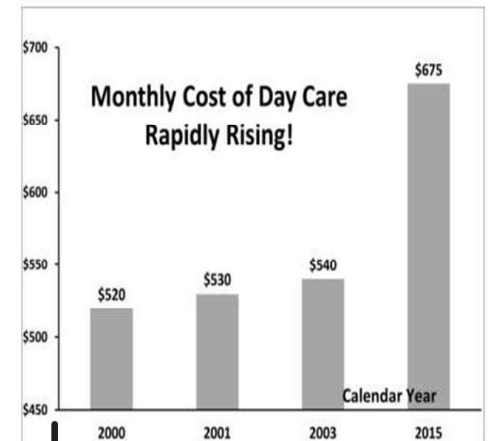

4. How is the graph here misrepresenting information? There are two ways!

First Deception: _____
① only looking at tops of bars, doesn't show full height

Second Deception: _____
② Not linear on bottom axis! 2015 should be way further right!

Monthly Cost of Day Care Rapidly Rising!

$700 $675
$650
$600
$550 $540
$520 $530
$500
$450
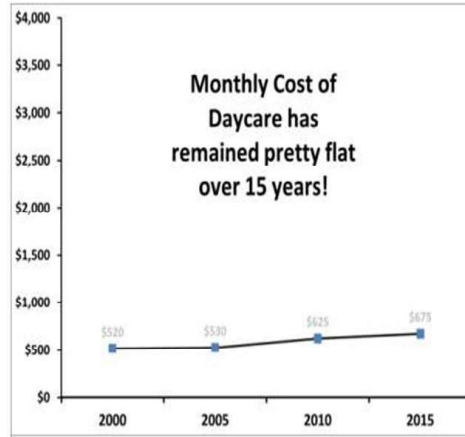   Calendar Year
2000   2001   2003   2015

0

Skips years

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

It did not use the entire graph! Squished scale!

Everything looks flat if you squish it!

Monthly Cost of Daycare has remained pretty flat over 15 years!

$520 $530 $625 $675

2000   2005   2010   2015

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

No! He put months alphabetically! Not in proper order of time

Projected Sales!

Oliver's Monthly Shoe Sales

April   February   January   July   August

4th month   2nd month   1st month   7th month   8th month