

Release Items Academic Program

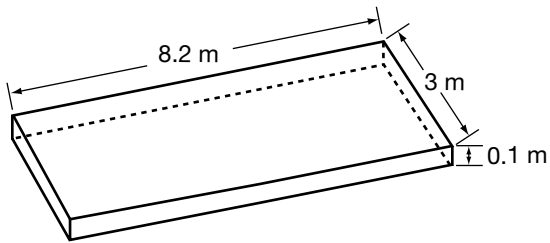


Education
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Multiple-Choice Questions

1. Richard wants to buy new soil for his garden. He wants the new soil to be approximately 0.1 m deep.

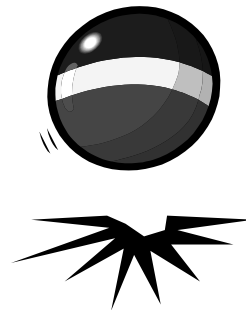
The figure shows the dimensions of Richard's garden, which is a **rectangular prism**.



What **volume** of soil does Richard need?

- A 2.24 m³
 - B 2.46 m³
 - C 11.3 m³
 - D 24.6 m³
2. Given A (2, 5) and B (-6, 5), which statement about the line segment AB is **true**?
- F The slope of AB is zero.
 - G The slope of AB is positive.
 - H The slope of AB is negative.
 - J The slope of AB is undefined.

3. A ball is dropped from a height of 10 m above the ground. It bounces to **90% of its previous height** on each bounce.

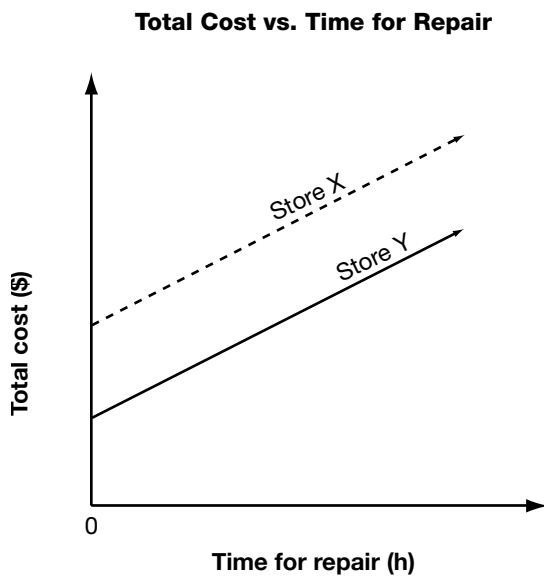


What is the approximate height that the ball bounces to on the **fourth** bounce?

- A 2.8 m
- B 4.3 m
- C 6.6 m
- D 7.2 m

4. Two bicycle repair stores charge an initial fee and an hourly rate for repairs.

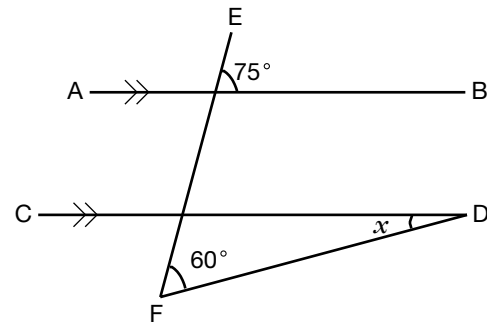
The graph below shows the total cost of repairs versus time for the repair.



Which statement is **true**?

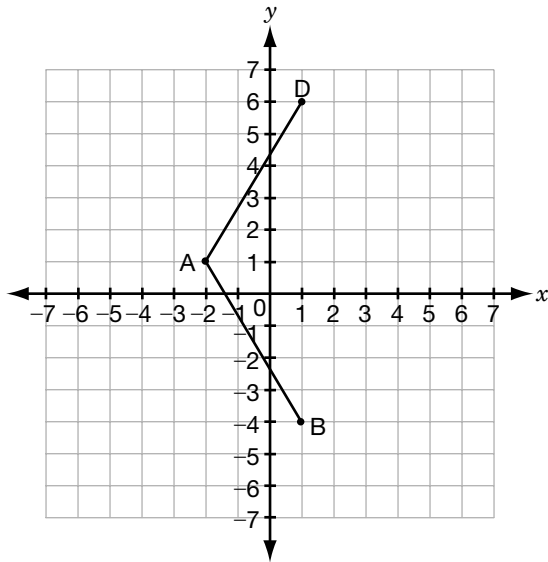
- F The two stores charge different hourly rates and the same initial fee.
- G The two stores charge the same hourly rate and different initial fees.
- H The two stores charge different hourly rates and different initial fees.
- J The two stores charge the same hourly rate and the same initial fee.

5. What is the value of x ?



- A 15°
- B 30°
- C 45°
- D 60°

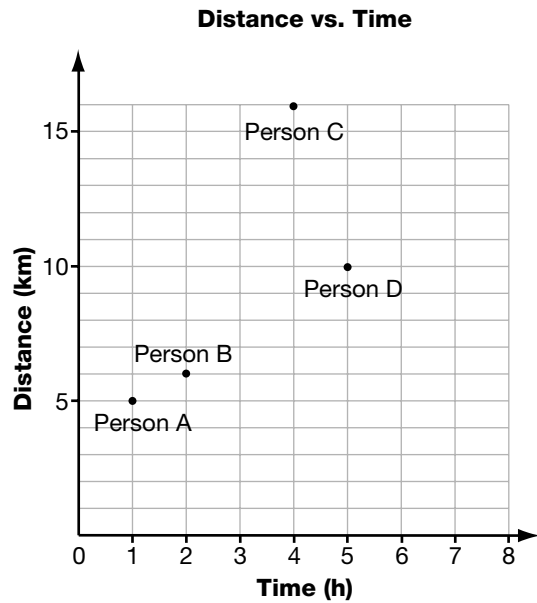
6. A is the point $(-2, 1)$, B is the point $(1, -4)$ and D is the point $(1, 6)$.



If ABCD is a **rhombus**, which of the following is **point C**?

- F $(1, 1)$
- G $(1, 4)$
- H $(4, 1)$
- J $(4, 4)$

7. The graph below shows the distance travelled by four people in a walkathon and the time they take.



Which person walks at the greatest average speed?

- A Person A
- B Person B
- C Person C
- D Person D

8. Simplify the following algebraic expression:

$$\frac{a^6b^4}{a^2b}$$

F $\frac{a^3}{b^3}$

G $\frac{a^4}{b^3}$

H a^3b^3

J a^4b^3

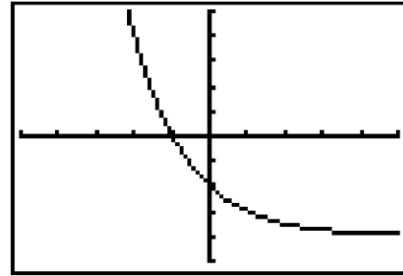
9. A basketball has a radius of 12 cm.



What is its **surface area**, correct to the nearest square centimetre?

- A 450 cm²
B 1810 cm²
C 5429 cm²
D 7238 cm²

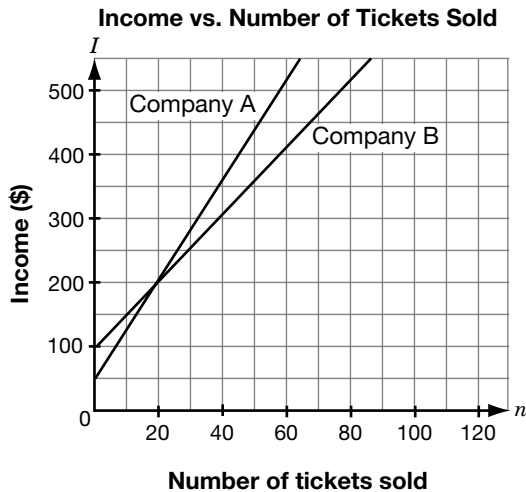
10. The graph below shows the display on Kalib's graphing calculator. The horizontal axis is the x -axis and the vertical axis is the y -axis.



Which statement describes the **change** in y as x **increases**?

- F y increases linearly.
G y decreases non-linearly.
H y decreases linearly.
J y increases non-linearly.

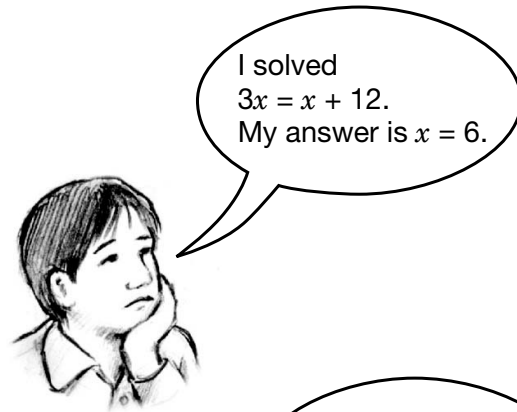
11. High school theatre companies earn their income through start-up grants and ticket sales. The graph shows the relationship between **income, I** , in dollars and **number of tickets sold, n** .



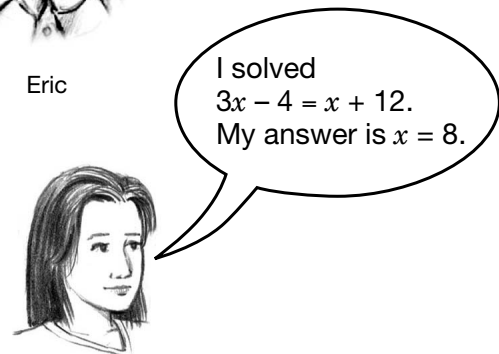
Which statement is true, given the information shown on the graph?

- A** Company A always had more income than Company B.
- B** The two companies had the same income when 40 tickets were sold.
- C** Company A got a larger start-up grant than Company B.
- D** Company A charged more per ticket than Company B.

12. Eric and Julie are each asked to solve an equation.



Eric



Julie

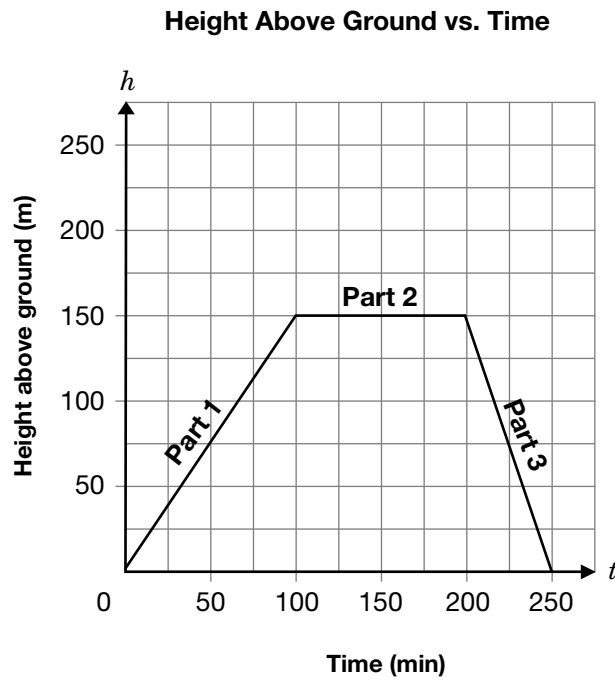
Who has correctly solved his or her equation?

- F** Eric only
- G** Julie only
- H** Both Eric and Julie
- J** Neither of them

Short-Answer Questions

1.1 Terri is a rock climber.

The graph below shows the relationship between her height in metres above the ground and the time in minutes she spends climbing.



In the table below, **describe** Terri's climb.

Section of graph	Description
Part 1	
Part 2	
Part 3	

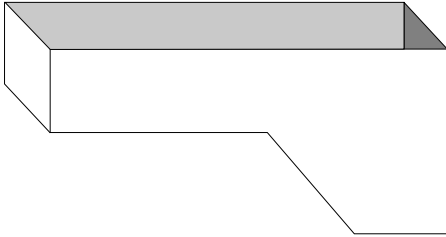
Hint: Use words like

- direction
- distance
- time
- speed

1.2 Jackie runs a pool maintenance service.

In order to add the correct amount of chlorine to keep the pool clean, she needs to know how much water is in the pool when the pool is full.

The following is a diagram of the pool.

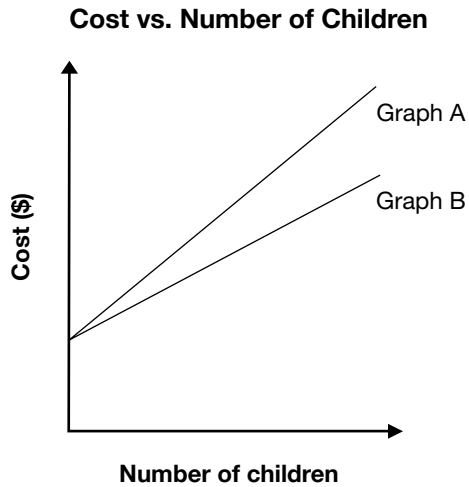


Assuming she knows all the lengths, widths and heights, **list the steps** that Jackie should take to determine the amount of water in the pool.

1.3 Amina is going to take some children to the zoo or to the museum.

The following equations represent the total cost of each trip, where C is the total cost, in dollars, and n is the number of children.

A trip to the zoo	$C = 5n + 8$
A trip to the museum	$C = 4n + 8$



Which graph represents the total cost of a trip to the **zoo**?

Circle one: Graph A or Graph B

Give reasons for your choice.

Tasks

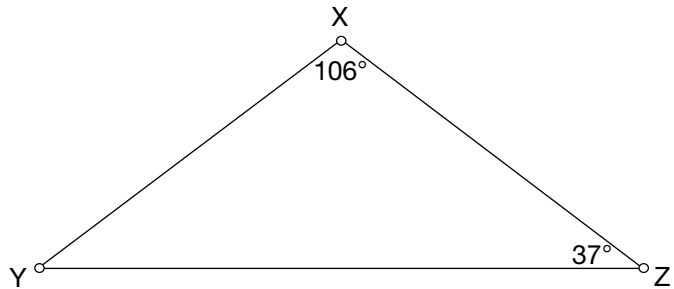
1.4 Everyone's a Winner with Math!

The math department has organized a contest.
Try the questions below.

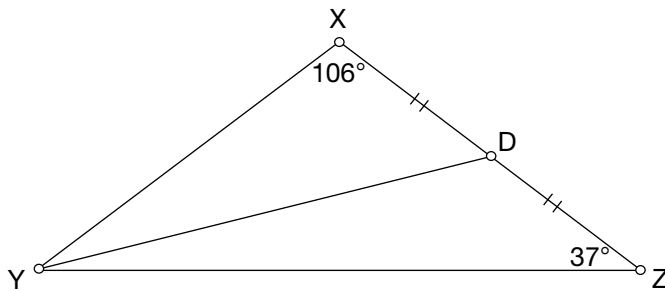
a) What **type of triangle** is $\triangle XYZ$?

- Check one: equilateral
 isosceles
 scalene

Give reasons for your answer.

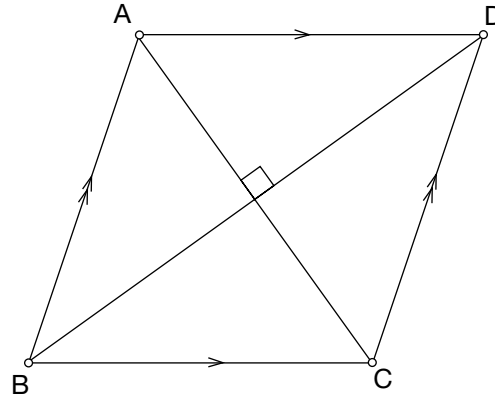


b) Line segment YD is a **median** from vertex Y.

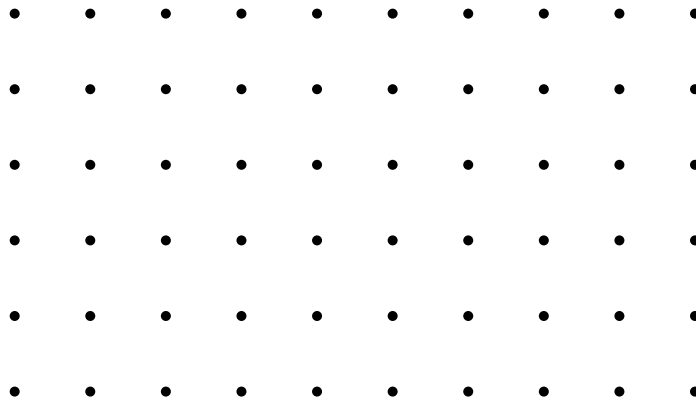


Draw the other **two medians** in the triangle and label the **point of intersection**.

c) The diagram below shows a **parallelogram** with diagonals that are **perpendicular**.



Draw a **quadrilateral** that has **perpendicular diagonals** but is **not** a parallelogram.



d) Pick up your prize for the contest.

Solve the **equation** below to find the number of the prize room:

$$3(2x - 9) - 4x = 13$$

1.5 In Hot Water

Demetrius's science class is performing an experiment. Demetrius fills a beaker with **room temperature** water. He slowly **heats** the water over a source of constant heat and records the **water temperature** at **different times** in the table below.



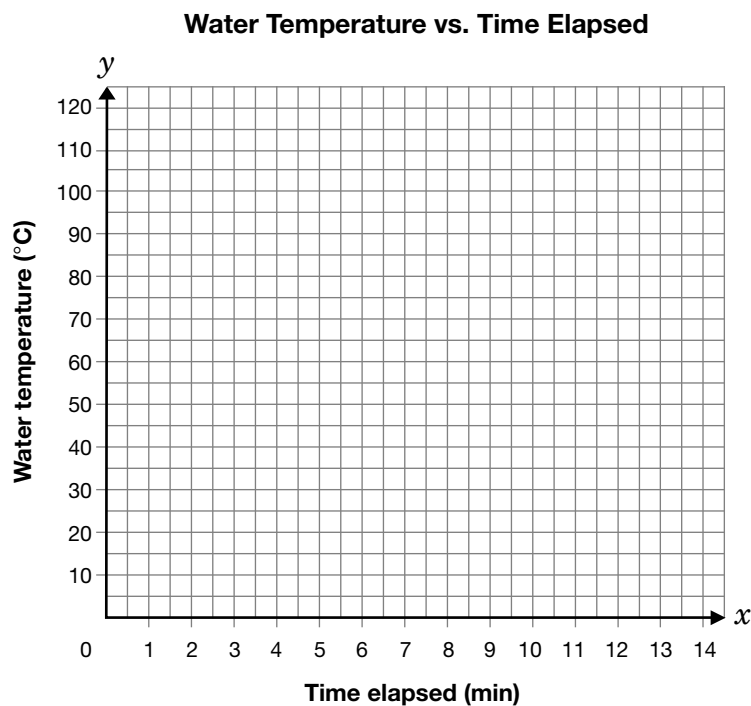
Time elapsed, x (min)	Water temperature, y (°C)	First differences
2	30	
4	43	
6	54	
8	66	
10	77	

- a) i) Complete the **first differences** column in the table of values above.
- ii) Is the **relationship** between the **water temperature** and the **time elapsed** linear or non-linear?

Check one: linear or non-linear

Give reasons for your answer.

- b) Graph the **data** from question a) on the grid below.
Draw a **line of best fit**.



- c) Water **boils** when it reaches a temperature of **100 °C**.

Predict **how long** it will take the water in Demetrius's beaker to **boil**.
Justify your answer.

- d) Suppose that Demetrius repeats the above experiment but fills his beaker with **cold** water taken from the refrigerator instead of **room temperature** water.

Compare **the line of best fit** for the data from this **new** experiment with the line in question b).

1.6 Math Munch

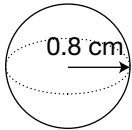
Math Munch is a new snack made of pretzels and cheese bits.

- The cheese bits are **spherical**.
- The pretzels are **cylindrical**.



- a) Calculate the **surface area** of one **spherical** cheese bit with a **radius** of **0.8 cm**.

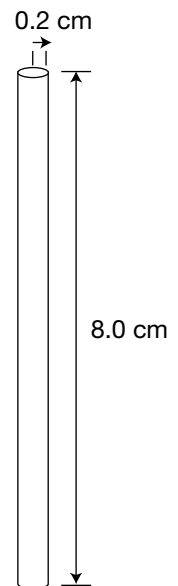
Show your work.



- b) The manufacturer of Math Munch is considering changing the size of the pretzels. Each pretzel will have a **volume** of approximately **1.0 cm³**.

- i) Calculate the **surface area** of a **cylindrical** pretzel with a **radius** of **0.2 cm** and a **height** of **8.0 cm**. Show your work.

Record your answer in the appropriate space in the table on the opposite page.



- ii) Calculate the **height** of a **cylinder** with a **radius** of **0.3 cm** and a **volume** of **1.0 cm³**.

Show your work.

Record your answer in the appropriate space in the table on the opposite page.

Record your answers to questions i) and ii) in the table below.

Radius (cm)	Height (cm)	Surface area of cylinder (cm ²)	Volume of cylinder (cm ³)
0.2	8.0	i)	1.0
0.3	ii)	7.2	1.0
0.4	2.0	6.0	1.0
0.5	1.2	5.5	1.0
0.6	0.9	5.6	1.0
0.7	0.6	5.9	1.0
0.8	0.5	6.5	1.0

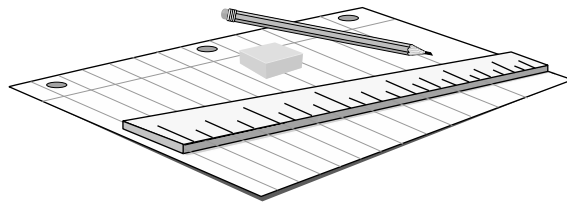
- c) The manufacturer wants to cover the **surface** of each Math Munch **pretzel** with chocolate, while keeping her **costs** to a **minimum**.

State **the dimensions** you would recommend for the **cylindrical** pretzel.
Give reasons for your answer.

Short-Answer Questions

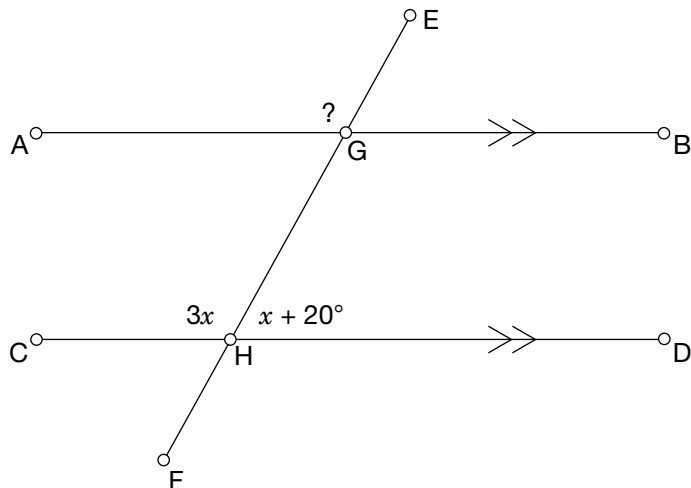
1.7 Expand and simplify.

$$2(3x^2 - 5x) + 4x(7 + x)$$



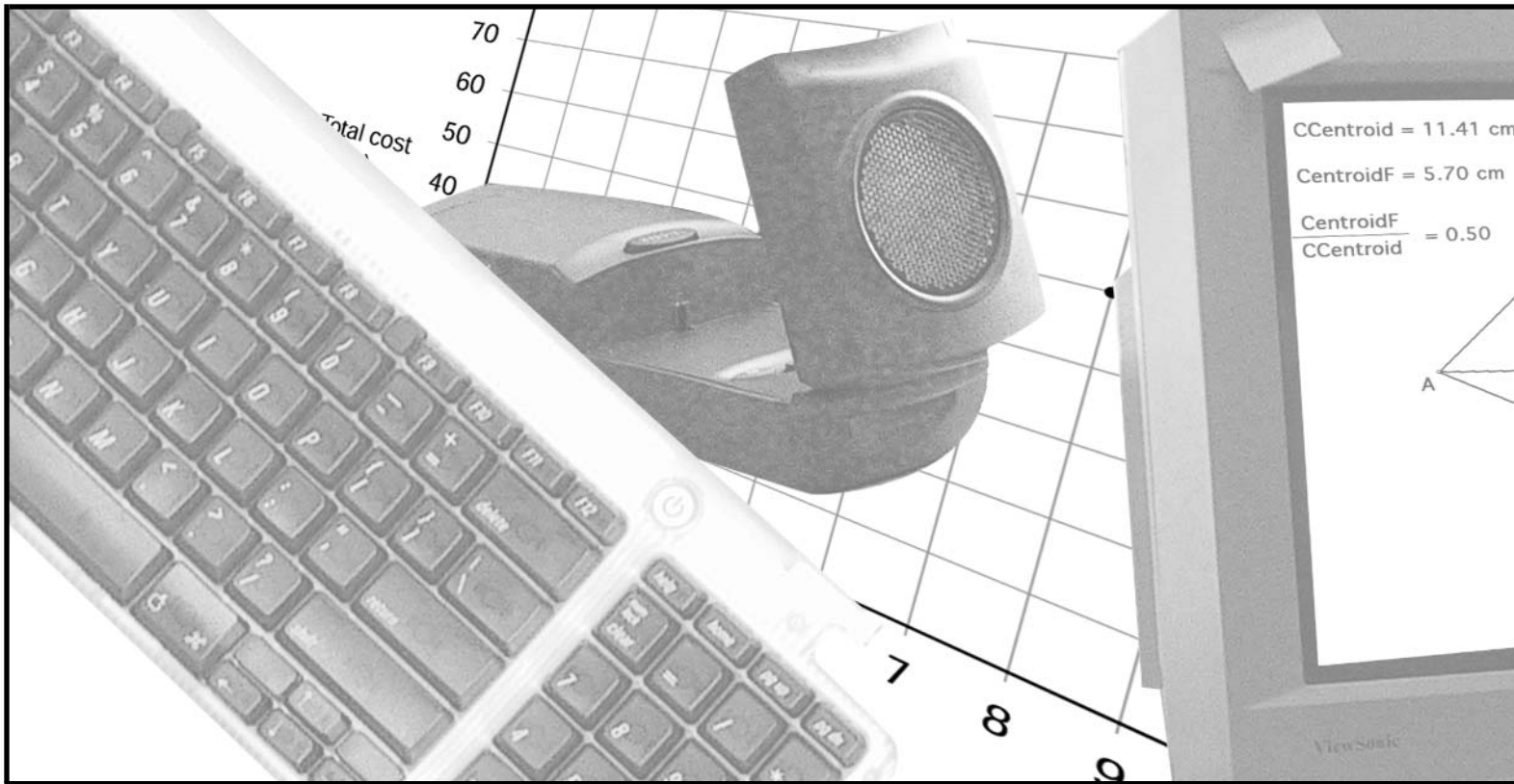
1.8 In the diagram below,

- $\angle DHG = x + 20^\circ$
- $\angle GHC = 3x$
- $AB \parallel CD$



Determine the **measure** of $\angle EGA$.
Justify your answer.






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