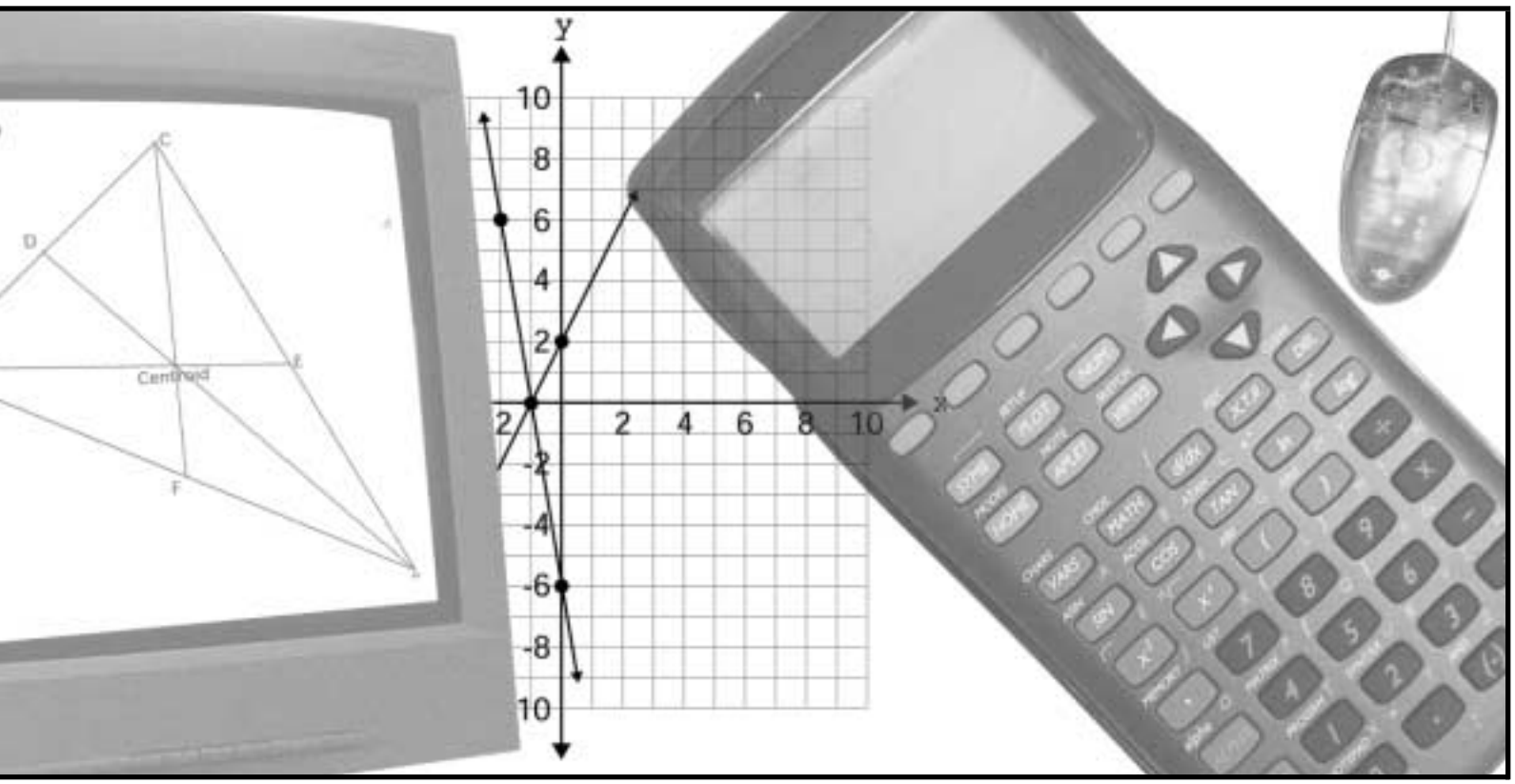
Grade 9 Assessment of Mathematics, 2000–2001




# Short Answer Items

EQAO

Education
Quality and
Accountability
Office

# Directions to Students about Answering Short Answer Items

1. For this part of the assessment, make sure you have the following items along with *Booklet 3*:
   - a pencil and an eraser or a pen
   - a scientific or a graphing calculator
   - a ruler and a protractor
2. Do all of your work (even rough work) in *Booklet 3*.
3. You will have 30 min to do these 10 items. That means you have about 3 min for each one. Give yourself time to answer all of the questions.
4. Figures in this section are not drawn to scale.
5. These questions are designed to get you to think deeply about the mathematics you know but they do not require you to write a great deal. Be sure to watch for the terms listed in the *Key Words and Phrases in Instructions* and do just what the prompt asks you to do.

   For example, the question might ask you to "**Explain** your answer." The *Key Words and Phrases in Instructions* sheet says, "**Explain** means to use words and symbols to make your solutions clear and understandable." As soon as you can explain a mathematical reason for the answer, do so. You do not need to provide lots of calculations to illustrate your point.
6. In short answer questions, you do not have to provide lots of examples to illustrate your answer. Write a short answer.
7. You have **30 min** to work.
8. When you see the 

sign, you have completed *Booklet 3*. Check your answers. Then wait quietly for directions from your teacher.

# Key Words and Phrases in Instructions

Throughout the assessment, key words and phrases are used to identify the type of response required from you. The key words and their explanations are listed below. Refer to these explanations to ensure you are responding to the question that is asked.

**Compare:**
Tell what is the same and what is different.

**Describe:**
Tell about something in a step-by-step manner. Use words, numbers, graphs, diagrams, symbols, charts and/or pictures to do this.

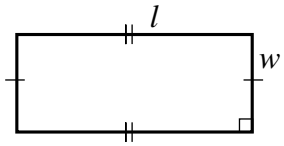
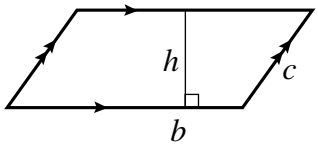
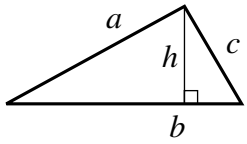
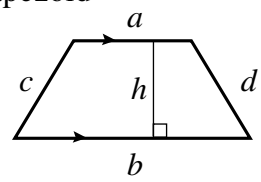
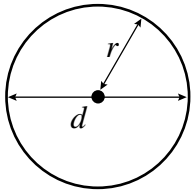
**Explain:**
Use words and symbols to make your solutions clear and understandable.

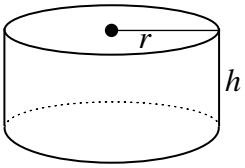
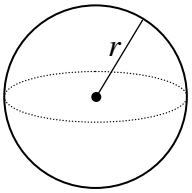
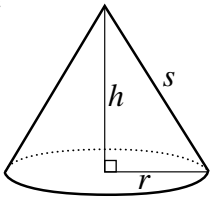
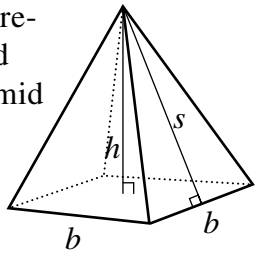
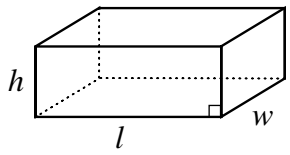
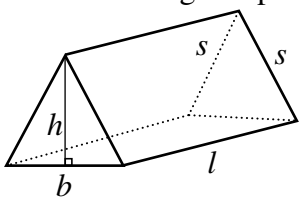
**Give reasons for your answer:**
Explain your reasoning in your own words. Give reasons and evidence to show your answer is correct or proper.

**List:**
Write down or identify in point form.

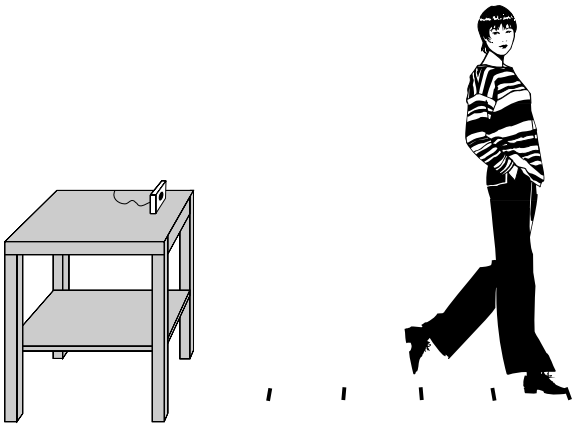
**Show your work:**
Record all calculations. Include all the steps you went through to get your answer. You may want to use words, numbers, graphs, diagrams, symbols, charts and/or pictures to explain your thinking.

# Formula Sheet

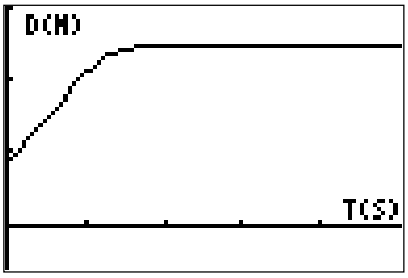
| Geometric Figure | Perimeter | Area/Surface Area |
|---|---|---|
| Rectangle   | $P = 2l + 2w$<br>$P = 2(l + w)$ | $A = lw$ |
| Parallelogram   | $P = b + b + c + c$<br>$P = 2b + 2c$ | $A = bh$ |
| Triangle   | $P = a + b + c$ | $A = \frac{bh}{2}$<br>**or**<br>$A = \frac{1}{2}bh$ |
| Trapezoid   | $P = a + b + c + d$ | $A = \frac{(a + b)h}{2}$<br>**or**<br>$A = \frac{1}{2}(a + b)h$ |
| Circle   | $C = \pi d$<br>**or**<br>$C = 2\pi r$ | $A = \pi r^2$ |

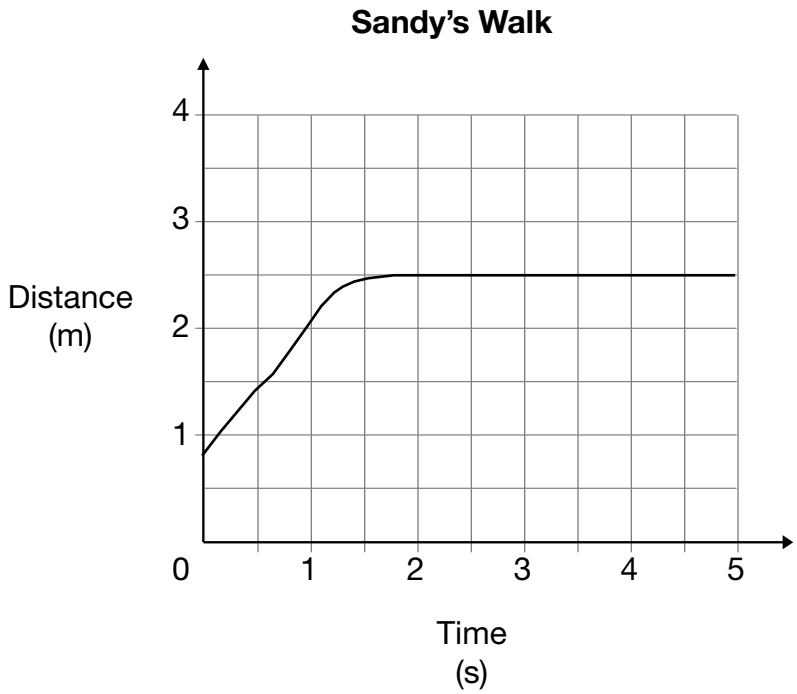
| Geometric Figure | Area/Surface Area | Volume |
|---|---|---|
| Cylinder   | $A_{top} = \pi r^2$<br>$A_{base} = \pi r^2$<br>$A_{side} = 2\pi rh$<br>$A_{total} = 2\pi r^2 + 2\pi rh$ | $V = \pi r^2 h$ |
| Sphere   | $A = 4\pi r^2$ | $V = \frac{4}{3}\pi r^3$ |
| Cone   | $A_{cone} = \pi rs$<br>$A_{base} = \pi r^2$<br>$A_{total} = A_{cone} + A_{base}$ | $V = \frac{1}{3}\pi r^2 h$ |
| Square-based pyramid   | $A_{triangle} = \frac{1}{2} bs$ *(for each triangle)*<br>$A_{base} = b^2$<br>$A_{total} = A_{4\ triangles} + A_{base}$ | $V = \frac{1}{3} b^2 h$ |
| Rectangular prism   | $A_{total} = wh + wh + lw + lw + lh + lh$<br>$A = 2(wh + lw + lh)$ | $V = lwh$ |
| Isosceles triangular prism   | $A_{triangle} = \frac{1}{2} bh$ *(for each triangle)*<br>$A_{rectangles} = ls + lb + ls$<br>$A_{total} = A_{rectangles} + A_{2\ triangles}$ | $V = \frac{1}{2}(bh)l$ |

**1.** Sandy walked away from a motion detector.



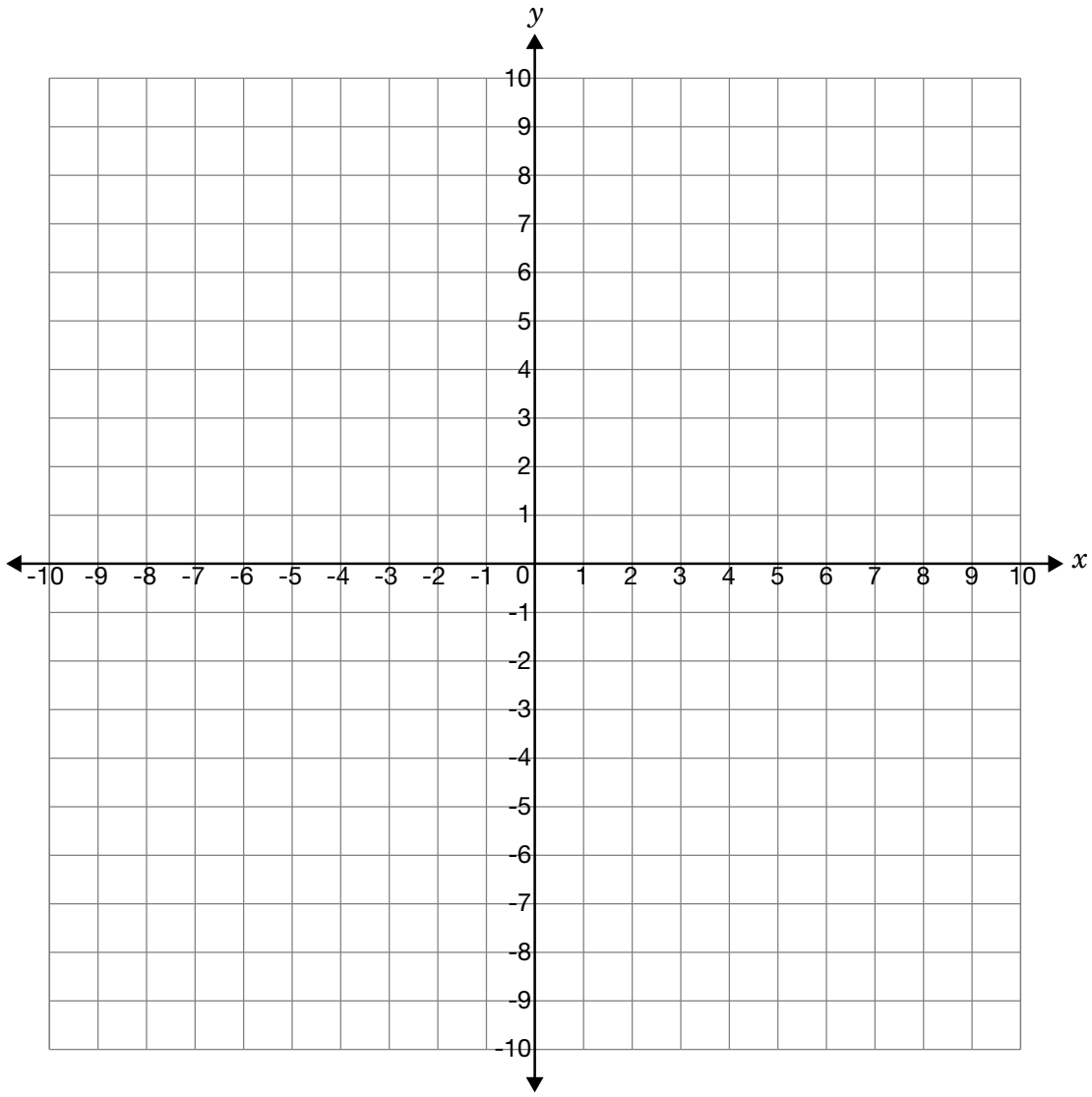
Below is a screen captured from the graphing calculator and a graph representing her walk.



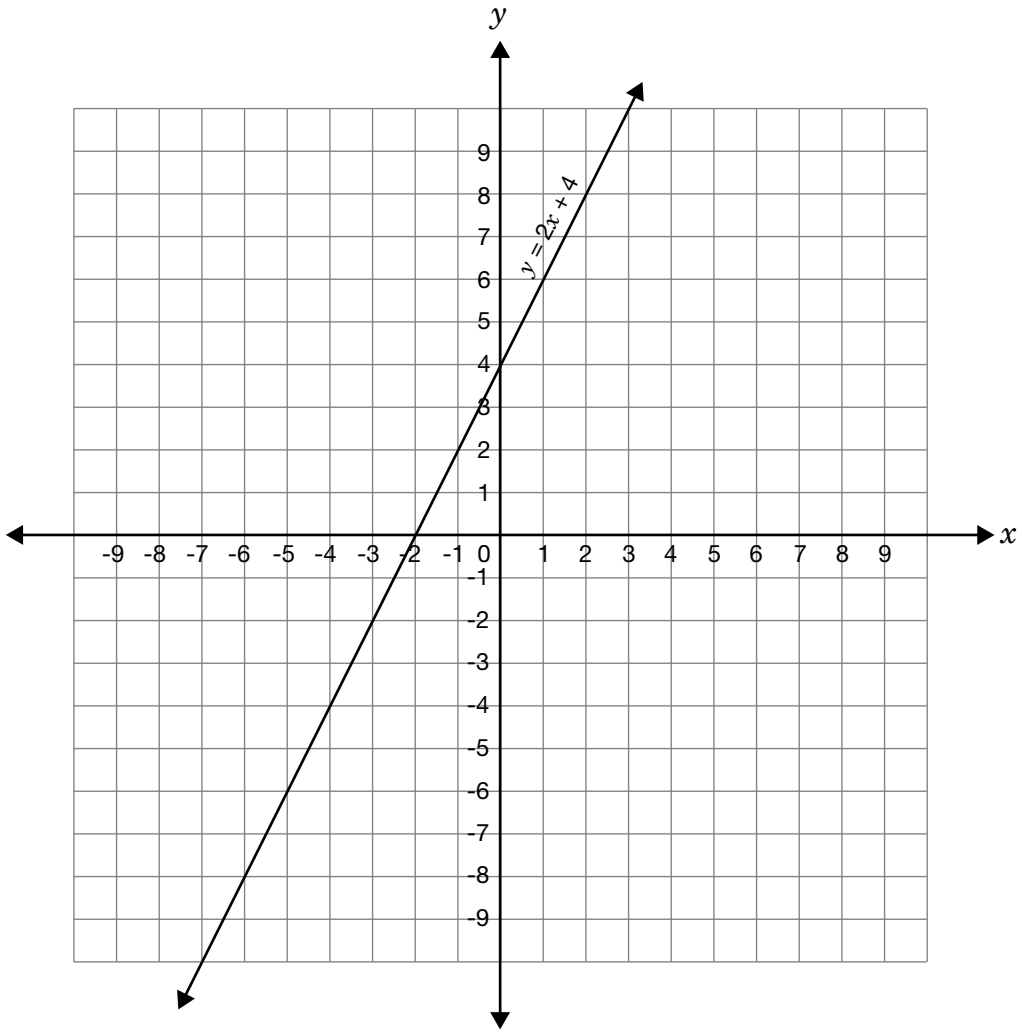

**Describe** Sandy's walk using mathematical language.
Use any of the information presented above.

**2.** **Graph** the line with a $y$-intercept of 4 and a slope of $\frac{1}{2}$.



**3.** There are about $1.6 \times 10^5$ students in Ontario writing this Grade 9 assessment. **Write** this number in standard numerical form.

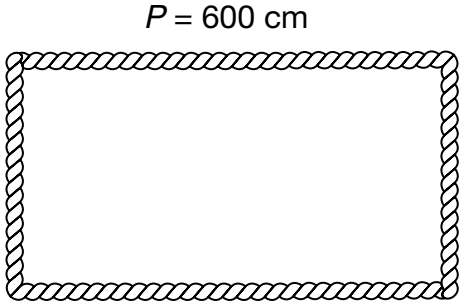
**4.** Draw a line **parallel** to $y = 2x + 4$ and **write** its equation.



**5.** Decide whether the following statement is true or false.

"In a quadrilateral, the maximum area that can be enclosed by 600 cm of rope is a rectangle with dimensions 200 cm × 100 cm."

Give a specific example to support your decision.




# Specific Scoring Guide
# Applied Program – Short Answer Questions

b – blank: nothing at all is written for the solution

u – unrelated or unengaged: the student has written "I don't know" or a question mark; the student has simply rewritten the question exactly as posed; the student has offered unrelated comments or drawn pictures; the student has not engaged in the problem solution

| Question Number | Codes | | | Category and Strand |
|---|---|---|---|---|
| | 0 | 1 | 2 | |
| 1 | • description of walk is incorrect **or**<br>• description of walk includes one correct feature and the rest is incorrect or missing<br>(e.g., Sandy began with a brisk walking speed and reached a comfortable speed that she could keep) | • description of walk is correct and includes two of the following features:<br>– initial position (≈0.8 m)<br>– final position (2.5 m)<br>– distance travelled (≈1.7 m)<br>– action of stopping<br>– she walks away from the motion detector<br>– speed is constant<br>– speed (≈1 m/s)<br>– travel time (≈1.5 s)<br>– amount of time stopped (≈3.5 s) | • description of walk is correct and includes three or more of the following features:<br>– initial position (≈0.8 m)<br>– final position (2.5 m)<br>– distance travelled (≈1.7 m)<br>– action of stopping<br>– she walks away from the motion detector<br>– speed is constant<br>– speed (≈1 m/s)<br>– travel time (≈1.5 s)<br>– amount of time stopped (≈3.5 s) | AP<br>R |
| 2 | • more than one error in graphing the line | • one error in graphing the line (e.g., the line drawn has a slope of 2 or –½ **or** the intercept of 4 has been drawn as an $x$-intercept)<br>• no line drawn through two or more correct points | • correct graph (e.g., $y$-intercept of 4 and $x$-intercept of –8 **or** $y$-intercept of 4 and slope of ½)<br>• **Note:** arrows at the ends of the line are not necessary | KU<br>G |
| 3 | • incorrect answer (e.g., 1605 or 1 600 000) | • partially correct answer (e.g., $1.6 \times 10 \times 10 \times 10 \times 10 \times 10$) | • correct answer (i.e., 160 000) | KU<br>N |
| 4 | • inappropriate line drawn and incorrect equation stated | • inappropriate line drawn (i.e., not parallel to $y = 2x + 4$) with correct equation stated (e.g., $y = 3x + 4$) **or**<br>• line drawn parallel to $y = 2x + 4$ with an incorrect equation stated | • appropriate line drawn parallel to $y = 2x + 4$ with correct equation stated (e.g., $y = 2x$) | AP<br>G |
| 5 | • answers true or false without an example to support the conclusion **or**<br>• conclusion does not follow from example given **or**<br>• illogical example with or without a conclusion given | • conclusion follows from partially appropriate example (e.g., False, uses $300 \times 300$ as a counter-example; e.g., True, uses $250 \times 50$ as an example with a smaller area) | • concludes that the statement is false and uses an appropriate example to support the conclusion (e.g., False, dimensions $150 \times 150$ have an area of 22 500 $cm^2$) | PS<br>M |