MPM2D
Examination
Exam A, 2012
Length: 3 hours
(Exam set for 2 hrs. + 1 hr. flex time)

OTTAWA-CARLETON
DISTRICT SCHOOL BOARD

Name : _____

Teacher : _____

School : _____

Instructions to students:

1. This examination booklet is **13 pages** long.
   Please check that you have all the pages.

2. Answer all questions with complete solutions in the spaces provided on the examination paper.

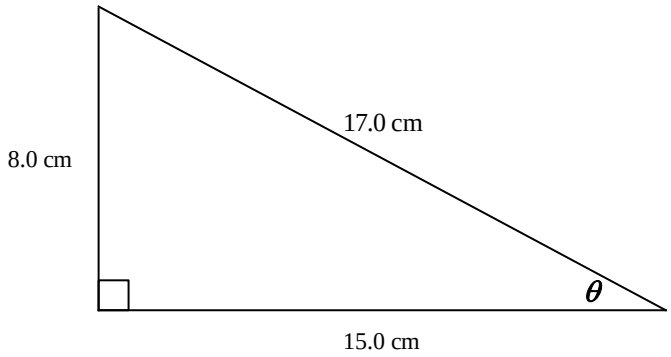
3. You may use any school-approved calculator on this examination.
   Make sure that your calculator is in **DEGREE** mode.
   Do **not** share your calculator.

4. There is a formula sheet that goes with the examination.

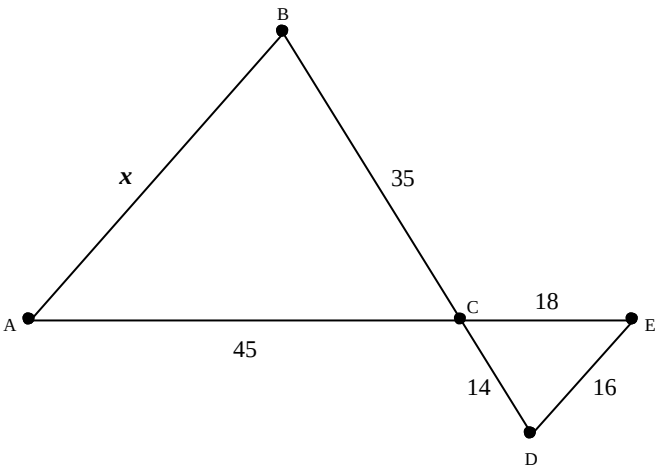
5. Diagrams are not drawn to scale.

A) Trigonometry

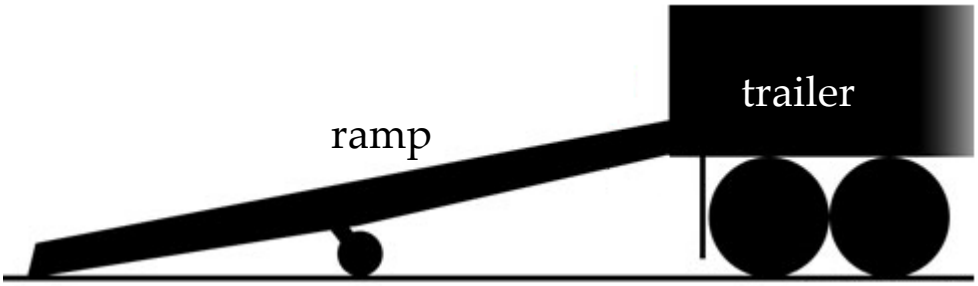
A1) **Determine** the value of θ to the nearest degree.



A2) **Determine** the value of x.

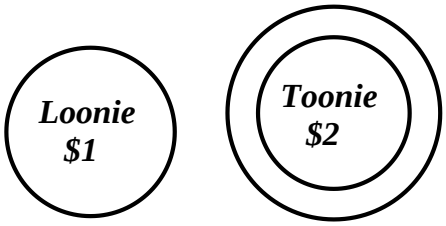


A3) Rick can place a 10 foot long ramp at an angle of 15° to reach a trailer.
Roy thinks that to reach a trailer twice as high as the first, the angle should be 30°.
Do you agree with Roy?
Justify your answer.



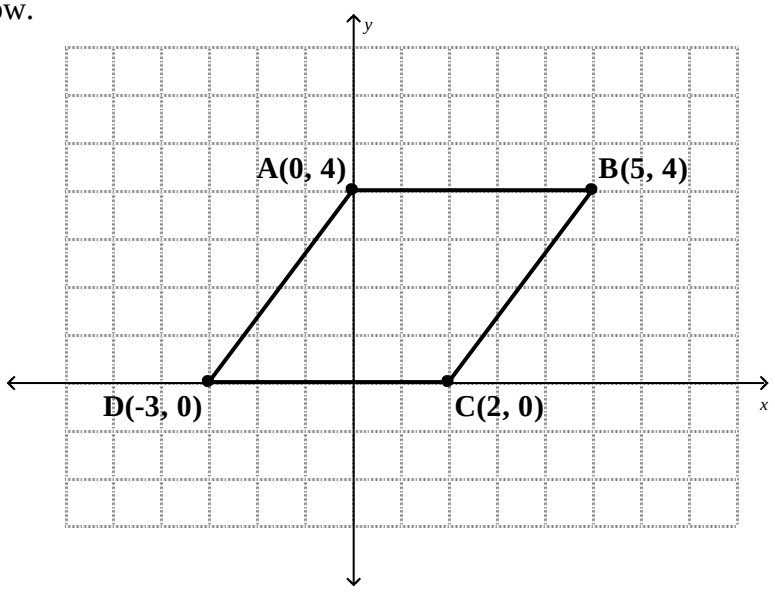
A4) Robin forgot her homework again so she calls Scott and he tells her about it.
She has to determine the length of the third side of a non-right triangle if one of the angles is $50°$ and other sides are 15.0 cm and 10.0 cm
Scott forgot to tell her which angle was $50°$.
Determine all possible lengths of the third side that Robin could calculate, rounded to one decimal place.
Justify your answer.

B) Analytic Geometry



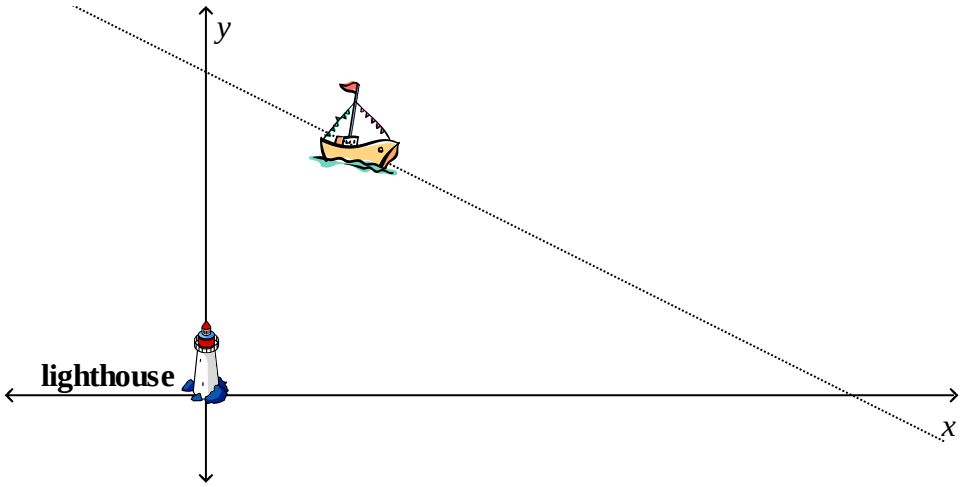
B1) Phil has 83 coins made up of Loonies and Toonies. He has a total of $137.
Determine the number of Loonies that Phil has.

B2) **Identify** the type of quadrilateral shown below.
Justify your answer.



B3) A boat is travelling on a path defined by $y = -\frac{1}{2}x + \frac{17}{2}$ where x and y are measured in kilometres.

A lighthouse, located at the origin, can detect boats up to 8 km away.
Determine if the boat gets close enough to the lighthouse to be detected.



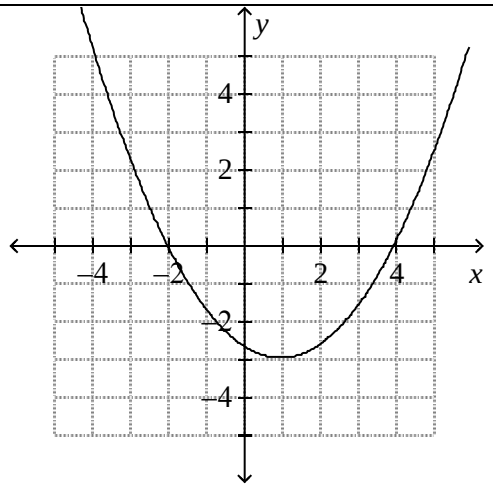
B4) For homework Barney is graphing the line with equation $5x + 3y = 240$.
For fun, he switched the coefficients of the variables yielding the equation $3x + 5y = 240$ and noticed that the two lines crossed.
Does switching the coefficients of <u>any equation</u> of this form result in one point of intersection?
Justify your answer.

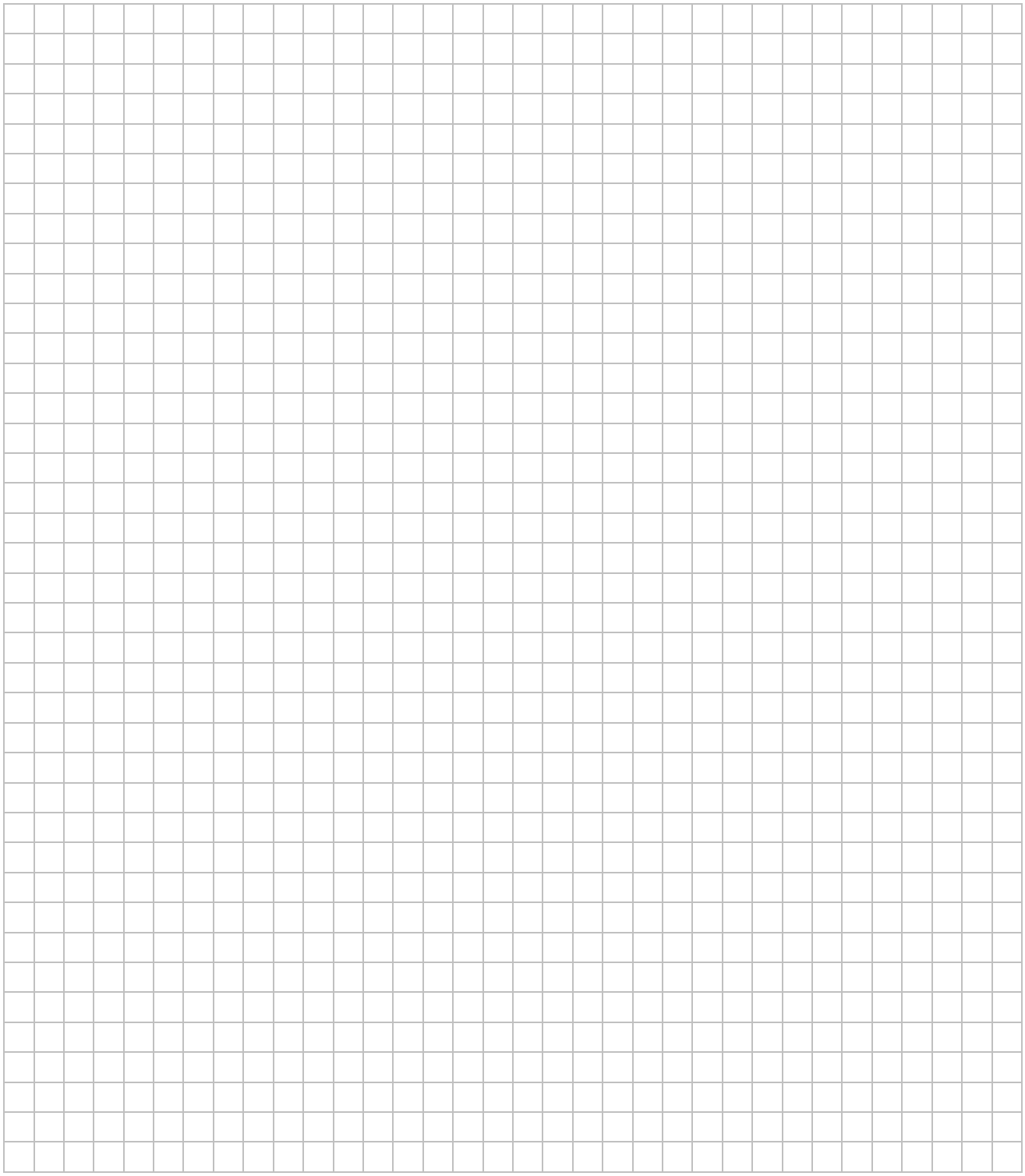
C) Quadratic Relations

C1) The parabola with equation $y = -2(x+3)^2 - 4$ is moved 4 units up and 5 units to the right.
State the equation of the new parabola.
Justify your answer.

C2) **Solve** the equation $10x^2 + x = 2$.

C3) **Compare** the properties of the three quadratic relations given below.

Model 1	Model 2	Model 3
<table><tr><th>x</th><th>y</th></tr><tr><td>–2</td><td>0</td></tr><tr><td>–1</td><td>5</td></tr><tr><td>0</td><td>8</td></tr><tr><td>1</td><td>9</td></tr><tr><td>2</td><td>8</td></tr><tr><td>3</td><td>5</td></tr><tr><td>4</td><td>0</td></tr></table>		$y = (x+2)(x-4)$

C4) Select values of a and h so that the quadratic relation with equation $y = a(x-h)^2 + 60$ models a real life scenario.

Explain the connection between the features of the parabola and the scenario you have modeled.