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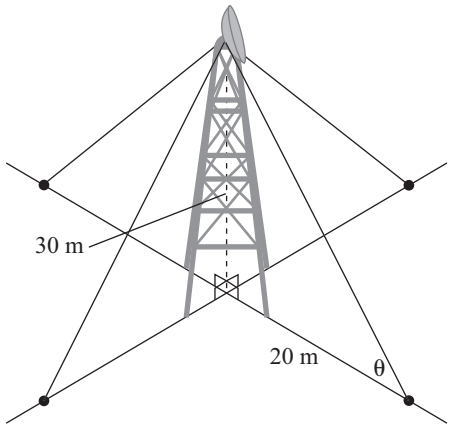
Mathematics 10 Option 1
Final Exam Written Response

Write your response in the space provided. Present your response in a well-organized way, using complete sentences and correct units.

Use this information to answer #1a)–b).

A communications tower is held securely in place by four identical cables attached to the tower and the ground.



1. a) To the nearest metre, determine the amount of cable used to secure the tower. Assume that the cable lengths are identical and that no extra cable was used.

b) What is the measure of $\angle\theta$, to the nearest tenth of a degree? Justify your work.

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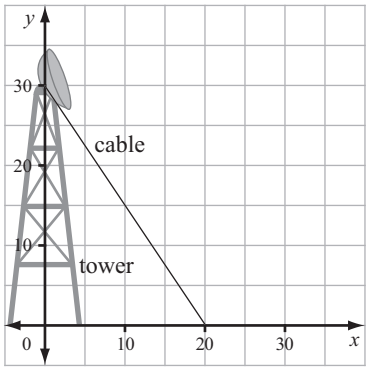
Use this information to answer #1c)–d).

The tower and one cable are plotted on a grid.



c) Determine the slope of the line. Show your work.

d) Write the equation of the line, in general form.

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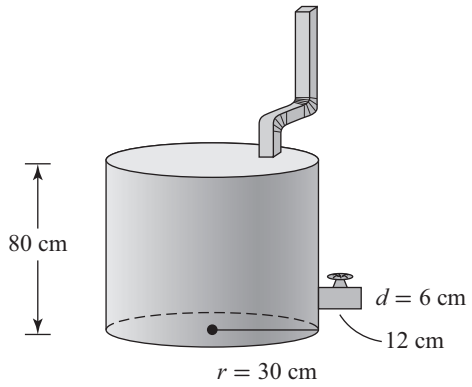
Use this information to answer #2.

Neil made a rain barrel in the shape of a right cylinder. He attached a piece of cylindrical pipe to use as a spigot.



2. a) Determine the volume of the barrel to the nearest cubic centimetre. Show your work.

b) What is the volume of the spigot, to the nearest cubic centimetre? Show your work.

c) Assume that a rainfall fills the barrel to the top. When Neil opens the valve on the spigot, the water flows out at a rate of 200 cm^3/s. Graph the rate of water flow, using the x-axis to represent time, in minutes, and the y-axis to represent volume of the rain barrel.

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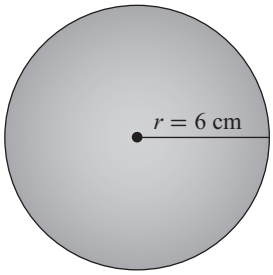
d) Suppose the valve on the spigot were left open for water to flow out. To the nearest tenth of a minute, how long would it take before the barrel was three quarters full?

e) Lynn and Bryan were discussing the slope of the line they drew in part c). Lynn said that the slope is positive and Bryan said the slope is negative. Who is correct? Explain your reasoning.

f) A child dropped a ball filled with water into the barrel. By how much did the level of the water in the barrel rise after the ball sank to the bottom of the barrel?



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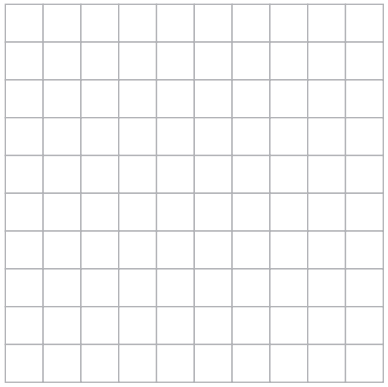
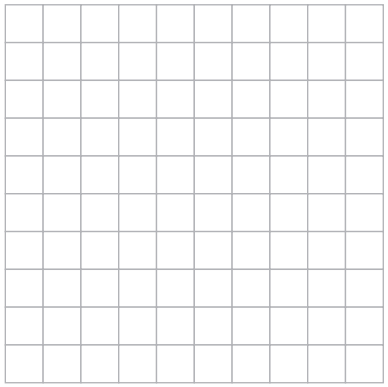
3. a) Draw a diagram to model the multiplication of $(2x + 1)(x - 3)$.

b) What is the product of $(2x + 1)(x - 3)$?

c) Sketch the graph of a relation of your choice.



d) Sketch a different graph of a relation that is a function, of your choice.



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e) Sketch a different graph of a relation that is not a function, of your choice.