

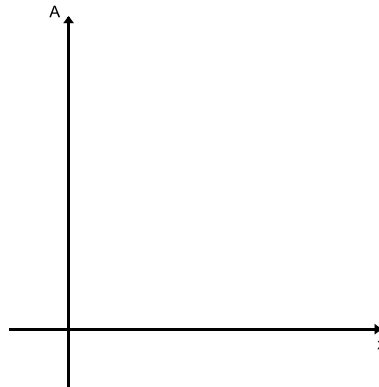
Name \_\_\_\_\_ Group Quiz Rectangle Related Optimization

A farmer has 500 yards of fencing and wishes to fence three sides of a rectangular field (the fourth side is along an existing stone wall that is 1200 yards long, and needs no additional fencing). Find the dimensions of the rectangular field of largest area that can be fenced.

1. Draw a related figure labelling the important features.
2. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_
3. There is an additional piece of information that is important, but will not impact this scenario at all in the given information. What is the extra or EXTRANEOUS piece of information?
4. What is the area model in terms of a single variable and the given available fencing?

5. Sketch a graph of the area model where the area is FEASIBLE. Label important features of the graph with a point

6. What are the EXACT dimensions of the rectangular pen that maximize the area of the rectangular field?



7. SHOW THE CALCULUS that supports your answer in part 6
8. Adaptation of the given scenario. Write the general area model in terms of a given amount of fencing,  $F$ .
9. Adaptation of the given scenario. Write the derivative of the general area model in terms of a given amount of fencing,  $F$ .

A metal box (WITHOUT A TOP) is to be constructed from a square sheet of metal that is 40 cm on a side by cutting square pieces of the same size from the corners of the sheet and then folding up the sides. Find the dimensions of the box with the largest volume that can be constructed in this manner

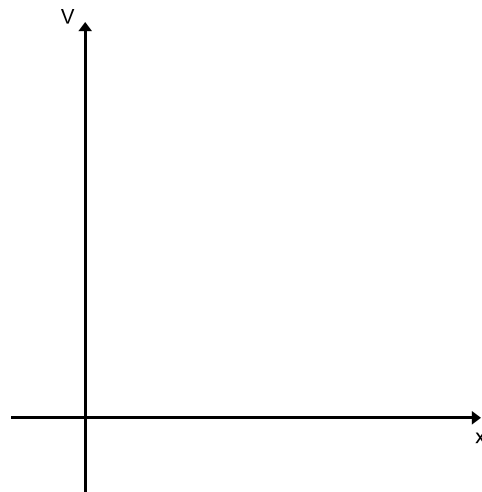
10. Draw a related figure labelling the important features.

11. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_ height = \_\_\_\_\_

12. What is the volume model in terms of a single variable and the given available material?

13. Sketch a graph of the volume model where the volume is FEASIBLE. Label important features of the graph with a point

14. What are the EXACT dimensions of the rectangular box that maximize the volume of the box?



15. SHOW THE CALCULUS that supports your answer in part 14

16. Adaptation of the given scenario. Write the general volume model in terms of a given square of material was  $G$  cm. on a side.

17. Adaptation of the given scenario. Write the derivative of the general volume model in terms of a given square of material was  $G$  cm. on a side.

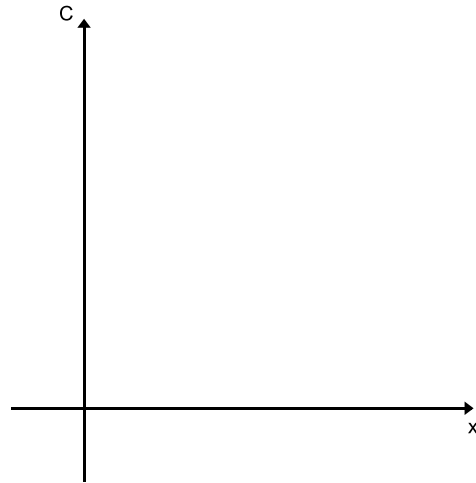
A rectangular container with open top is required to have a volume of 24 cubic meters. Also, one side of the rectangular base is required to be 6 meters long. If material for the base costs \$10 per square meter, and material for the sides costs \$4 per square meter, find the dimensions of the container so that the cost of material to make it be a minimum.

18. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_ height = \_\_\_\_\_

19. What is the cost model in terms of a single variable and the given constraints?

20. Sketch a graph of the cost model where the cost is FEASIBLE. Label important features of the graph with a point

21. What are the EXACT dimensions of the rectangular box that minimize the cost of the box?



22. SHOW THE CALCULUS that supports your answer in part 21

23. Adaptation of the given scenario. Write the general cost model in terms of a given volume was  $M$  and one of the required sides of the base needed to be  $N$  and the cost of the base material is  $B$  per square meter and the cost of the material for the sides was  $S$

24. Adaptation of the given scenario. Write the derivative of the general cost model in terms of a given volume was  $M$  and one of the required sides of the base needed to be  $N$  and the cost of the base material is  $B$  per square meter and the cost of the material for the sides was  $S$

Name \_\_\_\_\_ Group Quiz Rectangle Related Optimization

A farmer has 600 yards of fencing and wishes to fence three sides of a rectangular field (the fourth side is along an existing stone wall that is 1800 yards long, and needs no additional fencing). Find the dimensions of the rectangular field of largest area that can be fenced.

1. Draw a related figure labelling the important features.
2. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_
3. There is an additional piece of information that is important, but will not impact this scenario at all in the given information. What is the extra or EXTRANEIOUS piece of information?
4. What is the area model in terms of a single variable and the given available fencing?
5. Sketch a graph of the area model where the area is FEASIBLE. Label important features of the graph with a point
6. What are the EXACT dimensions of the rectangular pen that maximize the area of the rectangular field?
7. SHOW THE CALCULUS that supports your answer in part 6
8. Adaptation of the given scenario. Write the general area model in terms of a given amount of fencing,  $K$ .
9. Adaptation of the given scenario. Write the derivative of the general area model in terms of a given amount of fencing,  $K$ .

A metal box (WITHOUT A TOP) is to be constructed from a square sheet of metal that is 60 cm on a side by cutting square pieces of the same size from the corners of the sheet and then folding up the sides. Find the dimensions of the box with the largest volume that can be constructed in this manner

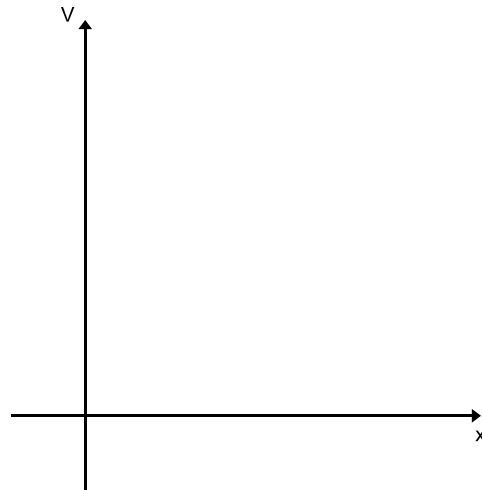
10. Draw a related figure labelling the important features.

11. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_ height = \_\_\_\_\_

12. What is the volume model in terms of a single variable and the given available material?

13. Sketch a graph of the volume model where the volume is FEASIBLE. Label important features of the graph with a point

14. What are the EXACT dimensions of the rectangular box that maximize the volume of the box?



15. SHOW THE CALCULUS that supports your answer in part 14

16. Adaptation of the given scenario. Write the general volume model in terms of a given square of material was R cm. on a side.

17. Adaptation of the given scenario. Write the derivative of the general volume model in terms of a given square of material was R cm. on a side.

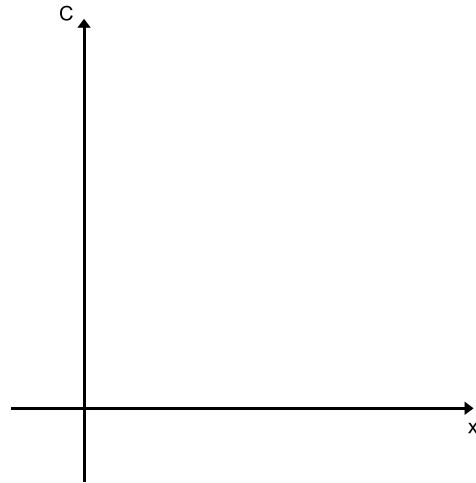
A rectangular container with open top is required to have a volume of 36 cubic meters. Also, one side of the rectangular base is required to be 8 meters long. If material for the base costs \$20 per square meter, and material for the sides costs \$8 per square meter, find the dimensions of the container so that the cost of material to make it be a minimum.

18. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_ height = \_\_\_\_\_

19. What is the cost model in terms of a single variable and the given constraints?

20. Sketch a graph of the cost model where the cost is FEASIBLE. Label important features of the graph with a point

21. What are the EXACT dimensions of the rectangular box that minimize the cost of the box?



22. SHOW THE CALCULUS that supports your answer in part 21

23. Adaptation of the given scenario. Write the general cost model in terms of a given volume was  $M$  and one of the required sides of the base needed to be  $N$  and the cost of the base material is  $B$  per square meter and the cost of the material for the sides was  $S$

24. Adaptation of the given scenario. Write the derivative of the general cost model in terms of a given volume was  $M$  and one of the required sides of the base needed to be  $N$  and the cost of the base material is  $B$  per square meter and the cost of the material for the sides was  $S$

Name \_\_\_\_\_ Group Quiz Rectangle Related Optimization

A farmer has 900 yards of fencing and wishes to fence three sides of a rectangular field (the fourth side is along an existing stone wall that is 2100 yards long, and needs no additional fencing). Find the dimensions of the rectangular field of largest area that can be fenced.

1. Draw a related figure labelling the important features.
2. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_
3. There is an additional piece of information that is important, but will not impact this scenario at all in the given information. What is the extra or EXTRANEIOUS piece of information?
4. What is the area model in terms of a single variable and the given available fencing?
5. Sketch a graph of the area model where the area is FEASIBLE. Label important features of the graph with a point
6. What are the EXACT dimensions of the rectangular pen that maximize the area of the rectangular field?
7. SHOW THE CALCULUS that supports your answer in part 6
8. Adaptation of the given scenario. Write the general area model in terms of a given amount of fencing,  $Q$ .
9. Adaptation of the given scenario. Write the derivative of the general area model in terms of a given amount of fencing,  $Q$ .

A metal box (WITHOUT A TOP) is to be constructed from a square sheet of metal that is 80 cm on a side by cutting square pieces of the same size from the corners of the sheet and then folding up the sides. Find the dimensions of the box with the largest volume that can be constructed in this manner

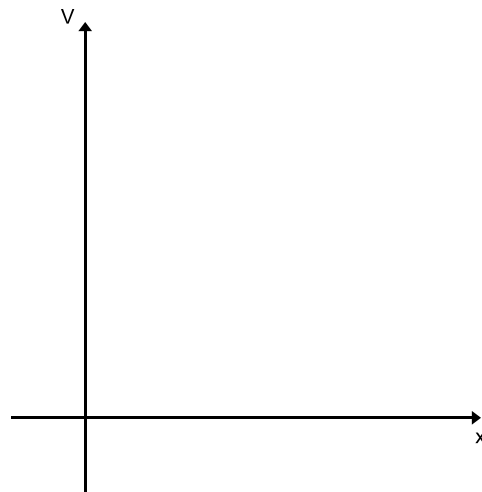
10. Draw a related figure labelling the important features.

11. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_ height = \_\_\_\_\_

12. What is the volume model in terms of a single variable and the given available material?

13. Sketch a graph of the volume model where the volume is FEASIBLE. Label important features of the graph with a point

14. What are the EXACT dimensions of the rectangular box that maximize the volume of the box?



15. SHOW THE CALCULUS that supports your answer in part 14

16. Adaptation of the given scenario. Write the general volume model in terms of a given square of material was T cm. on a side.

17. Adaptation of the given scenario. Write the derivative of the general volume model in terms of a given square of material was T cm. on a side.



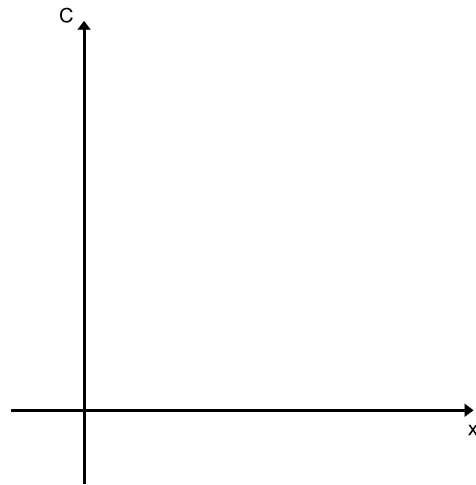
A rectangular container with open top is required to have a volume of 48 cubic meters. Also, one side of the rectangular base is required to be 9 meters long. If material for the base costs \$8 per square meter, and material for the sides costs \$15 per square meter, find the dimensions of the container so that the cost of material to make it be a minimum.

18. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_ height = \_\_\_\_\_

19. What is the cost model in terms of a single variable and the given constraints?

20. Sketch a graph of the cost model where the cost is FEASIBLE. Label important features of the graph with a point

21. What are the EXACT dimensions of the rectangular box that minimize the cost of the box?



22. SHOW THE CALCULUS that supports your answer in part 21

23. Adaptation of the given scenario. Write the general cost model in terms of a given volume was  $M$  and one of the required sides of the base needed to be  $N$  and the cost of the base material is  $B$  per square meter and the cost of the material for the sides was  $S$

24. Adaptation of the given scenario. Write the derivative of the general cost model in terms of a given volume was  $M$  and one of the required sides of the base needed to be  $N$  and the cost of the base material is  $B$  per square meter and the cost of the material for the sides was  $S$

Name \_\_\_\_\_ Group Quiz Rectangle Related Optimization

A farmer has 800 yards of fencing and wishes to fence three sides of a rectangular field (the fourth side is along an existing stone wall that is 2500 yards long, and needs no additional fencing). Find the dimensions of the rectangular field of largest area that can be fenced.

1. Draw a related figure labelling the important features.
2. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_
3. There is an additional piece of information that is important, but will not impact this scenario at all in the given information. What is the extra or EXTRANEIOUS piece of information?
4. What is the area model in terms of a single variable and the given available fencing?
5. Sketch a graph of the area model where the area is FEASIBLE. Label important features of the graph with a point
6. What are the EXACT dimensions of the rectangular pen that maximize the area of the rectangular field?
7. SHOW THE CALCULUS that supports your answer in part 6
8. Adaptation of the given scenario. Write the general area model in terms of a given amount of fencing,  $G$ .
9. Adaptation of the given scenario. Write the derivative of the general area model in terms of a given amount of fencing,  $G$ .

A metal box (WITHOUT A TOP) is to be constructed from a square sheet of metal that is 90 cm on a side by cutting square pieces of the same size from the corners of the sheet and then folding up the sides. Find the dimensions of the box with the largest volume that can be constructed in this manner

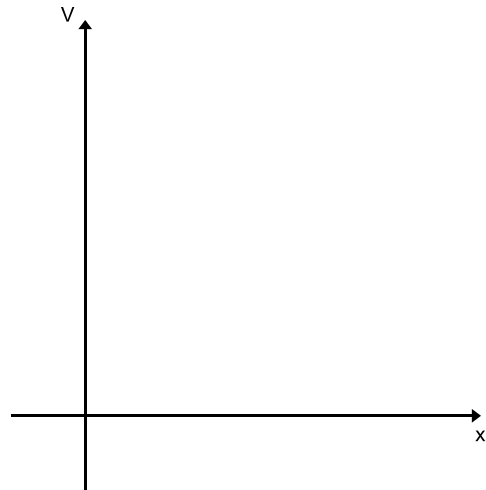
10. Draw a related figure labelling the important features.

11. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_ height = \_\_\_\_\_

12. What is the volume model in terms of a single variable and the given available material?

13. Sketch a graph of the volume model where the volume is FEASIBLE. Label important features of the graph with a point

14. What are the EXACT dimensions of the rectangular box that maximize the volume of the box?



15. SHOW THE CALCULUS that supports your answer in part 14

16. Adaptation of the given scenario. Write the general volume model in terms of a given square of material was B cm. on a side.

17. Adaptation of the given scenario. Write the derivative of the general volume model in terms of a given square of material was B cm. on a side.

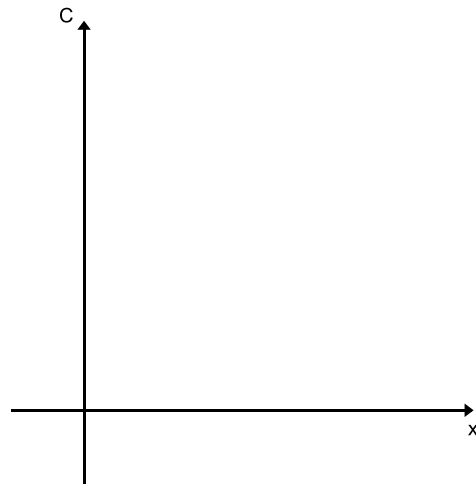
A rectangular container with open top is required to have a volume of 36 cubic meters. Also, one side of the rectangular base is required to be 8 meters long. If material for the base costs \$20 per square meter, and material for the sides costs \$8 per square meter, find the dimensions of the container so that the cost of material to make it be a minimum.

18. Define your variables width = \_\_\_\_\_ length = \_\_\_\_\_ height = \_\_\_\_\_

19. What is the cost model in terms of a single variable and the given constraints?

20. Sketch a graph of the cost model where the cost is FEASIBLE. Label important features of the graph with a point

21. What are the EXACT dimensions of the rectangular box that minimize the cost of the box?



22. SHOW THE CALCULUS that supports your answer in part 21

23. Adaptation of the given scenario. Write the general cost model in terms of a given volume was  $M$  and one of the required sides of the base needed to be  $N$  and the cost of the base material is  $B$  per square meter and the cost of the material for the sides was  $S$

24. Adaptation of the given scenario. Write the derivative of the general cost model in terms of a given volume was  $M$  and one of the required sides of the base needed to be  $N$  and the cost of the base material is  $B$  per square meter and the cost of the material for the sides was  $S$