

Okanagan University College  
Math 112(71 & 72), Fall 1999  
Term Test One

Instructor: Clint Lee

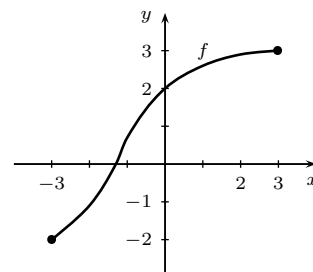
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Student Name: \_\_\_\_\_

Total Marks: \_\_\_\_\_  
40

**Instructions.** Do all parts of all 7 questions. Show all work and give explanations where required. You may receive part marks for a question if your work is correct even if the final answer is incorrect. However, if your answer is incorrect and no work or explanation is given, you will receive no marks. The number of points for each question is given in the left margin, total 40.

1. The graph of the function  $f$  is shown.



[2] (a) Give the domain and range of  $f$ .

[1] (b) Explain why  $f$  is one-to-one.

[2] (c) Give the domain and range of  $f^{-1}$ .

[1] (d) Estimate  $f(2)$ .

[1] (e) Estimate  $f^{-1}(2)$ .

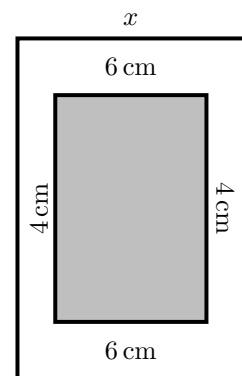
2. Let  $f(x) = x + \frac{1}{x}$ . Find and simplify

[2] (a)  $f(1+h)$

[2] (b)  $f(1+h) - f(1)$

[2] (c)  $\frac{f(1+h) - f(1)}{h}$  for  $h \neq 0$ .

- [4] 3. The top and bottom margins of a poster are each 6 cm and the side margins are each 4 cm. The area of the printed material on the poster is fixed at  $384 \text{ cm}^2$ . Express the total area of the poster as a function of its overall width  $x$ .

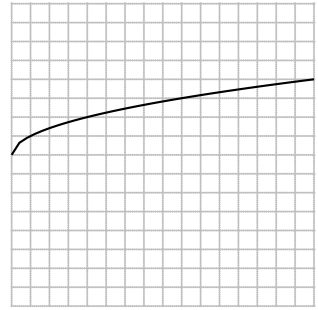


4. The manager of a tree planting operation finds that when she has 10 planters 1000 trees get planted in a day, and when she has 22 planters 2500 trees get planted.
- [3] (a) Assuming that the relationship between the number of tree planters,  $x$ , and the number of trees planted per day,  $y$ , is linear, find  $y$  as a function of  $x$ .
- [2] (b) What is the slope of the graph of the linear function in part (a)? What does this slope represent? Give its units.
- [2] (c) What is the  $x$ -intercept of the graph of the function in part (a)? Why isn't it zero?

- [4] 5. The graph of  $y = \sqrt{x}$  is shown. Use appropriate transformations to sketch the graph of

$$y = 2 - 3\sqrt{x-1}.$$

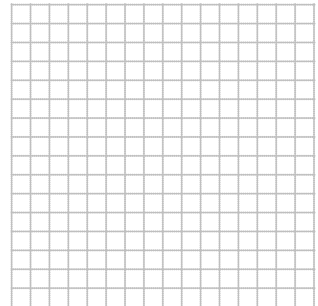
Describe each transformation and be sure to specify the order in which they must be applied.



6. Let  $f(x) = \frac{e^x}{e^x + 1}$ .

- [3] (a) Sketch the graph of  $f$  and give its domain and range.

- [3] (b) Find a formula for  $f^{-1}(x)$  and give its domain and range.



7. A bacterial population increases by 20% every hour. There are initially 1000 organisms.

- [3] (a) Express the number of organisms in the form  $P = P_0 e^{kt}$  where  $t$  is the time in hours since the population started to grow.

- [1] (b) Find the population after ten hours.

- [2] (c) Find the time it takes for the population to double.