
Your Name (print clearly)

Monday, November 2

Page	Total Points	Score
1	15	
2	18	
3	20	
4	15	
5	20	
6	12	
extra credit	5	
Total	100	

Instructions and information:

- Please turn off cell phones or any other thing that will go BEEP.
- Calculators are **not** allowed on this test.
- Read the directions for each problem. You must always show your work to receive partial credit.
- Be wary of doing computations in your head. Instead, write out your computations on the exam paper.
- If you need more room, use the backs of the pages and indicate to the grader where to look.
- Raise your hand (or come up to the front) if you have a question.

$$\begin{aligned}n(t) &= n_0 2^{t/a} \\m(t) &= m_0 2^{-t/h} \\A(t) &= P\left(1 + \frac{r}{n}\right)^{nt} \\\log_b x &= (\log_a x)/(\log_a b)\end{aligned}$$

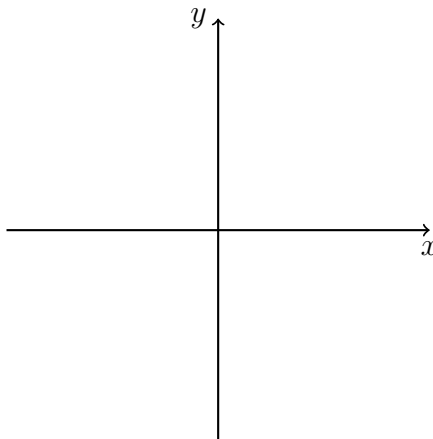
Formulas

$$\begin{aligned}n(t) &= n_0 e^{rt} \\m(t) &= m_0 e^{rt} \text{ where } r = (\ln 2)/h, \\A(t) &= P e^{rt}\end{aligned}$$

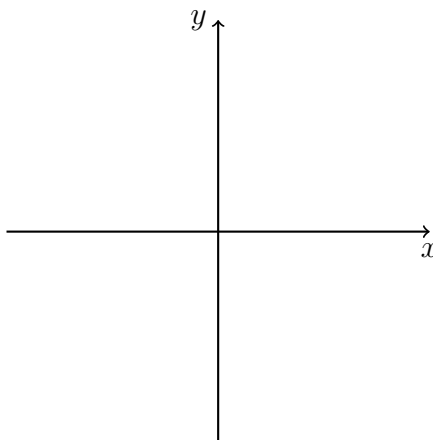
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1. The owner of a toy factory estimates that it costs \$1300 to produce 100 toys in one day and \$1900 to produce 300 toys in one day.
 - (a) (3 points) Assuming that the relationship between cost and the number of toys produced is linear, find a linear function C that models the cost of producing x toys in one day.
 - (b) (2 points) At what rate does the factory's cost increase for every additional toy produced?
 2. (5 points each) Let $f(x) = \sqrt{16 - x^2}$ and $g(x) = \sqrt{x + 2}$.
 - (a) Find f/g and state its domain.
 - (b) Find $f \circ g$ and state its domain.

3. (6 points each) Sketch the graphs below. Label any asymptotes and intercepts.

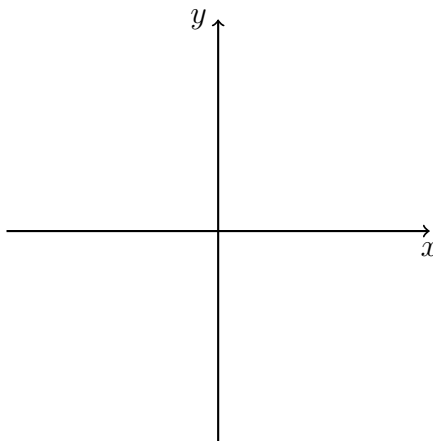
(a) $f(x) = 2 - \sqrt[3]{x}$



(b) $f(x) = \frac{-3}{(x-5)^2}$



(c) $f(x) = |x^2 - 1|$



4. (5 points) Find the inverse of $h(x) = \frac{(2-x^3)^5}{7}$.

5. Let $g(x) = 5x^2 - 15x + 2$.

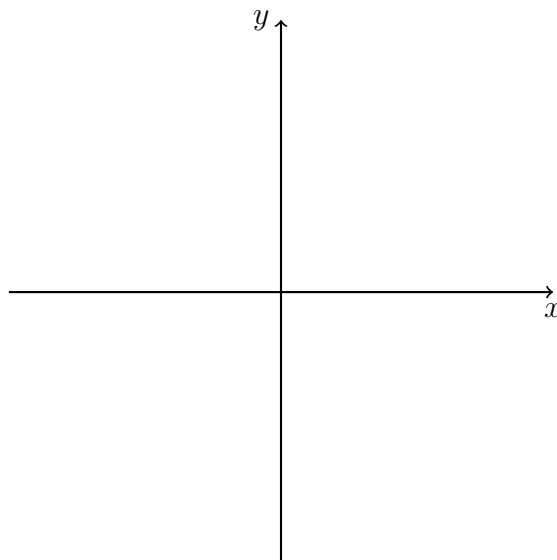
(a) (6 points) Express g in standard form.

(b) (2 points) Find the vertex of the graph of g .

(c) (2 points) Determine the range of g .

6. (5 points)

Sketch the graph of $P(x) = -(x+4)^2(x-1)^3$ on the axes. Make sure you label all intercepts and exhibits proper end behavior.



7. (5 points) Find the quotient, $Q(x)$, and remainder $R(x)$, of $\frac{6x^2-17x+7}{2x-3}$.

8. (5 points) Let $r(x) = \frac{x^2-25}{3x^2+17x+10} = \frac{(x-5)(x+5)}{(3x+2)(x+5)}$

(a) Find any horizontal asymptotes or state that none exist.

(b) Find any vertical asymptotes or state that none exist.

9. (5 points) Solve the rational inequality $\frac{6x-7}{5x-2} \geq 1$. Give your answer in interval notation.

10. (5 points) Expand $\log_2 x \sqrt{\frac{y}{z}}$ using the Laws of Logarithms.

11. (5 points each) Solve.

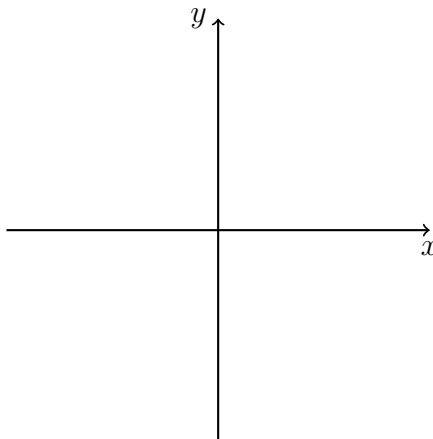
(a) $10^{1-x} = 6$

(b) $\log_6 x + \log_6(x+1) = 1$

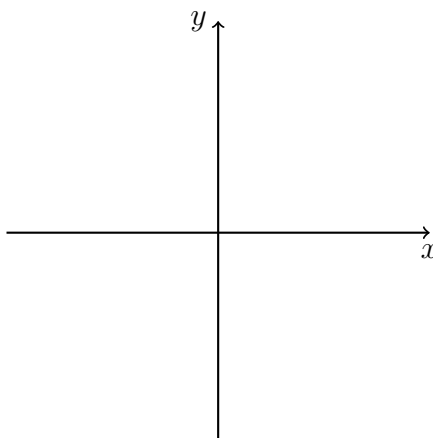
(c) $e^{2x} + e^x - 20 = 0$

12. (6 points each) Sketch the graphs below. Label any asymptotes and intercepts.

(a) $h(x) = 4 - 2^{x-1}$



(b) $f(x) = 1 + \ln(-x)$



EXTRA CREDIT (5 points) A certain population of fish has a relative growth rate of 2.5% per year. How long will it take for the population to double? (Yes. You do have enough information to complete this problem.)