Your Name (print clearly)

Monday, October 5

| Page | Total Points | Score |
|---|---|---|
| 1 | 20 | |
| 2 | 20 | |
| 3 | 15 | |
| 4 | 20 | |
| 5 | 10 | |
| 6 | 15 | |
| 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.

1. (5 points) Simplify the expression below and and eliminate any negative exponents.

$$t^2 \left( \frac{9r^{-1}t^6}{rt^2} \right)^{-2}$$

Answer:_____

2. (5 points) Multiply and simplify $x^{3/4}(2x^{1/4} - 1/\sqrt[4]{x})$.

Answer:_____

3. (5 points) Factor $1000 + 8y^3$.

Answer:_____

4. (5 points) Explain why the quadratic equation $6x^2 - 4x + 3 = 0$ has no solutions.

5. (5 points) Factor the expression $x(x+1)^{5/2} - x^2(x+1)^{3/2}$ completely by factoring out the lowest power of each common factor.

Answer:_____

6. (5 points) Simplify the compound fraction $\frac{\frac{10}{y}+2}{\frac{x}{y}+\frac{y}{x}}$

Answer:_____

7. (5 points) Simplify the rational expression $\frac{2x^2-9x+4}{x^2-x-12}$

Answer:_____

8. (5 points) Find all real solutions of $2x^2 - 3x - 1 = 0$ by completing the square.

Answer:_____

9. (5 points) An electrician and his assistant work together to replace the wiring in an old garage. The electrician charges \$50 per hour for his own labor and \$30 per hour for his assistant's labor. If the electrician works twice as long as his assistant on this job and the final bill has a labor charge of \$520, how long did the electrician and his assistant work on this job?

Electrician:_____

Assistant:_____

10. (5 points) Find all real solutions of $x^{2/3} + 4x^{1/3} + 4 = 0$.

Answer:_____

11. (5 points) Find the domain of the function $f(x) = \sqrt{(x-5)(x-3)}$.

Answer:_____

12. (5 points each) Solve the inequalities below. Express your solutions using interval notation.

(a) $|2x + 1| + 3 > 5$.

Answer:_____

(b) $\frac{2x+1}{x} > 1$.

Answer:_____

13. (4 points) Write an equation for a circle with center $(2, -5)$ and radius 3.

Answer:_____

14. (6 points) Write an equation of a line through $(7, -3)$ perpendicular to the line $5x - 10y = 14$ and find the $y$-intercept of this line.

Line:_____

$y$-intercept:_____

15. (3 points each) Use $g(x) = x + \frac{1}{x}$ to find the expressions below. You do NOT need to simplify your answers.

(a) $g(x + 2)$

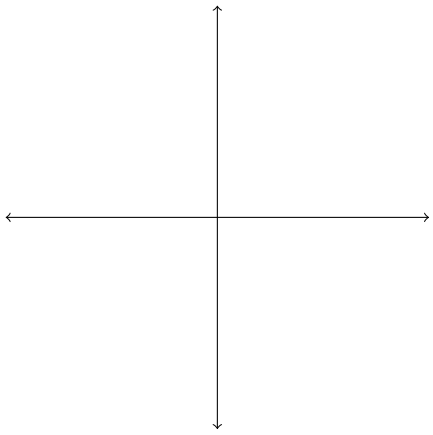
Answer:_____

(b) $g(3x) + 1$

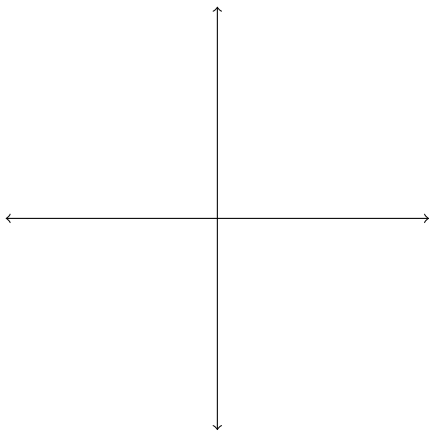
Answer:_____

16. (4 points each) Sketch the graphs of the functions below. You do not have to make a table but you must plot at least two points on the graph.

(a) $y = x^2$



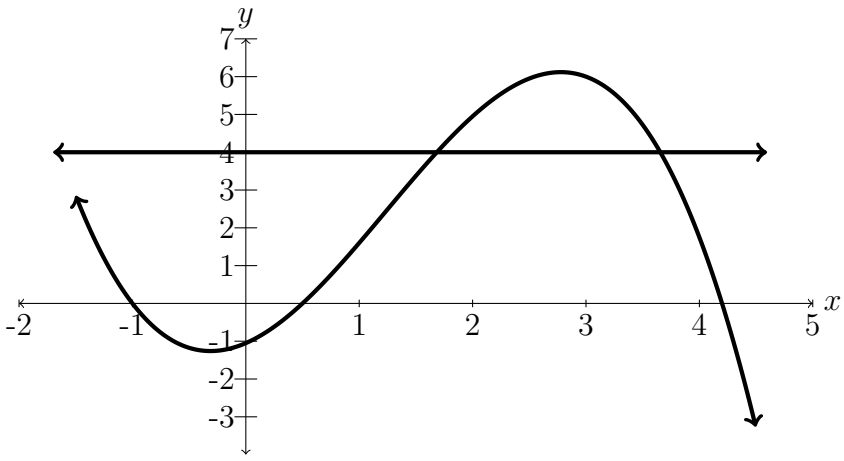
(b) $y = \sqrt[3]{x}$



17. (5 points) Find the average rate of change of the function $f(x) = 3 - 2x$ from $x = a$ to $x = a + h$.

Answer:_____

18. (10 points) Below is graphed the function $f(x) = \frac{-1}{2}x^3 + 1.85x^2 + 1.3x - 1.05$ and the line $y = 4$. Use the graphs to answer questions (a) through (e).




(a) Estimate $f(2)$. Answer:_____

(b) Estimate the $x$-intercepts of $f(x)$. Answer:_____

(c) Estimate the $y$-intercepts of $f(x)$. Answer:_____

(d) Find solutions to the inequality $\frac{-1}{2}x^3 + 1.85x^2 + 1.3x - 1.05 \geq 0$. Answer:_____

(e) Estimate all **positive** solutions to the equation $\frac{-1}{2}x^3 + 1.85x^2 + 1.3x - 1.05 = 4$. Answer:_____