F1310501

MAT 1050 GROUP FINAL EXAM – FALL 2013

SHOW ALL WORK. DO NOT USE A CALCULATOR.

1. (7 pts.) Simplify by adding (or subtracting) like terms wherever possible:

$$3 \cdot 7^x + 3^x - 7^x + 3^y - \pi \cdot 3^x$$

2. (7 pts.) Simplify completely: $\sqrt[4]{2x^{-3}y} \cdot \sqrt[4]{8x^{-5}y^3z^0}$

3. (7 pts.) Multiply and simplify: $\left(\sqrt{18} + \sqrt{50}\right)^2$

4. (7 pts.) Simplify completely: $\dfrac{8^{-\frac{1}{3}} + 16^{-\frac{1}{2}}}{8^{-\frac{2}{3}} - 16^{-\frac{3}{2}}}$

5. (6 pts.) Let $f(x) = |2x - 3|$ and $g(x) = |-7 + 2x|$. Find all x for which $f(x) = g(x)$.

6. (6 pts.) Solve: $-2\left|\frac{4x-2}{2}\right| < -4$

7. (7 pts.) Jasmine cashes out her drawer at the end of her shift and finds she has \$165 in \$5 and \$10 bills. If the total number of bills is 21, how many of each type of bill does Jasmine have?

8. (7 pts.) Solve for b: $3a + \frac{a}{b} = \frac{1}{c}$

9. (6 pts.) Let g be the function given by $g(x) = \frac{2x^3}{3} - \sqrt{x+1}$.
   What is the domain of g?

10. (6 pts.) Let h be the function given by $h(x) = \frac{\sqrt{x-1}}{x^2+1}$
    a) Find and simplify $h(5)$.
    b) Find and simplify $h(a+1)$.

11. (7 pts.) Let f be the function given by $f(x) = x^2 - 7x$.
    Find and simplify $\frac{f(a+h)-f(a)}{h}$.

12. (6 pts.) Find the equation of the line that has x-intercept (2,0) and y-intercept (0,4).

13. (6 pts.) Find the equation of the line that is perpendicular to the y-axis and passes through the point $(-\sqrt{2}, \sqrt{2})$.

14. (7 pts.) The sum of the two numbers is 10 and the sum of their squares is 58. Find the numbers.

15. (7 pts.) Solve, writing any non-real solutions in the form $a + bi$:
    $\frac{x^2}{2} = 5x - 17$

16. (7 pts.) Graph, labeling the vertex and all x or y intercepts:
    $f(x) = 2x^2 + 4x + 5$

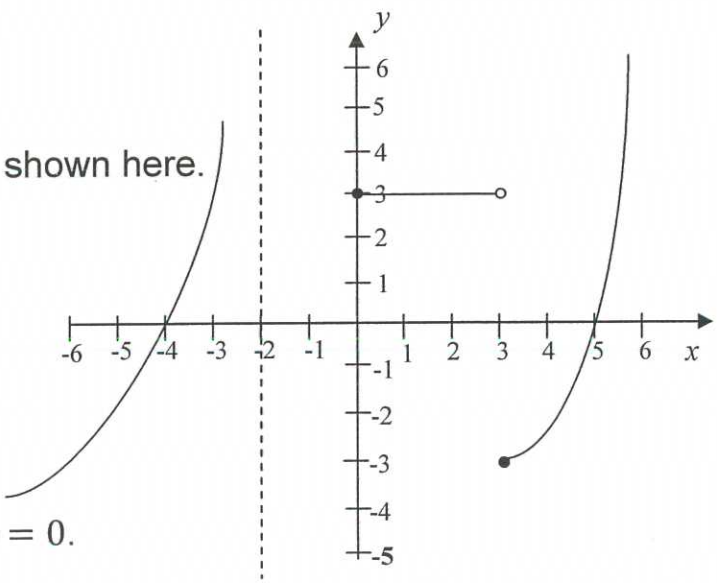
17. (7 pts.) Simplify completely: $1 - \frac{x}{x+3} - \frac{7x}{x^2-x-12}$

18. (7 pts.) Solve: $\sqrt{2x+6} - x = -1$

19. (7 pts.) Solve: $x^3 \leq 4x$

20. (7 pts.) Solve: $\frac{5-x}{x} \geq -\frac{4}{x}$

21. (7 pts.) The graph of a function, f, is shown here.



a) What is the domain of f?

b) What is the range of f?

c) What is $f(3)$?

d) Find all numbers, x, such that $f(x) = 0$.

22. (7 pts.) Solve: $y^{\frac{2}{3}} = 4y^{\frac{1}{3}} + 5$

23. (6 pts.) Find: **a)** $log_{49}(7)$ **b)** $log_{\frac{1}{16}}(2)$ **c)** $log_4(64)$

24. (6 pts.) Given the approximate values $log_3(2) = 0.6$ and $log_3(5) = 1.5$ find:

a) $log_3(10)$ **b)** $log_3(16)$ **c)** $log_3\left(\frac{2}{3}\right)$

25. (7 pts.) Solve: $log_3(1 - 2x) = log_3(2 - 3x)$

26. (7 pts.) Divide, clearly stating the quotient and remainder:

$(4x^3 - 5x + 3) \div (2x + 1)$

27. (7 pts.) Arrange the following numbers in order from smallest to largest:

$\tan(2\pi)$ $\cos(2)$ $\sin(2)$ $-log_3(5)$

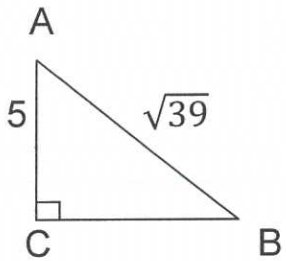
28. (6 pts.) **a)** Convert $5°$ to radians.

b) Convert $\frac{\pi}{12}$ radians to degrees.

29. (6 pts.) In the right triangle shown here, find:

a.) $\cos(< A)$

b.) $\tan(< B)$



30. (7 pts.) A 3 mile boat race takes place in Detroit every summer. The current in the river is 4mph. What is the speed of the boat in still water, if the total time upstream and downstream is 1 hour?