W1410501

MAT 1050 GROUP FINAL EXAM – Winter 2014

SHOW ALL WORK. DO NOT USE A CALCULATOR.

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

$$2\pi x^{\frac{1}{2}} - 11x^{\frac{2}{3}} - x^{\frac{1}{2}} + x^{\frac{3}{2}} + x^{\frac{2}{3}}$$

2. (7 pts.) Simplify completely: $(-3a^{-3}b^4c^0)^2 \left(\frac{a^5}{b^{-2}}\right)$

3. (7 pts.) Multiply and simplify: $\sqrt[3]{2}\,(\sqrt[3]{4} - 2\sqrt[3]{32})$

4. (7 pts.) Simplify completely: $(27^{-\frac{2}{3}} - 27^{-\frac{1}{3}})^{-1}$

5. (6 pts.) Solve: $3 - 2\left|\frac{x-1}{2}\right| \leq 2$

6. (6 pts.) Solve: $-|2x + 1| - 5 < -2$

7. (7 pts.)The perimeter of a triangular garden is 39 feet. The length of the sides of the triangle are consecutive odd integers. Find the length of each side.

8. (7 pts.) Solve for b: $\frac{ac-b}{ab} + 1 = \frac{1}{b}$

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

10. (6 pts.) Let f be the function given by $f(x) = \frac{\sqrt[3]{x-4}}{-2x}$.
    a) Find and simplify $f(3)$.
    b) Find and simplify $f(4 + b)$.

11. (7 pts.) Let f be the function given by $f(x) = x^2 - 3x + 2$.
    Find and simplify $\frac{f(x+h)-f(x)}{h}$.

12. (6 pts.) Find the equation of the line that is perpendicular to the line $4x + 3y = 6$ and passes through the point $(1, -1)$.

13. (6 pts.) Find the equation of the line with undefined slope that passes through the point $(\sqrt{2}, \sqrt{3})$.

14. (7 pts.) A rectangle has a diagonal measuring $\sqrt{146}$ cm. The length of the rectangle is 6 cm. more than the width of the rectangle. Find the length and the width.

15. (7 pts.) Given that $f(x) = \frac{x^2}{3}$ and $g(x) = 2x - 4$, find all x for which $f(x) = g(x)$.

16. (7 pts.) Graph, labeling the vertex and all x or y intercepts:

$$f(x) = -x^2 - 4x - 3$$

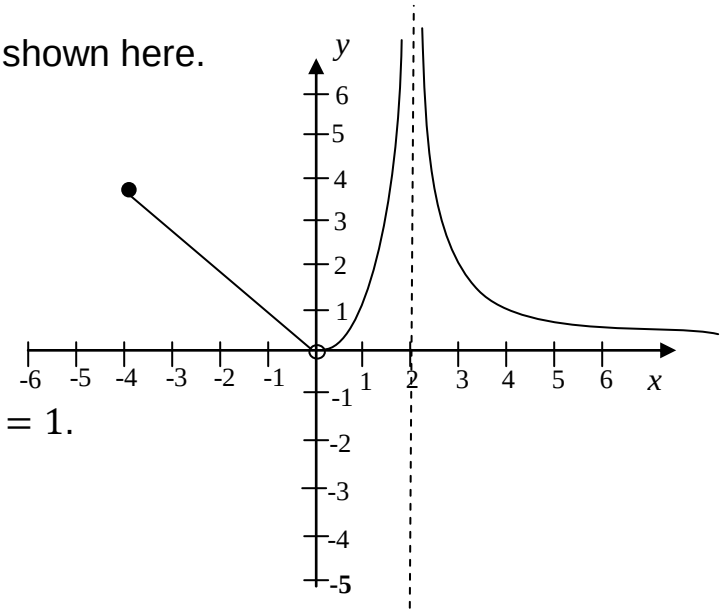
17. (7 pts.) Simplify completely: $\dfrac{x - \frac{9}{x}}{\frac{x}{x-2} - \frac{3}{2-x}}$

18. (7 pts.) Solve: $\sqrt{t+7} + 2 = \sqrt{3-t}$

19. (7 pts.) Solve: $-3x^2 + 8x < 0$

20. (7 pts.) Solve: $\frac{2x}{x-2} \geq 4$

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 $f(x) = 1$.

22. (7 pts.) Solve: $(x^2-7)^2-3(x^2-7)+2=0$

23. (6 pts.) Find: **a)** $\log_{\frac{1}{3}}(9)$ **b)** $\log_2(32)$ **c)** $\log_{27}\left(\frac{1}{3}\right)$

24. (6 pts.) Given the approximate values $\log_3(2)=0.6$ and $\log_3(7)=1.8$ find:

a) $\log_3(14)$ **b)** $\log_3(8)$ **c)** $\log_3\left(\frac{3}{7}\right)$

25. (7 pts.) Solve: $\log_3(1-\mathrm{x})=1+\log_3(\mathrm{x}+11)$

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

$(-x^3-x^2-8)\div(x-2)$

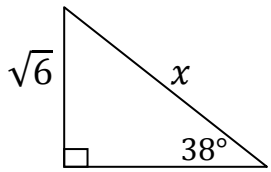
27. (7 pts.) Arrange the following numbers in order from smallest to largest:

$\cos(6.3)$ $\sin(6.3)$ $\frac{\pi}{3}$ $\log_2\left(\frac{1}{5}\right)$

28. (6 pts.) **a)** Convert -3 radians to degrees.

b) Convert $\frac{7\pi}{9}$ radians to degrees.

29. (6 pts.) In the right triangle shown here, find an exact value for x.



30. (7 pts.) A boat can travel 8 miles upstream in the same time it takes to travel 11 miles downstream. If the current is 3 miles per hour, find the rate of the boat in still water.