W1710501

MAT 1050 GROUP FINAL EXAM – Winter 2017

SHOW ALL WORK. DO NOT USE A CALCULATOR.

1. (8 pts.) Simplify by adding (or subtracting) like terms wherever possible:

$$5m^x + \sqrt{7}\,m^2 - 5y^x - \pi m^2 + y^x - 3y^x$$

2. (8 pts.) Simplify completely: $\left(\dfrac{\sqrt[3]{81x^{-2}y^3z^0}}{\sqrt[3]{3x^4y^6}}\right)^{-1}$

3. (8 pts.) Multiply and simplify completely: $\left(\sqrt{28}+\sqrt{12}\right)\left(3\sqrt{7}-3\sqrt{3}\right)$

4. (8 pts.) Simplify completely: $\dfrac{8^0 - 16^{-\frac{3}{4}}}{8^{\frac{1}{3}} + 16^{-\frac{3}{4}}}$

5. (9 pts.) Solve: $5+|8-2x| \le -5$

6. (8 pts.) In his college career, Joe has taken a combined total of 28 three-credit and four-credit classes, and he has earned 94 credits. How many of the 28 were three-credit classes, and how many were four-credit classes?

7. (8 pts.) Solve for c: $b = \dfrac{ac}{1+c}$

8. (8 pts.) Let f be the function given by $f(x) = \dfrac{x+1}{\sqrt{5-x}}$.

   What is the domain of f ?

9. (9 pts.) Let g be the function given by $g(x) = \dfrac{10}{\sqrt{x}} - \sqrt{2x-1}$.

   Find and simplify $g(1) - 3g(25)$.

10. (8 pts.) Let f be the function given by $f(x) = 5x - x^2$.

    Find and simplify $\dfrac{f(x+h) - f(x)}{h}$.

11. (8 pts.) Find the equation of the line that is perpendicular to the line $2x + 4y = 9$ and passes through the point $(5,0)$.

12. (9 pts.) The length of a rectangle is 3 feet more than its width. The diagonal of the rectangle is exactly $\sqrt{17}$ feet. Find the perimeter of the rectangle.

13. (8 pts.) Solve, writing any non-real solutions in the form $a+bi$: $5x(x+1) = x-1$

14. (8 pts.) Graph, labeling the vertex and all x and y intercepts: $h(x) = 9 - 8x - x^2$

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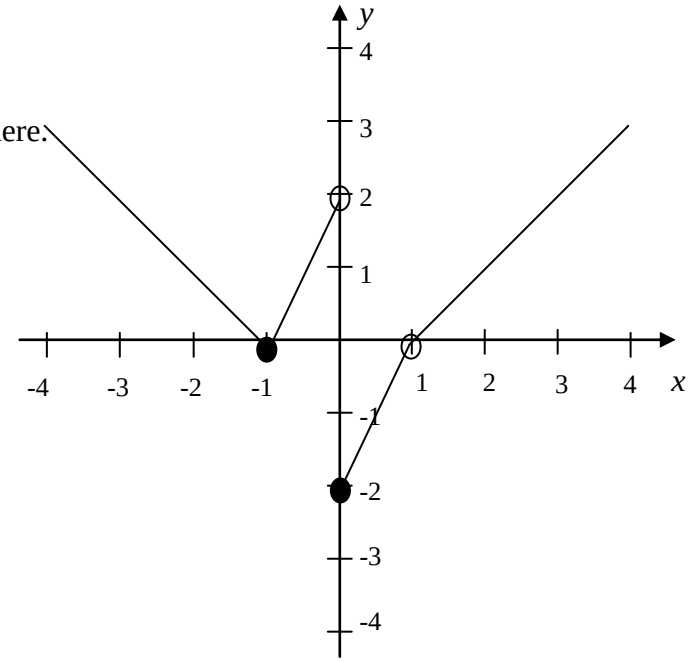
15. (8 pts.) Simplify completely: $\dfrac{\dfrac{2}{x}-\dfrac{2}{2-x}}{\dfrac{2x-2}{x-2}}$

16. (8 pts.) Solve: $\sqrt[4]{2x+3}-5=-2$

17. (9 pts.) Solve: $\dfrac{x}{x+1}\geq\dfrac{9}{x+1}$

18. (8 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) Find all x such that $f(x)=2$.

d) What is $f(0)$?

19. (9 pts.) Solve: $|x-7|^2-|x-7|-20=0$

20. (9 pts.) Find: a) $\log_8\left(\dfrac{1}{64}\right)$ b) $\log_3(81)$ c) $\log_4\left(\sqrt{2}\right)$

21. (8 pts.) Solve: $\log_4(x+2)+\log_4(x-7)=\log_4(10)$

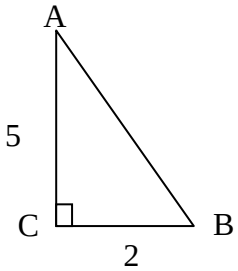
22. (8 pts.) Arrange the following numbers in order from smallest to largest:

$\tan(\pi)$ $\sin(3)$ $-\dfrac{\pi}{3}$ $\cos(3)$

23. (9 pts.) For the right triangle shown here, find:

a) $\cos(<A)$

b) $\tan(<B)$



24. (9 pts.) Martina's boat travels at a rate of 10 mph in still water. If the boat travels 35 mi downstream in the same time it takes to travel 15 mi upstream, what is the speed of the current?