W1610501

MAT 1050 GROUP FINAL EXAM - Winter 2016

SHOW ALL WORK. DO NOT USE A CALCULATOR.

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

$$\frac{3}{5}abc + 5a^2 - 2b - 2a^2 - 2^b - \frac{1}{15}abc$$

2. (7 pts.) Simplify completely: $\frac{(3x^2y^{-1}z^5)^{-1}}{-9x^{-2}y^0z^{-3}}$

3. (7 pts.) Multiply and simplify: $\sqrt[3]{5}\left(2\sqrt[3]{200} - \sqrt[3]{25}\right)$

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

5. (6 pts.) Let $f(x) = \left|\frac{1-3x}{2}\right|$. Find all x for which $f(x) \leq 3$

6. (6 pts.) Solve: $7 - |3x - 2| = 9$

7. (7 pts.) Mark is painting his house. The blue paint for the siding is $14 per gallon and the white paint for the trim is $12 per gallon. Altogether he bought 12 gallons and spent $160. How many of each did he buy?

8. (7 pts.) Solve for k: $\frac{k-7}{ak} = \frac{1}{m}$

9. (6 pts.) Let f be the function given by $f(x) = \frac{x+1}{x^2+5x-6}$.
   What is the domain of f?

10. (6 pts.) Let g be the function given by $g(x) = \sqrt{x+9} - 3$.
    Find and simplify $g(7) + [g(-5)]^2$.

11. (7 pts.) Let f be the function given by $f(x) = x^2 + x - 1$.
    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 $-2x - y = 3$ and passes through the point $(-3, -5)$.

13. (6 pts.) Find the equation of the line that is parallel to the line $y = -2$ and passes through the point $(3, -8)$

14. (7 pts.) A right triangle with hypotenuse $2\sqrt{5}$ inches has legs such that one is twice as long as the other. Find the lengths of the legs.

15. (7 pts.) Solve, writing all non-real solutions in the form $a + bi$:
$x^2 + 10 = 6x$

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

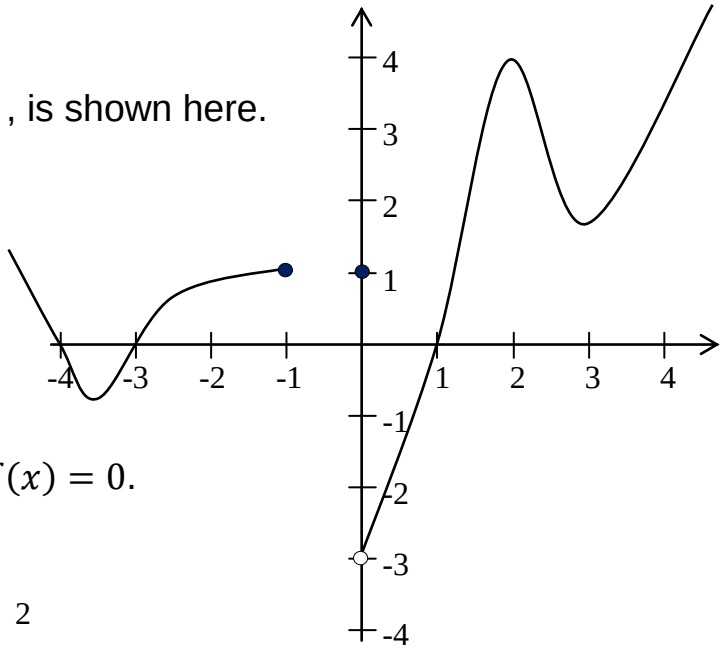
17. (7 pts.) Simplify completely: $\dfrac{\frac{x}{y} - y}{\frac{x}{y^2} - \frac{y^2}{x}}$

18. (7 pts.) Solve: $2 - \sqrt{8 - x} = x$

19. (7 pts.) Solve: $x^2(2 - x) \geq 0$

20. (7 pts.) Solve: $\dfrac{x^2}{x-1} < x$

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 $f(0)$?

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

22. (7 pts.) Solve: $2(x-2)^{\frac{1}{2}} + 3(x-2)^{\frac{1}{4}} - 2 = 0$

23. (6 pts.) Find: **a)** $\log_4(64)$ **b)** $\log_{25}(5)$ **c)** $\log_3\left(\frac{1}{27}\right)$

24. (6 pts.) Given the approximate values $\log_5(11) = 1.49$ and $\log_5(2) = 0.43$ find:

a) $\log_5(55)$ **b)** $\log_5(\frac{11}{2})$ **c)** $\log_5(16)$

25. (7 pts.) Solve: $\log_3(x-4) = 2 - \log_3(x+4)$

26. (7 pts.) Identify and sketch the curve given by: $(x-4)^2 + 9y^2 = 81$

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

$\tan(3\pi)$ $\cos(4)$ $\frac{\pi}{3}$ $\sin(3)$

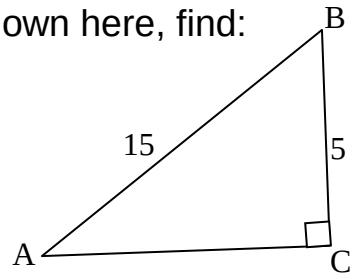
28. (6 pts.) **a)** Convert $\frac{\pi}{3}$ radians to degrees.

b) Convert $36°$ to radians

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

a) $\boldsymbol{tan}(< B)$

b) $\boldsymbol{sin}(< A)$



30. (7 pts.) On a typical day in the fall, the scenic riverboat tour travels 16 miles upstream against a 2 mph current. In the spring, the current runs 4 mph faster than in the fall, and the same upstream trip takes twice as long. What is the speed of the boat in still water?