F1610501

MAT 1050 GROUP FINAL EXAM – FALL 2016

SHOW ALL WORK. DO NOT USE A CALCULATOR.

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

$$\sqrt{3}\,x + 3x^{\frac{1}{2}} + x^{\frac{3}{2}} - 2x + y^{\frac{3}{2}} - x^{\frac{1}{2}}$$

2. (7 pts.) Simplify completely: $\sqrt[3]{\dfrac{-9b^8c^{-5}}{a^0b^{-2}}} \cdot \sqrt[3]{\dfrac{3a^{-6}b^2}{c}}$

3. (7 pts.) Simplify completely: $\left(5\sqrt{50} - 3\sqrt{200} + 3\sqrt{18}\right)^2$

4. (7 pts.) Simplify completely: $\left(\dfrac{25^0 - 25^{-\frac{1}{2}}}{25^{-\frac{1}{2}} - 25^{\frac{1}{2}}}\right)^{-2}$

5. (6 pts.) Let $f(x) = 13 - |2x+1|$. Find all x for which $f(x) \le 14$.

6. (6 pts.) Solve: $\left|\dfrac{3x-2}{5}\right| - 5 = -3$

7. (7 pts.) In a triangle, the measure of the second angle is 5 degrees less than three times the measure of the first. The measure of the third angle is 30 degrees more than the sum of the first two angles. Find the measure of each of the three angles.

8. (7 pts.) Solve for b: $\dfrac{1}{b} + \dfrac{2}{c} = \dfrac{a}{3}$

9. (6 pts.) Let f be the function given by $f(x) = \dfrac{x^2 - 2x - 3}{\sqrt[3]{x-3}}$.

   What is the domain of f?

10. (6 pts.) Let g be the function given by $g(x) = \dfrac{3-x}{x+5}$.

    Find and simplify $g(2) - \dfrac{1}{g(-3)}$.

11. (7 pts.) Let f be the function given by $f(x) = 5x^2 - 3$.

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

12. (6 pts.) Find the equation of the line that passes through the point $(-3,-4)$ and is parallel to the line that passes through the points $(-5,1)$ and $(7,-3)$.

13. (6 pts.) Find the equation of the line that is perpendicular to the line $x = -5$ and passes through the point $(1,\pi)$.

14. (7 pts.) Jay uses a 10-ft. board to make the corner of his backyard into a triangular garden. He places the board to hit both fences and form a right triangle with the board as the hypotenuse and one leg of the triangle twice as long as the other. Find the exact lengths of the two legs.

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

16. (7 pts.) Graph, labeling the vertex and all x and y intercepts: $f(x) = x^2 - 3x - 4$

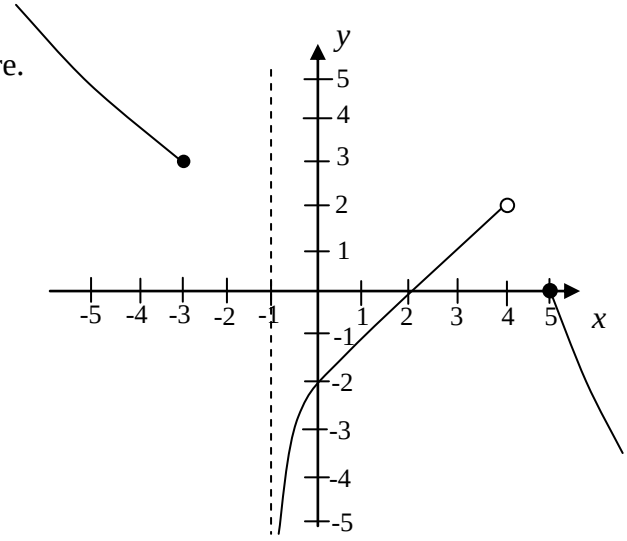
17. (7 pts.) Simplify completely: $(3-x)^{-1} + \dfrac{2x+10}{x^2+2x-15}$

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

19. (7 pts.) Solve: $x(2x-3)(x-5) \le 0$

20. (7 pts.) Solve: $\dfrac{(x-2)^2}{x+3} > 0$

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: $x^{\frac{2}{3}} - 2x^{\frac{1}{3}} = 8$

23. (6 pts.) Find: **a)** $\log_4\left(\frac{1}{64}\right)$ **b)** $\log_{\frac{1}{5}}\left(\frac{1}{25}\right)$ **c)** $\log_{27}(3)$

24. (6 pts.) Given the approximate values $\log_4(3) = 0.8$ and $\log_4(5) = 1.2$ find:

a) $\log_4(12)$ **b)** $\log_4(25)$ **c)** $\log_4\left(\frac{5}{3}\right)$

25. (7 pts.) Solve: $\log_4(9 - x^2) - \log_4(1 - x) = 1$

26. (7 pts.) Sketch the curve given by $x^2 - 9y^2 - 81 = 0$.

27. (7 pts.) Arrange the following numbers in order from smallest to largest:
$\cos(3)$ $\sin(3)$ $\log_5(6)$ $\tan(2\pi)$

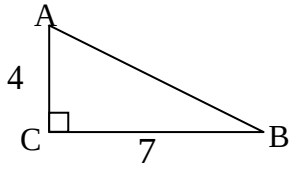
28. (6 pts.) **a)** Convert $-60\pi^\circ$ to radians.

b) Convert $\frac{4\pi}{9}$ radians to degrees.

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

a) $\sin(< A)$

b) $\tan(< B)$



30. (7 pts.) Leaving from the same starting line at the same time, Rami jogs along the riverbank at a constant speed, while Joe paddles a canoe at a constant speed in the river beside her. If Joe was in still water, his speed would be the same as Rami's, but Joe is paddling against a 1 mile per hour current. If Rami arrives at the end of her 20-mile jog 1 hour before Joe arrives at the same finish line how fast was Rami jogging?