

MATH 1050 GROUP FINAL EXAM – FALL 2018

SHOW ALL WORK. DO NOT USE A CALCULATOR.

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

$$4x^2y + \sqrt{3}x - 9x^2y - 2x + 4^x + 3^x + 3^x$$

2. (8 pts.) Simplify completely:

$$\left(\frac{x^2y^{-4}z^0}{x^{-1}y^2z^4}\right)^{-2} (x^3y^{-2})$$

3. (8 pts.) Simplify completely: $\left(\frac{8^{-\frac{2}{3}} + 1}{8^{-\frac{2}{3}}}\right)^3$

4. (8 pts.) Simplify completely:

$$(4\sqrt{5} - \sqrt{3})(2\sqrt{5} + \sqrt{3})$$

5. (8 pts.) Simplify completely: $\frac{1 + \frac{1}{x+3}}{\frac{x+4}{x^2-9}}$

6. (10 pts.) Let f be the function given by $f(x) = 3x^2 - x + 2$

a) (2 pts.) $f(-2)$

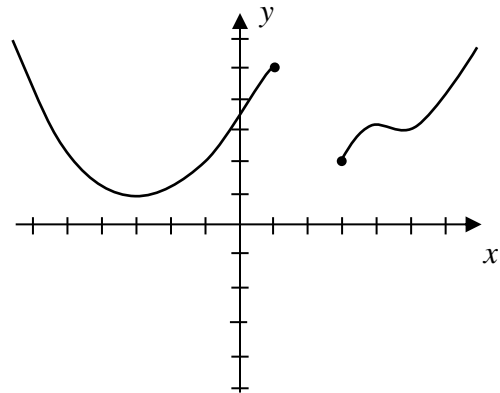
b) (8 pts.) $\frac{f(2)}{2} + 3f(0)$

7. (8 pts.) Let f be the function given by $f(x) = x^3 + \sqrt{2x+3}$. What is the domain of f ?

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

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

9. (12 pts.) The graph of a function, f , is shown here:



- What is the domain of f ?
- What is the range of f ?
- What is $f(-3)$?
- List all the numbers x such that $f(x) = 2$.

10. (8 pts.) Find the equation of the line that is parallel to the line $3x + 2y = 1$ and passes through the point $(2,1)$.

11. (8 pts.) Let $f(x) = 2x^2 - 8x + 6$. Graph f , labeling the vertex and all intercepts.

12. (8 pts.) Solve: $\sqrt{2x^2 + 2x} - x = 1$

13. (8 pts.) Solve for C : $A = \frac{B}{D} + \frac{D}{C}$

14. (8 pts.) A rectangular tablet is being designed so that the length is 9 inches. The diagonal is twice the width. What should the width be?

15. (8 pts.) Solve, writing any non-real solutions in the form $a+bi$: $x^2 + 2x = -2$

16. (8 pts.) Solve: $x^{\frac{2}{3}} + x^{\frac{1}{3}} - 2 = 0$

17. (8 pts.) Solve: $2|-3x + 1| + 1 < 7$

18. (8 pts.) Solve: $\frac{2}{x+3} < \frac{1}{x}$

19. (8 pts.) A movie theatre sells adult tickets and children's tickets. One night, the theatre sold a total of 60 tickets. The adult tickets cost \$8 per ticket, while the children's tickets cost \$6 per ticket. The theatre sold a total of \$450 worth of tickets. How many of each type of ticket was sold?

20. (9 pts.) Find:

a) $\log_2(32)$

b) $\log_5\left(\frac{1}{25}\right)$

c) $\log_{16}(4)$

21. (9 pts.) Using the approximate values $\log_5(2) \approx 0.4$ and $\log_5(6) \approx 1.1$, find

a) $\log_5(12)$

b) $\log_5(8)$

c) $\log_5(10)$

22. (8 pts.) Solve: $\log_2(x^2 - 3x) - \log_2(1 - x) = 1$

23. (8 pts.) Arrange the following numbers in order, with the smallest on the left:

$$\sin(3), \cos(4), 0, \sin(1)$$

24. (8 pts.) Find the exact value of x :

