F1410501

# MAT 1050 GROUP FINAL EXAM - FALL 2014

## SHOW ALL WORK. DO NOT USE A CALCULATOR.

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

$$\pi\sqrt{a} - 9\sqrt{b} + x^{\frac{1}{3}} + 2\sqrt{a-b} - \sqrt{a} - 3x^{\frac{1}{3}}$$

2. (7 pts.) Simplify completely: $(m^{-6}n)\left(\frac{-3m^{-5}np^{0}}{m^{2}n^{-1}}\right)^{-2}$

3. (7 pts.) Multiply and simplify: $\left(4\sqrt{5} - 3\sqrt{2}\right)\left(2\sqrt{5} + 4\sqrt{2}\right)$

4. (7 pts.) Simplify completely: $\left(\frac{27^{-\frac{1}{3}}}{81^{-\frac{1}{4}} + 27^{-\frac{2}{3}}}\right)^{-1}$

5. (6 pts.) Solve: $5 - 3\left|\frac{x-2}{3}\right| \leq -7$

6. (6 pts.) Solve: $3 - |2x - 5| = 5$

7. (7 pts.) A triangle has a perimeter of 72 cm. The shortest side is three-fifths the length of the longest side. The third side is 6 cm. less than the longest side. What are the lengths of the three sides?

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

9. (6 pts.) Let $g$ be the function given by $g(x) = \frac{2x^2 - 3}{\sqrt[3]{2x+1}}$.
   What is the domain of $g$?

10. (6 pts.) Let $f$ be the function given by $f(x) = x + \frac{\sqrt{x+1}}{x-1}$ .
    **a)** Find and simplify $f(3)$.

    **b)** Find and simplify $f(a+1)$.

11. (7 pts.) Let $f$ be the function given by $f(x) = x^2 - 2x - 1$.
    Find and simplify $\frac{f(x+h)-f(x)}{h}$.

12. (6 pts.) Find the equation of the line that is parallel to the line $x + 5y = 10$ and passes through the point $(1, 3)$.

13. (6 pts.) Find the equation of the line that is perpendicular to the line $y = 4$ and passes through the point $(-2, 1)$.

14. (7 pts.) The base of a 13 foot ladder is 5 feet away from the wall. How far up the wall does the ladder reach?

15. (7 pts.) Solve, writing all non-real solutions in the form $a + bi$:
    $2x - 3 = 2x(x - 1)$

16. (7 pts.) Graph, labeling the vertex and all $x$ or $y$ intercepts:
    $f(x) = -x^2 + 2x + 8$

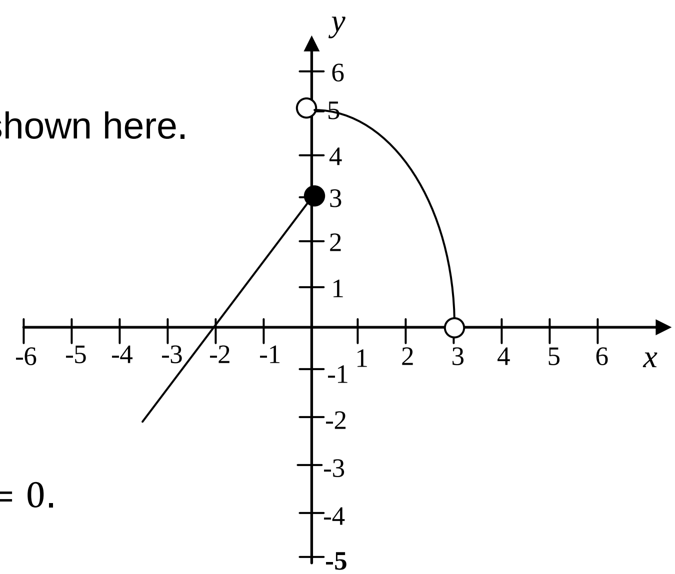
17. (7 pts.) Simplify completely: $\frac{-3x-6}{2x^2+3x-2} - \frac{x}{1-2x}$

18. (7 pts.) Given $f(x) = \sqrt{30 - 2x} - x$. Find all $x$ for which $f(x) = -3$.

19. (7 pts.) Solve: $6x - 5x^2 \leq 0$

20. (7 pts.) Solve: $\frac{1}{x+7} \geq \frac{1}{x+3}$

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: $x^{\frac{1}{2}} - 6 = x^{\frac{1}{4}}$

23. (6 pts.) Find: **a)** $\log_4(64)$ **b)** $\log_8\left(\frac{1}{2}\right)$ **c)** $\log_{\sqrt{7}}(1)$

24. (6 pts.) Given the approximate values $\log_2(5) = 2.3$ and $\log_2(15) = 3.9$ find:

**a)** $\log_2(10)$ **b)** $\log_2(125)$ **c)** $\log_2(3)$

25. (7 pts.) Solve: $\log_5(\mathrm{x} + 4) + \log_5(\mathrm{x} - 4) = \log_5(20)$

26. (7 pts.) Draw the graph: $9x^2 + y^2 = 36$

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

$\sin(1.7)$ $\cos(1.7)$ $\log_2(3)$ $tan(-\pi)$

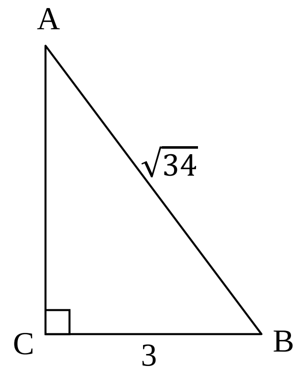
28. (6 pts.) **a)** Conver 5 radians to degrees.

**b)** Convert $5°$ to radians

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

**a)** $\boldsymbol{cos}(< B)$

**b)** $\boldsymbol{tan}(< A)$




30. (7 pts.) Matt decides it's time to get in shape, so he goes out for a run. He runs for 60 feet before twisting his ankle. He then hobbles home at a rate that is 8 feet/second slower than has running speed. The whole ordeal, from when he leaves home until he returns, lasts 20 seconds. What was Matt's running speed AND what was Matt's hobbling speed?