

MATH 22 Spring 05 EXAM I

1. (5 pts.) The slopes of four lines are indicated in the figure. List the slopes m_1, m_2, m_3, m_4 in order of increasing value.
4. (5 pts.) The center of a circle is the point $(4, 3)$. If the point $(-1, -9)$ lies on this circle, find the equation of the circle.

- a) $(x - 4)^2 + (y - 3)^2 = 13$
 b) $(x + 4)^2 + (y - 3)^2 = 169$
 c) $(x - 4)^2 - (y - 3)^2 = 169$
 d) $(x + 4)^2 + (y + 3)^2 = 169$
 e) $(x - 4)^2 + (y - 3)^2 = 169$

5. (5 pts.) Solve the equation $2y^2 - 5y - 5 = 0$.

- a) $y = 5 \pm \sqrt{65}$
 b) $y = \frac{5 \pm \sqrt{67}}{2}$
 c) $y = \frac{-5 \pm \sqrt{65}}{2}$
 d) $y = \frac{\sqrt{67} \pm 5}{4}$
 e) $y = \frac{5 \pm \sqrt{65}}{4}$

- a) m_1, m_4, m_2, m_3
 b) m_4, m_2, m_1, m_3
 c) m_3, m_1, m_4, m_2
 d) m_4, m_2, m_3, m_1
 e) m_2, m_3, m_1, m_4

2. (5 pts.) Find the equation of the line which passes through the points $(-3, -2)$ and $(4, -1)$.

- a) $y = \frac{1}{4}x - \frac{1}{7}$
 b) $y = \frac{1}{7}x - \frac{11}{7}$
 c) $y = \frac{1}{9}x - \frac{9}{11}$
 d) $y = \frac{1}{5}x - \frac{11}{7}$
 e) $y = \frac{1}{8}x - \frac{11}{7}$

6. (5 pts.) Find the sum and the product of the roots of the equation $x^2 + 9x - 10 = 0$.

- a) sum: -5 , product: 10
 b) sum: -9 , product: 10
 c) sum: -10 , product: 9
 d) sum: -9 , product: -10
 e) sum: -10 , product: 9

3. (5 pts.) Find the center of the circle whose equation is given by $x^2 + y^2 + 8x - 2y = -16$.

- a) $(4, 1)$
 b) $(-4, -1)$
 c) $(-8, 2)$
 d) $(-4, 1)$
 e) $(4, -1)$

7. (5 pts.) Find the value of k such that the equation $x^2 + 10x + k = 0$ has one real root.

- a) $k = 25$
 b) $k = 5$
 c) $k = 36$
 d) $k = 0$
 e) $k = 34$

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8. (5 pts.) Find all solutions of $|5x - 4| = 25$.
- $x = -8, 4$
 - $x = \frac{1}{5}, \frac{3}{5}$
 - $x = \frac{29}{5}, -\frac{21}{5}$
 - $x = -\frac{1}{8}, \frac{1}{4}$
 - $x = -\frac{3}{5}, -\frac{3}{4}$
9. (5 pts.) Find all real solutions of $4y^2 = 5 - y^4$.
- $y = 1, -1$
 - $y = 4, 1$
 - $y = -5, -1$
 - $y = -4, 5, 1$
 - $y = 4, -5$
10. (5 pts.) Find all real solutions of $t^{\frac{2}{3}} = 25$.
- $t = \pm 625$
 - $t = \pm 5$
 - $t = 125$
 - $t = \sqrt{5}$
 - $t = \pm 125$
11. (5 pts.) Solve $6x + 15 < 3(x - 1) - x$. Express your answer using interval notation.
- $(-\infty, -\frac{9}{2})$
 - $(-\frac{9}{2}, \infty)$
 - $(-\frac{2}{9}, 0)$
 - $(-\infty, -\frac{2}{9})$
 - $(-\infty, -\frac{2}{9}]$
12. (5 pts.) Solve $\frac{5x}{19} - \frac{x-1}{5} < 1$. Express your answer using interval notation.
- $(-\infty, \frac{3}{38})$
 - $(-\infty, \frac{38}{3})$
 - $[\frac{38}{3}, \infty)$
 - $(-\infty, \frac{38}{3}]$
 - $(\frac{38}{3}, \infty)$
13. (5 pts.) Solve $|\frac{x-4}{2}| < 3$. Express your answer using interval notation.
- $(-2, \infty)$
 - $(-2, 10)$
 - $(-\infty, -2) \cup (10, \infty)$
 - $[-2, 10]$
 - $(-\infty, -2] \cup [10, \infty)$
14. (5 pts.) Use the graph below to solve the inequality $-\frac{1}{2}x^2 - \frac{9}{2}x - 9 \geq 0$.
- $(-6, -3)$
 - $(-\infty, -6) \cup (-3, \infty)$
 - $[-6, -3]$
 - $(-\infty, -6] \cup [-3, \infty)$
 - no solution

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15. (5 pts.) Solve the inequality $x^2 + 6x - 72 < 0$. Express your answer in interval form.
19. (5 pts.) The following figure displays the graph of a function f . Which of the following is the largest?

- a) $(-6, 12)$
- b) $[-12, 6]$
- c) $(-\infty, -12) \cup (6, \infty)$
- d) $(-12, 6)$
- e) no solution

16. (5 pts.) Solve the inequality $(x - 1)(x + 2)(x + 9) \geq 0$. Express your answer in interval form.

- a) $(-\infty, -9] \cup [2, \infty)$
- b) $(-\infty, -2] \cup [9, \infty)$
- c) $[-9, -2] \cup [1, \infty)$
- d) $(-\infty, -9] \cup [-2, -1]$
- e) no solution

- a) $f(-2) + f(2)$
- b) $2f(2)$
- c) $2f(0)$
- d) $f(5) - f(2)$
- e) $f(1) + f(2)$

17. (5 pts.) Find the domain of the function $g(t) = \frac{1}{t^2 - 7t + 10}$.

- a) $(-\infty, -5) \cup (-5, 2) \cup (2, \infty)$
- b) $(-\infty, 3) \cup (6, \infty)$
- c) $(-\infty, 2) \cup (2, 5) \cup (5, \infty)$
- d) $(-\infty, -5) \cup (2, \infty)$
- e) $(\infty, -2) \cup (2, \infty)$

18. (5 pts.) Let $T(x) = 2x^2 - 3x$. Find (and simplify) the expression $T(x + 1) - T(x - 1)$.

- a) $6x - 8$
- b) $8x$
- c) $8x - 6$
- d) $2x$
- e) $6x$

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20. (5 pts.) Which of the following graphs represent this function:

$$f(x) = \begin{cases} \sqrt{1-x^2} & \text{if } -1 \leq x < 1 \\ \frac{1}{x} & \text{if } x \geq 1 \end{cases}$$