MATH 1314 MyLab Math Mid-Term Exam Study Sheet

Learning and practice has occured using the student resources and graded assignments in this course. When studying math you should not study in order, practice using the eText and MLM HW assignments. If you can work the questions without your notes correctly then you are ready for an exam, otherwise seek help and ask questions. MLM exams have 12 to 20 questions.

NOTE: This study sheet may reflect some exam questions, however, this study sheet may not reflet every type of question that may be included on the exam.

Use the graph to determine the function's domain and range.

    1.
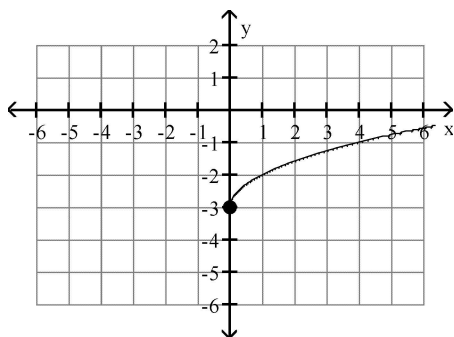
Solve the inequality. Graph and write the solution set in interval notation.

    2. $|2 - 3x| \geq 11$

    3. $|3x + 2| < 8$

    4. $3(2x + 1) < 9 - 5(2x - 3)$

    5. $9x + 7 \geq -2$ and $9x - 2 \geq 34$

    6. $6x - 4 < 2x$ or $-2x \leq -6$

Solve the equation by completing the square.

    7. $x^2 + 4x + 68 = 0$

Find the function value.

    8. Find $f(2a)$ when $f(x) = 4x^2 + 3x$.
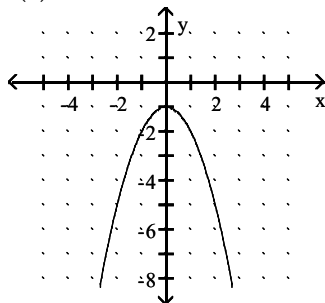
    9. Find $g(a + 1)$ when $g(x) = 4x + 1$.

    10. $f(x) = 3x^2 - 2x + 7;$ $f(x - 1)$

Determine algebraically whether the graph is symmetric with respect to the x–axis, the y–axis, and the origin.

    11. $xy = 2$

A function *f* is depicted in the graph. Find any input values that produce the indicated output.

12. $f(x) = -2$

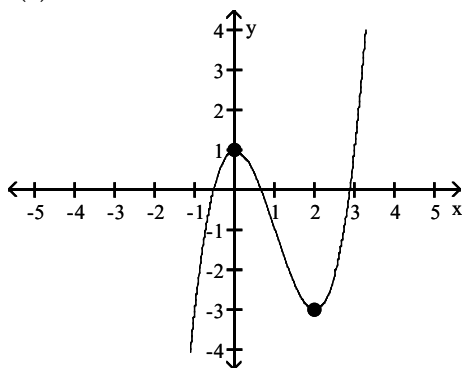**Solve the formula for the specified letter.**

13. $I = \dfrac{kE}{R}$ for R

Graph the function.

14. $f(x) = \begin{cases} 3 - x, & \text{for } x \le 2, \\ 1 + 2x, & \text{for } x > 2 \end{cases}$

Using the graph, determine any relative maxima and relative minima of the function.

15. $f(x) = x^3 - 3x^2 + 1$

Find the point that is symmetric to the given point with respect to the requested axis.

16. Symmetric with respect to the x–axis: $(7, 2)$

17. Symmetric with respect to the y–axis: $(1.5, 1.75)$

Answer the question.

18. How can the graph of $f(x) = \dfrac{1}{2}(x + 5)^2 - 10$ be obtained from the graph of $y = x^2$?

19. How can the graph of $f(x) = -\sqrt{x + 2}$ be obtained from the graph of $y = \sqrt{x}$?

For the pair of functions, find the indicated sum, difference, product, or quotient.

20. $f(x) = 5x - 5$, $g(x) = 8x - 2$ Find $(f - g)(x)$.

21. $f(x) = 5x - 6$, $g(x) = 6x - 9$ Find $(f \cdot g)(x)$.

22. Find $(f + g)(-3)$ when $f(x) = x + 6$ and $g(x) = x - 2$.

23. Find $(f/g)(-3)$ when $f(x) = 5x - 5$ and $g(x) = 4x^2 + 14x + 5$.

Solve the problem.

24. The revenue for a small company is given by the quadratic function $r(t) = 11t^2 + 4t + 720$ where t is the number of years since 1998 and r(t) is in thousands of dollars. If this trend continues, find the year after 1998 in which the company's revenue will be \$831 thousand. Round to the nearest whole year.

25. Persons taking a 30–hour review course to prepare for a standardized exam average a score of 620 on that exam. Persons taking a 70–hour review course average a score of 775. Find a linear function S(t), which fits this data, and which expresses score as a function of time.

26. $\sqrt{x + 63} + 9 = x$

27. In 1995 the United States recovered 23% of its municipal wastes through recycling, up from 17% in 1990. Let P represent the percentage recycled and t the number of years since 1990. Find a linear function P(t) that fits this data. Use this function to predict the percentage recycled in 2004.

28. $|6x - 5| - 7 = -1$

29. A quality–control inspector examined 280 calculators and found 6 of them to be defective. At this rate, how many defective calculators will there be in a batch of 10,360 calculators?

30. $z^4 - 9z^2 + 18 = 0$

31. On a sunny day, a tree and its shadow form the sides of a right triangle. If the hypotenuse is 50 m long and the tree is 40 m tall, how long is the shadow?

32. Given that $f(x) = 3x^2 - 8x$; find all values of a such that $f(a) = 16$.

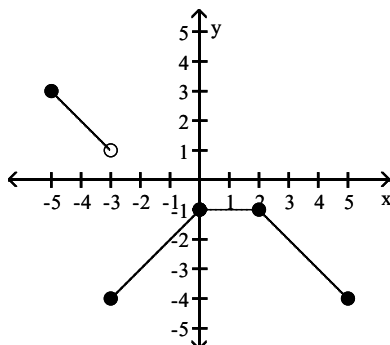33. $\dfrac{15}{x} - \dfrac{15}{x - 1} = \dfrac{3}{x}$

34. If the first and third of three consecutive odd integers are added, the result is 69 less than five times the second integer. Find the third integer.

Solve the equation using the quadratic formula.
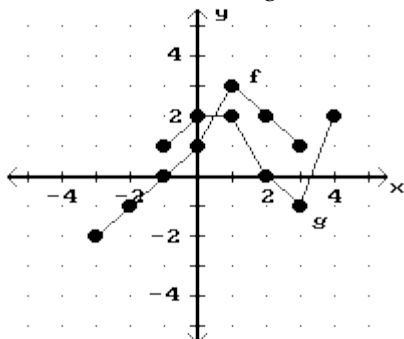
35. $4x^2 = -10x - 1$

Determine the intervals on which the function is increasing, decreasing, and constant.
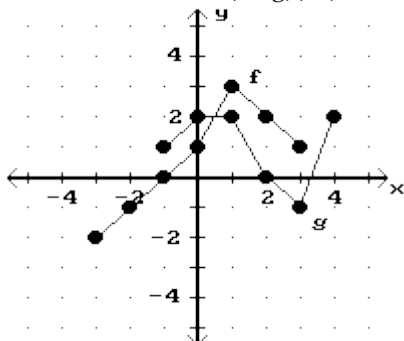
36.

Consider the functions *f* and *g* as shown in the graph. Answer the question.

37. What is the value of $(f \cdot g)(1)$?

38. What is the value of $(f - g)(-1)$?

Write an equation for a function that has a graph with the given characteristics.

39. The shape of $y = |x|$ is reflected across the y–axis. This graph is then vertically stretched by a factor of 1.2. Finally, the graph is shifted 10 units downward.

40. The shape of $y = \sqrt{x}$ is shifted 6 units to the left. Then the graph is shifted 3 units upward.

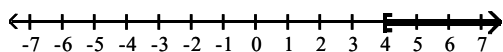1. domain: $[0, \infty)$
   range: $[-3, \infty)$

2. $(-\infty, -3] \cup \left[\dfrac{13}{3}, \infty\right)$
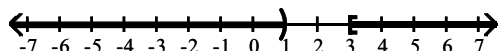
3. $\left(-\dfrac{10}{3}, 2\right]$

4. $\left(-\infty, \dfrac{21}{16}\right)$

5. $[4, \infty)$

6. $(-\infty, 1) \cup [3, \infty)$

7. $\{-2 \pm 8i\}$
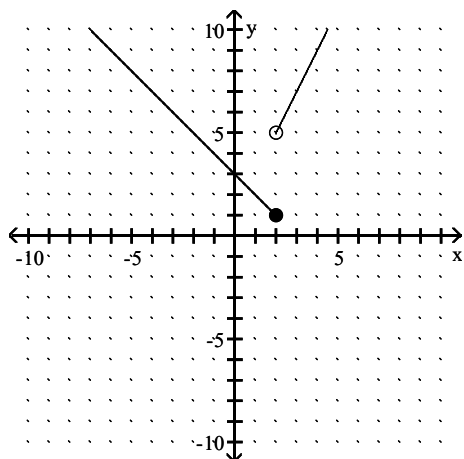
8. $16a^2 + 6a$

9. $4a + 5$

10. $3x^2 - 8x + 12$

11. Origin only

12. $x = 1$ and $x = -1$

13. $R = \dfrac{kE}{I}$

14.

15. Relative maximum: 1 at $x = 0$; Relative minimum: -3 at $x = 2$

16. $(7, -2)$

17. $(-1.5, 1.75)$

18. Shift it horizontally 5 units to the left. Shrink it vertically by a factor of $\dfrac{1}{2}$. Shift it 10 units down.

19. Shift it horizontally 2 units to the left. Reflect it across the x–axis.

20. $-3x - 3$

21. $30x^2 - 81x + 54$

22. -2

23. 20

24. 2001

25. $S(t) = 3.875t + 503.75$

26. 18

27. 33.8%

28. $\left\{-\dfrac{1}{6}, \dfrac{11}{6}\right\}$

29. 222

30. $\pm\sqrt{3}, \pm\sqrt{6}$

31. 30 m

32. $a = -\dfrac{4}{3}$ or $a = 4$

33. -4

34. 25

35. $\left\{\dfrac{-5 \pm \sqrt{21}}{4}\right\}$

36. Increasing on $(-3, 0)$; Decreasing on $(-5, -3)$ and $(2, 5)$; Constant on $(0, 2)$

37. 6

38. -1

39. $f(x) = 1.2^{|-x|} - 10$

40. $f(x) = \sqrt{x + 6} + 3$