

Sharyland ISD Study Guide

Precal Semester 1



Student Name: _____
Student ID: _____

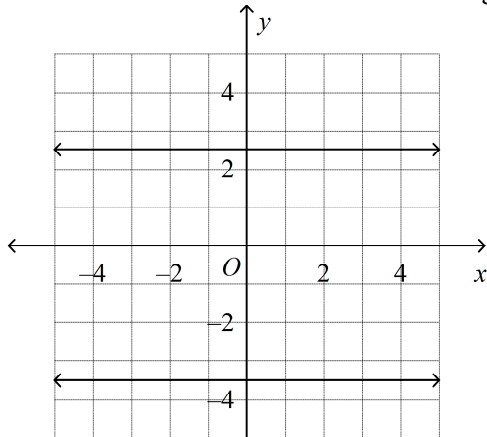
Precal A CBE Study Guide

Multiple Choice

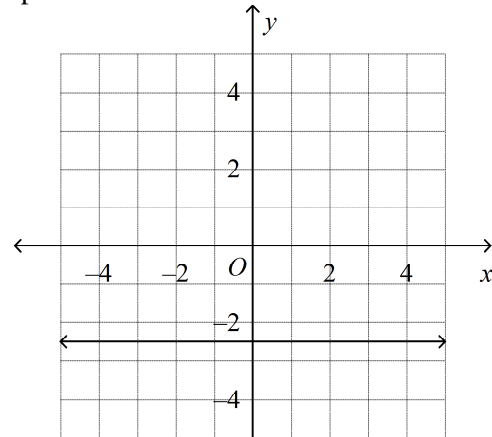
Identify the choice that best completes the statement or answers the question.

_____ 1. Use the vertical-line test to determine which graph represents a function.

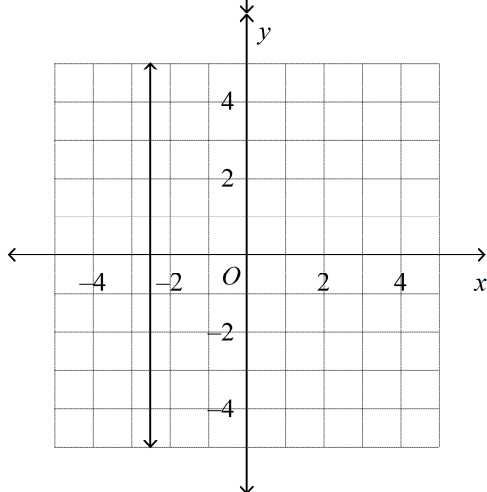
a.



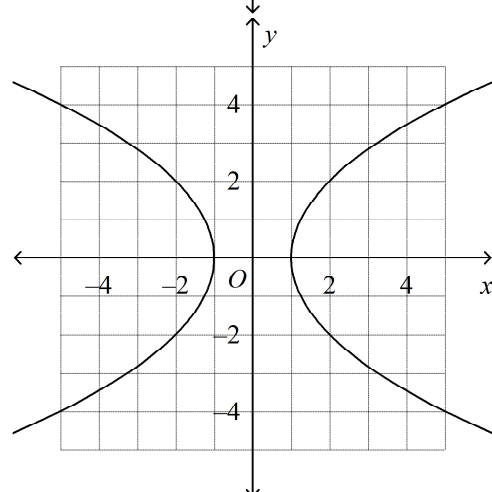
c.



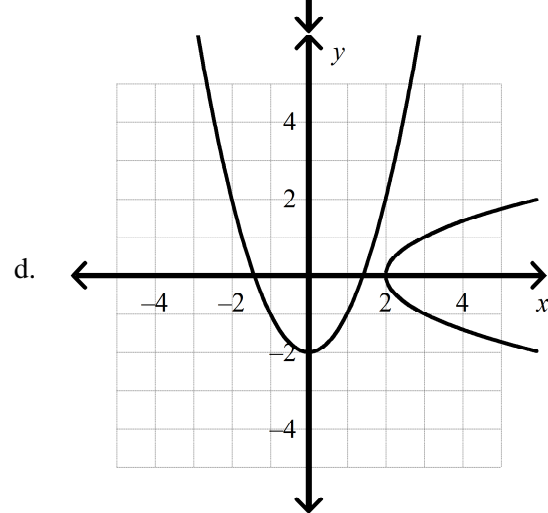
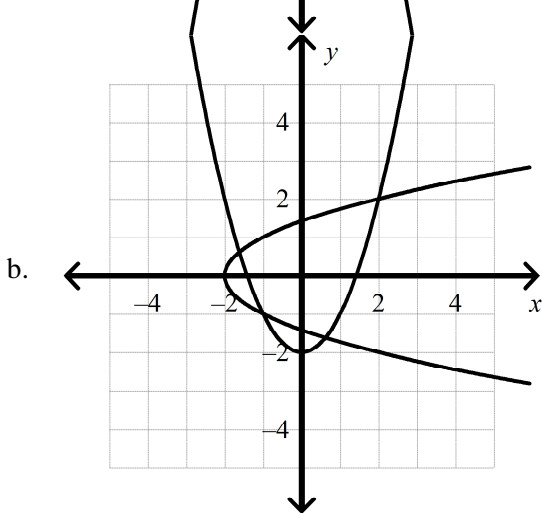
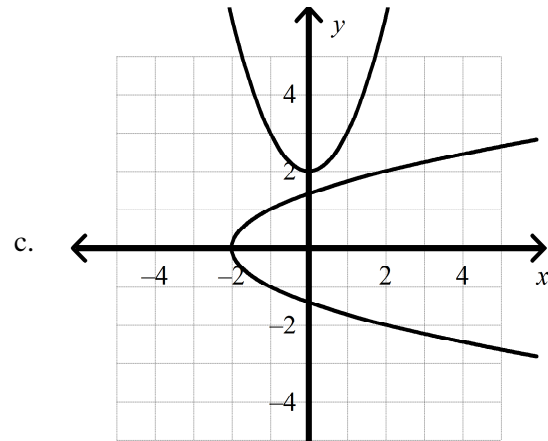
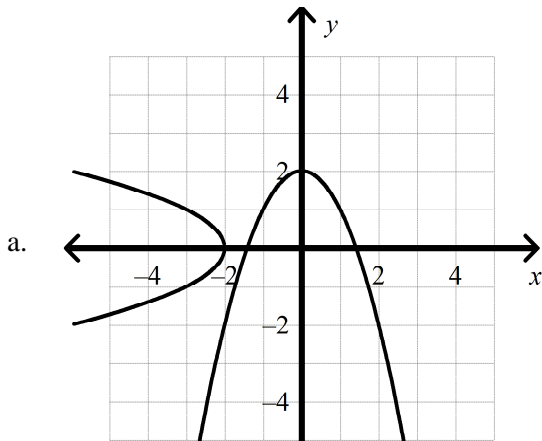
b.



d.



_____ 2. Graph the function $f(x) = x^2 - 2$ and its inverse $f^{-1}(x) = \pm\sqrt{x+2}$ on the same coordinate plane.



_____ 3. Which of the following is *not* a polynomial?

a. $\frac{5}{x} + \frac{x}{6}$

c. $x^2 - 5$

b. $x^2 - 5 + 6x$

d. $-\frac{5}{6}$

Find the domain of the function.

_____ 4. $h(x) = \frac{7x}{x(x^2 - 81)}$

a. All real numbers $x \neq \pm 9$

c. All real numbers $x \neq 9$

b. All real numbers $x \neq \pm 81, 0$

d. All real numbers $x \neq \pm 9, 0$

Rationalize the denominator of the expression. Then simplify the answer.

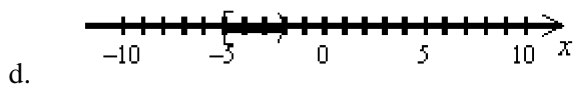
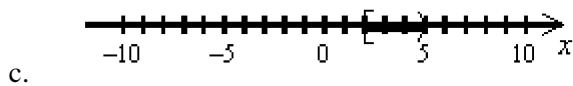
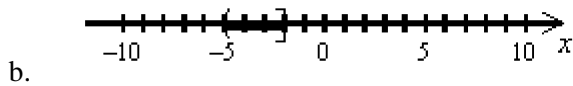
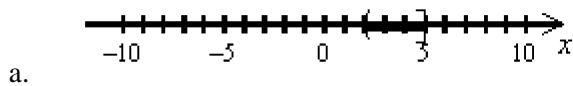
- _____ 5. $\frac{5}{5-\sqrt{2}}$
- a. $\frac{25+\sqrt{2}}{23}$
- b. $\frac{25+5\sqrt{2}}{23}$
- c. $\frac{25}{27}$
- d. $\frac{5\sqrt{2}}{5\sqrt{2}-2}$

Identify the verbal description of the interval.

- _____ 6. $(-\infty, -7)$
- a. All real numbers less than -7
- b. All real numbers less than or equal to -7
- c. All real numbers greater than -7
- d. All real numbers greater than or equal to -7

Which is the graph of the inequality?

- _____ 7. $2 \leq x < 5$



Name: _____

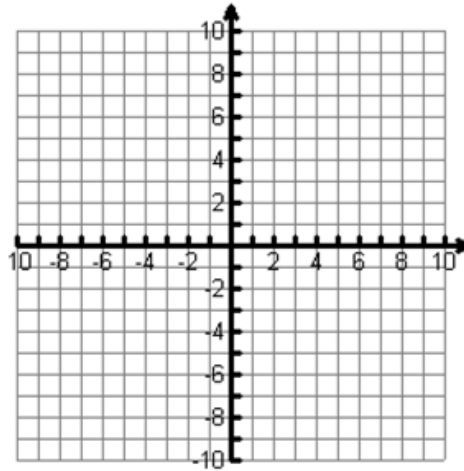
ID: A

- _____ 8. Which of the following intervals represents $-16 < x \leq 10$?
- a. $(-16, 10]$
 - b. $(-16, 10)$
 - c. $[-16, 10]$
 - d. $[-16, 10)$

Short Answer

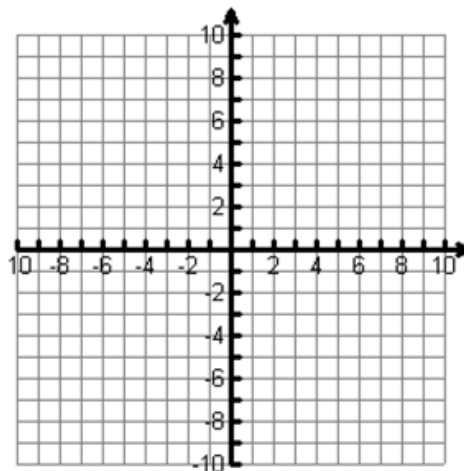
9. Use the intersect method to solve the equation.

$$x^2 - 1 = -x^2 + 7$$



10. Use the intersect method to solve the equation.

$$x^2 + 2 = -x^2 + 10$$



Name: _____

ID: A

11. Use the x -intercept method to find all real solutions of the equation.

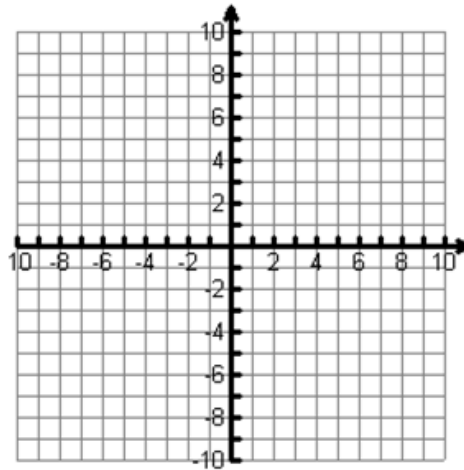
$$x^3 - 8x^2 + 17x - 10 = 0$$

12. Solve by taking the square root of both sides.

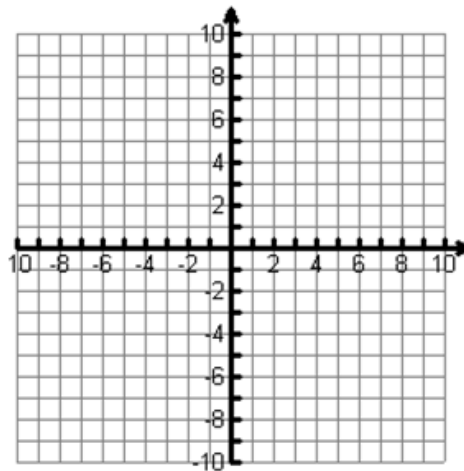
$$3(x+3)^2 - 81 = 0$$

Solve the equation by graphing.

13. $-8x^3 - 13x^2 + 6x = 0$



14. $6x = 9 + x^2$



Solve the quadratic equation.

15. $-3x^2 + 7x = -5$

16. Solve the equation.

$$6x = 3x^2 + 1$$

17. Find the absolute value
- $|-7 - 9i|$
- .

Solve the absolute value equation. Graph the solution.

- 18.
- $2|4x + 1| + 5 = 19$

Solve the equation. Check for extraneous solutions.

- 19.
- $9|2 - 2x| = 3x + 2$

20. Find all real solutions of the equation
- $\left|\frac{5}{7}x + 6\right| + 3 = 8$
- .

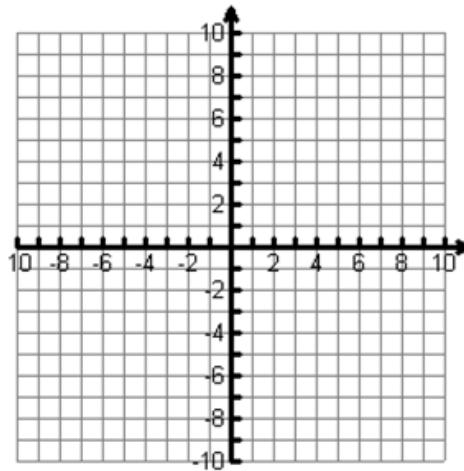
What is the solution of the equation? Eliminate any extraneous solutions.

- 21.
- $\sqrt{3x + 28} - 8 = x$

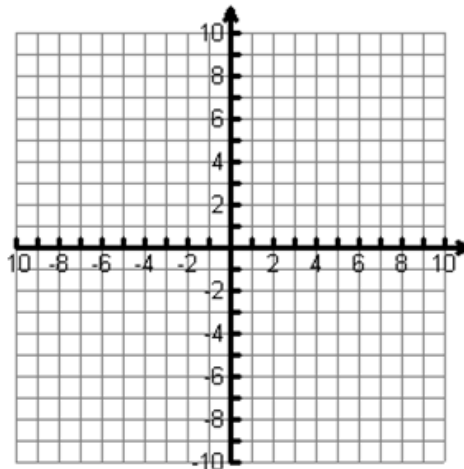
22. Find all real solutions of the equation
- $\sqrt{x^2 + 6x + 2} = 3$
- .

23. Determine the domain of the function
- $f(x) = \frac{x^2 - 9x + 14}{x^2 + 10x + 21}$
- .

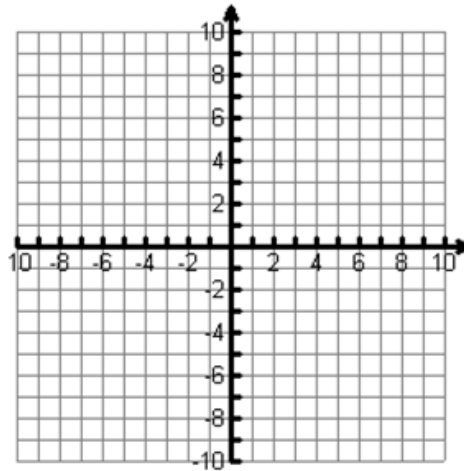
24. Graph the function $f(x) = -2x^3 + 6x^2 - x + 3$ and estimate the following, using the graph and a maximum and minimum finder.
- all local maxima and minima of the function.
 - intervals where the function is increasing and where it is decreasing
 - all inflection points of the function
 - intervals where the function is concave up and where it is concave down



25. Find the rule and the graph of the function whose graph can be obtained by performing the translation 2 units left and 3 units up on the parent function $f(x) = x^2$.



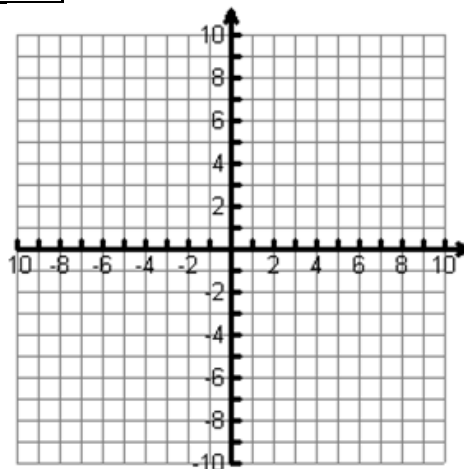
26. Find the rule and the graph of the function whose graph can be obtained by performing the translation 4 units right and 2 units up on the parent function $f(x) = |x|$.



27. Find the inverse of the function $f(x) = \{(6, -1), (-3, 4), (14, -10)\}$.

28. Graph the relation and its inverse. Use open circles to graph the points of the inverse.

x	0	4	9	10
y	3	2	7	-1



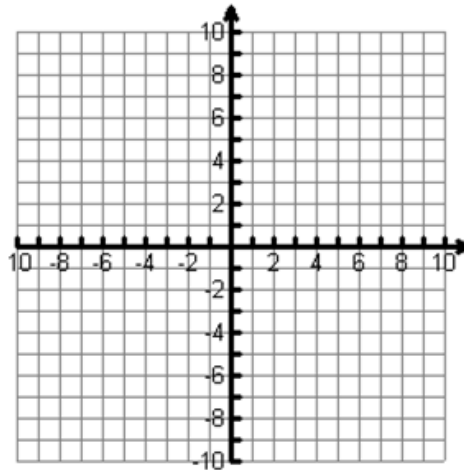
29. Is relation t a function? Is the inverse of Relation t a function?

Relation t

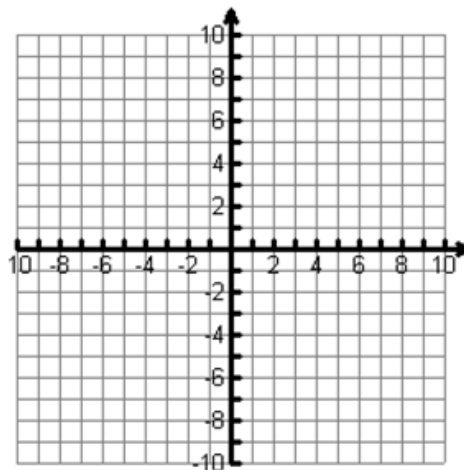
x	0	2	4	6
y	-8	-7	-4	-4

30. Identify all of the real roots of $3x^5 + 6x^4 - 72x^3 = 0$.
31. Find the quotient and remainder when $-4x^3 + 12x^2 - 13x + 1$ is divided by $2x - 3$.
32. Find the quotient and remainder when $-6x^3 - 2x^2 + 6x + 9$ is divided by $2x + 2$.
33. Solve by taking the square root of both sides.
 $3(x + 4)^2 - 24 = 0$
34. Add. Write the answer in the form $a + bi$.
 $(6 + 5i) + (-4 + i)$
35. Multiply $(-6 + 4i)(8 + i)$.
36. Multiply $(4 - 8i)(-2 + 5i)$.
37. Use a calculator to evaluate $6^{\sqrt{3}}$ to the nearest ten thousandth.
38. Simplify $\frac{\sqrt{x}}{\sqrt{x} - \sqrt{3}}$.

39. Use the graph of $f(x) = 2^x$ to sketch the graph of $h(x) = 2^{-2x}$



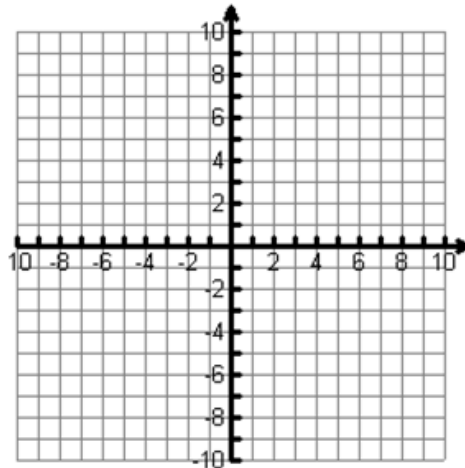
40. Use the graph of $f(x) = 4^x$ to sketch the graph of $h(x) = 4^{1+x}$



41. Suppose you invest \$1600 at an annual interest rate of 4.6% compounded continuously. How much will you have in the account after 4 years?
42. Suppose you invest \$100 at an annual interest rate of 4.7% compounded continuously. How much will you have in the account after 15 years?
43. How much money invested at 5% compounded continuously for 3 years will yield \$820?

Evaluate the logarithm.

44. $\log 0.01$
45. Find the value of $\ln 45$.
46. Find the value of $\ln 79$.
47. Solve for x . Round to the nearest hundredth.
 $10^x = 18$
48. $11i^{30}$ equals
49. $7i^{24}$ equals
50. Graph the logarithmic function $f(x) = 5 - \ln(x + 3)$.

**Write the expression as a single logarithm.**

51. $5 \log_b q + 2 \log_b y$
52. $4 \log x - 6 \log(x + 2)$

Name: _____

ID: A

53. Which is the solution to $7^x = 2^{x+2}$?

54. Use the x -intercept method to find all real solutions of the equation.
 $14x^3 - 53x^2 + 41x - 4 = -4x^3 + x^2 + 1x + 4$

What is the factored form of the expression?

55. $15g^3 + 18g^2 - 10g - 12$

What is the factored form of the expression? Factor completely.

56. $56k^3 - 84k^2 + 70k - 105$

57. Which is the solution to $4^x = 9^{x+3}$?

58. Simplify $\ln e^{-6x}$.

59. Simplify $\ln e^3$.

Problem

60. Solve the equation. Write the solutions in the form $a + bi$.

$$x^2 - 10x + 30 = 0$$

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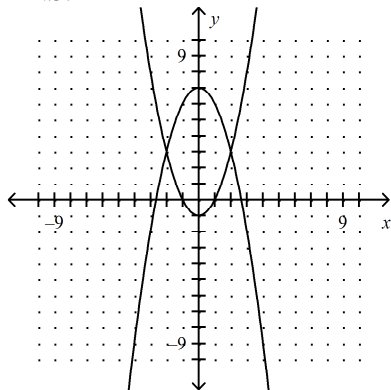
Answer Section

MULTIPLE CHOICE

- | | | |
|-----------|--|------------------|
| 1. ANS: C | TOP: 2-1 Example 5 | |
| 2. ANS: B | STA: (2)(B) (2)(C) (2)(D) (7)(I) | |
| | TOP: 1-4 Problem 3 Graphing a Function and its Inverse | |
| 3. ANS: A | | |
| 4. ANS: D | STA: TX TEKS PRE.P.1.B | TOP: Objective 3 |
| 5. ANS: B | STA: TX TEKS PRE.P.3.D | TOP: Objective 5 |
| 6. ANS: A | STA: TX TEKS PRE.P.1.D | TOP: Objective 2 |
| 7. ANS: C | STA: TX TEKS PRE.P.1.E | TOP: Objective 1 |
| 8. ANS: A | STA: TX TEKS PRE.P.1.E | TOP: Objective 1 |

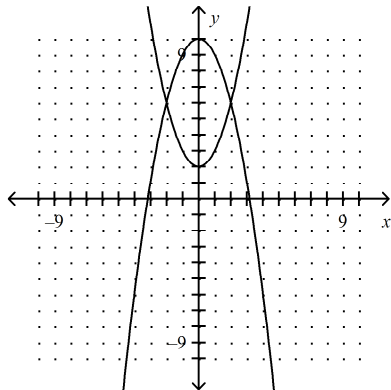
SHORT ANSWER

9. ANS:



$$x = -2 \text{ or } 2$$

10. ANS:



$$x = -2 \text{ or } 2$$

11. ANS:
 $x = 1, 2, \text{ or } 5$

12. ANS:
 $x = -3 - 3\sqrt{3} \text{ or } -3 + 3\sqrt{3}$

13. ANS:
 $0, -2, 0.38$

STA: TX TEKS 2A.2A

TOP: 6-4 Example 1

14. ANS:
 3

STA: TX TEKS 2A.2A

TOP: 6-4 Example 1

15. ANS:
 $\frac{7}{6} \pm \frac{\sqrt{109}}{6}$

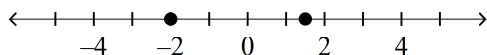
STA: (4)(D)|(4)(F)

TOP: 5-7 Problem 5 Solving by Completing the Square

16. ANS:
 $x = \frac{3 + \sqrt{6}}{3} \text{ or } \frac{3 - \sqrt{6}}{3}$

17. ANS:
 $\sqrt{130}$

18. ANS:
 $x = 1\frac{1}{2} \text{ or } x = -2$



STA: (6)(D)|(6)(E)

TOP: 2-1 Problem 2 Solving a Multi-Step Absolute Value Equation

19. ANS:
 $x = \frac{16}{21} \text{ or } x = \frac{4}{3}$

STA: (6)(D)|(6)(E)

TOP: 2-1 Problem 3 Checking for Extraneous Solutions

20. ANS:
 $-\frac{7}{5} \text{ or } -\frac{77}{5}$

21. ANS:
 -4

STA: (4)(F)|(4)(G)

TOP: 6-5 Problem 2 Checking for Extraneous Solutions

22. ANS:
 $x = 1 \text{ or } -7$

23. ANS:

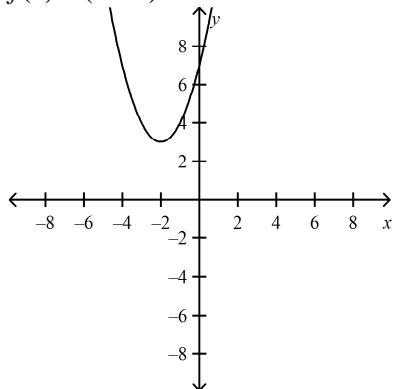
All real numbers except -7 and -3

24. ANS:

a. local max at $x \approx 1.9129$, local min at $x \approx 0.0871$ b. decreasing over the intervals $(-\infty, 0.0871)$ and $(1.9129, \infty)$ increasing over the intervals $(0.0871, 1.9129)$ c. point of inflection is located about $x \approx 1$ d. concave up over the interval $(-\infty, 1)$, concave down over the interval $(1, \infty)$

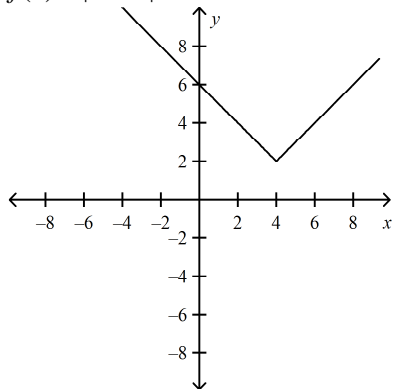
25. ANS:

$$f(x) = (x+2)^2 + 3$$



26. ANS:

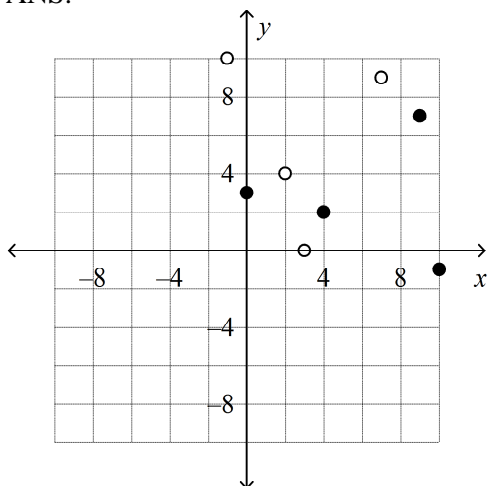
$$f(x) = |x-4| + 2$$



27. ANS:

$$\{(-1, 6), (4, -3), (-10, 14)\}$$

28. ANS:



STA: (2)(B)|(2)(C)|(2)(D)|(7)(I)

TOP: 1-4 Problem 1 Finding the Inverse of a Relation

29. ANS:

Relation t is a function. The inverse of relation t is not a function.

STA: (2)(B)|(2)(C)|(2)(D)|(7)(I)

TOP: 1-4 Problem 1 Finding the Inverse of a Relation

30. ANS:

 $x = 0, -6,$ and $4.$

31. ANS:

Quotient $-2x^2 + 3x - 2$; remainder -5

32. ANS:

Quotient $-3x^2 + 2x + 1$; remainder 7

33. ANS:

 $x = -4 - 2\sqrt{2}$ or $-4 + 2\sqrt{2}$

34. ANS:

 $2 + 6i$

35. ANS:

 $-52 + 26i$

TOP: Benchmark Test 4

36. ANS:

 $32 + 36i$

TOP: Benchmark Test 4

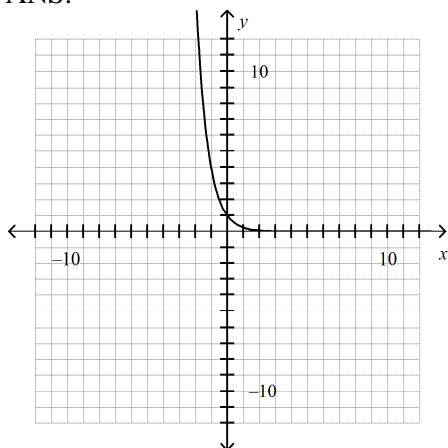
37. ANS:

22.2740

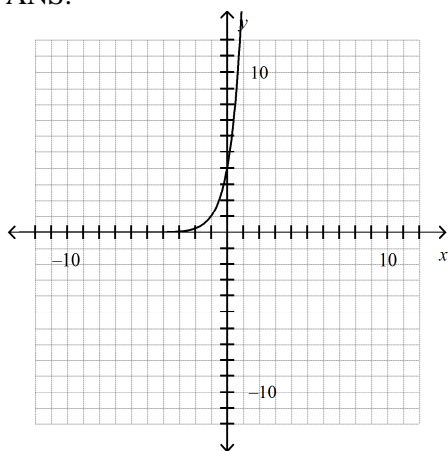
38. ANS:

$$\frac{x + \sqrt{3x}}{x - 3}$$

39. ANS:



40. ANS:



41. ANS:

\$1,923.23

STA: TX TEKS 2A.4B | TX TEKS 2A.11B | TX TEKS 2A.1B | TX TEKS 2A.4A | TX TEKS 2A.11F
 TOP: 8-2 Example 5

42. ANS:

\$202.38

STA: TX TEKS 2A.4B | TX TEKS 2A.11B | TX TEKS 2A.1B | TX TEKS 2A.4A | TX TEKS 2A.11F
 TOP: 8-2 Example 5

43. ANS:

\$705.78

STA: (2)(A)| (5)(A)| (7)(I) TOP: 7-3 Problem 6 Continuously Compounded Interest

44. ANS:

-2

STA: (2)(A)| (2)(B)| (2)(C)| (5)(C) TOP: 7-5 Problem 2 Evaluating a Logarithm

45. ANS:

3.807

46. ANS:
4.369

47. ANS:
1.26

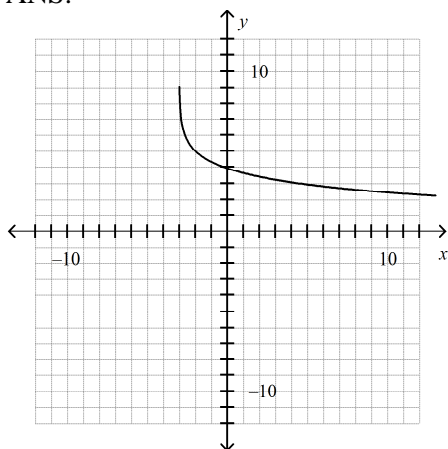
48. ANS:
-11

TOP: End-of-Course Exam

49. ANS:
7

TOP: End-of-Course Exam

50. ANS:



51. ANS:
 $\log_b(q^5y^2)$

STA: TX TEKS 2A.2A

TOP: 8-4 Example 2

52. ANS:
none of these

STA: TX TEKS 2A.2A

TOP: 8-4 Example 2

53. ANS:
1.1066

54. ANS:
 $x = \frac{2}{3}, \frac{1}{3}, \text{ or } 2$

55. ANS:
 $(3g^2 - 2)(5g + 6)$

STA: (10)(B)|(10)(D)|(10)(E)

TOP: 7-8 Problem 1 Factoring a Cubic Polynomial

56. ANS:
 $7(4k^2 + 5)(2k - 3)$

STA: (10)(B)|(10)(D)|(10)(E)

TOP: 7-8 Problem 2 Factoring a Polynomial Completely

57. ANS:
-8.1285

58. ANS:
-6x

59. ANS:
3

STA: (5)(C)|(5)(D)

TOP: 7-10 Problem 1 Simplifying a Natural Logarithmic Expression

PROBLEM

60. ANS:
 $5 \pm i\sqrt{5}$

TOP: Cumulative Test 18