Name: _____ Per: ____

Algebra 2

1st Semester Benchmark Exam
Study Guide

1	Add. $8\sqrt{3}+\sqrt{48}$	16	State whether the function has a maximum or minimum value and find it $f(x) = x^2 + 10x - 3$.
2	Graph $f(x) = -x^2 + 6x - 4$	17	Find the roots of the equation $14x - 60 = -2x^2$ by factoring.
3	Add. Write your answer in standard form. $(3h^7 + h^4) + (-h^7 + 2h^4 - 6)$	18	Write a quadratic function in standard form with zeros 3 and -2.
4	Find the product $(7x - 2)(x^4 + 2x^2 + 1)$	19	Given the equation $y = xn$ where $x > 1$ and $0 < n < 1$, which statement is valid for the real values of y? A. $y < 0$ B. $y < x$ C. $y > x$ D. $y = 0$
5	Solve the equation $x^2 = 5 + 4x$	20	Solve the equation $x^2 - 6x - 22 = 41$.
6	Graph the system of equations. $\begin{cases} -2x + 7y = 14 \\ -5x - 2y = 15 \end{cases}$	21	If x is a real number, which best describes the values of x for which the inequality $x^2 > 0$ is true? A. all $x < 0$ B. all $x \leq 0$ C. all values of x D. none
7	Find the product $3ab^3(-5a^2b + a^4b^3)$.	22	Express $5\sqrt{-117}$ in terms of i.
8	Graph the solution to the following inequality $\lvert 3 + 2x \rvert < 13$	23	Find the complex conjugate of $7 - 2i$
9	Graph the inequality $y < \frac{1}{2}x + 5$.	24	Graph the complex number $3 + 6i$.
10	Solve the system $\begin{cases} 4x + y = 8 \\ y = 2x + 2 \end{cases}$	25	Subtract. Write the result in the form $a + bi$. $(8 - 4i) - (2 + 3i)$
11	Solve the system $\begin{cases} 2x - 4y = 8 \\ -2x - y = -18 \end{cases}$	26	Multiply $4i(6 - 9i)$. Write the result in the form $a + bi$.
12	Determine the number of solutions for the system $\begin{cases} 4x + 3y = 15 \\ 12y - 16x = -60 \end{cases}$	27	Simplify $\frac{-5 + 9i}{3 - 3i}$
13	Solve the system of equations $\begin{cases} 2x + 4y + z = 10 \\ x - 5y + 2z = 25 \\ -x + y + z = -5 \end{cases}$ A. (-5, -2, -8) C. (6, 4, 20) B. (5, -2, 8) D. (7, -2, 4)	28	A toy rocket is launched from the ground level with an initial vertical velocity 32 ft/s. The position of the rocket can be tracked using the following equation $f(t) = -16t^2 + 32t$, where t is the time in seconds. After how many seconds will the rocket hit the ground?
14	The parent function $f(x) = x^2$ is reflected over the x-axis, horizontally stretched by a factor of 4, and translated down 3 units to create g. Use the description to write the quadratic function in vertex form.	29	Factor $x^3 + 3x^2 - 16x - 48$ completely. A. $(x + 3)(x^2 + 16)$ C. $(x + 3)(x + 4)(x - 4)$ B. $(x - 3)(x^2 + 16)$ D. $(x - 3)(x + 4)(x - 4)$
15	Graph $y \geq x^2 + 2x - 8$.	30	Divide. $(x^2 - 4x + 7) \div (x + 3)$

31 Which of the following conclusions is true about the statement? $-x^4 = \sqrt[4]{x}$

A. The statement is always true.
B. The statement is true when x is negative.
C. The statement is true when $x = 0$.
D. The statement is never true.

32 Identify the axis of symmetry for the graph of $f(x) = 3x^2 + 12x + 4$.

33 On a recent test, Jorge wrote the equation $\frac{x^2 - 49}{x + 7} = x - 7$.
Which of the following statements is correct about the equation he wrote?

A. The equation is always true.
B. The equation is always true, except when $x = -7$.
C. The equation is sometimes true when $x = -7$.
D. The equation is never true.

34 Use inverse operations to write the inverse of $f(x) = x + \frac{2}{5}$

35 Write the logarithmic equation $\log_3 27 = 3$ in exponential form.

36 Evaluate $\log_3 \frac{1}{81}$ by using mental math.

37 Simplify the expression $\log_6 216$.

38 In 1995 the population of a small town was 450. If the annual rate of increase is about 0.4%, write an expression that represents the population 6 years later.

39 Determine whether f is an exponential function of x of the form $f(x) = ab^x$. If so, find the constant ratio.

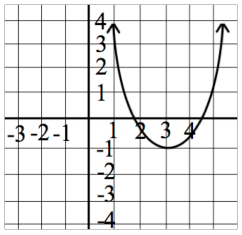
x	-1	0	1	2	3
$f(x)$	0.525	4.2	33.6	268.8	2150.4

A. The second differences are not constant.
The data set is not exponential.
B. The ratio of the successive first differences is constant.
$f(x)$ is a linear function of x.
C. The data set is exponential with a constant ratio of 7.4.
D. The data set is exponential with a constant ratio of 8.

40 What is the solution to the equation $11^x = 2$?

A. $x = 9$
B. $x = \frac{\log_{10} 2}{\log_{10} 11}$
C. $x = \log_{10} 2 + \log_{10} 11$
D. $x = \log_{10} 9$

41 Use a table to translate the graph 2 units down.



42 Find P(-4) using the Remainder Theorem.
$P(x) = x^4 + 3x^2 - 22x + 16$ for x = -4.

43 Completely factor the expression $250x^5 + 54x^2y^3$.

A. $2x^2(5x + 3y)^3$
B. $2x^2(125x^3 + 27y^3)$
C. $2x^2(5x + 3y)(25x^2 - 15xy + 9y^2)$
D. $2x^2(5x + 3y)(25x^2 + 15xy + 9y^2)$

44 Subtract. Write your answer in standard form.
$(6x^2 + 7x - 12) - (4x^2 - 22)$

45 Simplify the expression $(6)^0(5)^{-3}$.

46 Tell whether the function $y = 6(2)^x$ shows growth or decay. Then graph the function.

47 Solve $16^{x-2} = 64^x$.

48 Which is the first incorrect step in simplifying $\log_2 \frac{8}{64}$?

Step 1: $\log_2 \frac{8}{64} = \log_2 8 + \log_2 64$
Step 2: $= 3 + 6$
Step 3: $= 9$

49 A student showed the following steps in his solution of the equation below, but his answer was not correct. Which is his first incorrect step in solving this equation?

$$\log_6(2x^2 + x - 6) - \log_6(2x - 3) = 4$$

Step 1: $\log_6(x + 2)(2x - 3) - \log_6(2x - 3) = 4$
Step 2: $\log_6(x + 2) = 4$
Step 1: $x + 2 = 24$
Step 3: $x = 22$

50 If x is a real number, for what values of x is the equation $\frac{3x - 18}{3} = x - 6$ true?

A. all values of x
B. some values of x
C. no values of x
D. impossible to determine