Introduction - Algebra II

The following released test questions are taken from the Algebra II Standards Test. This test is one of the California Standards Tests administered as part of the Standardized Testing and Reporting (STAR) Program under policies set by the State Board of Education.

All questions on the California Standards Tests are evaluated by committees of content experts, including teachers and administrators, to ensure their appropriateness for measuring the California academic content standards in Algebra II. In addition to content, all items are reviewed and approved to ensure their adherence to the principles of fairness and to ensure no bias exists with respect to characteristics such as gender, ethnicity, and language.

This document contains released test questions from the California Standards Test forms in 2003, 2004, 2005, 2006, and 2007. First on the pages that follow are lists of the standards assessed on the Algebra II Test. Next are released test questions. Following the questions is a table that gives the correct answer for each question, the content standard that each question is measuring, and the year each question last appeared on the test.

The following table lists each reporting cluster, the number of items that appear on the exam, and the number of released test questions that appear in this document. Some of the released test questions for Algebra II are the same test questions found in different combinations on the Integrated Mathematics 2 and 3 California Standards Tests and the Summative High School Mathematics California Standards Test.

REPORTING CLUSTER	NUMBER OF QUESTIONS ON EXAM	NUMBER OF RELEASED TEST QUESTIONS
Polynomials and Rational Expressions	19	23
Quadratics, Conics, and Complex Numbers	17	20
Exponents and Logarithms	15	19
Series, Combinatorics, and Probability and Statistics	14	18
TOTAL	65	80

In selecting test questions for release, three criteria are used: (1) the questions adequately cover a selection of the academic content standards assessed on the Algebra II Test; (2) the questions demonstrate a range of difficulty; and (3) the questions present a variety of ways standards can be assessed. These released test questions do not reflect all of the ways the standards may be assessed. Released test questions will not appear on future tests.

For more information about the California Standards Tests, visit the California Department of Education's Web site at http://www.cde.ca.gov/ta/tg/sr/resources.asp.

THE POLYNOMIALS AND RATIONAL EXPRESSIONS REPORTING CLUSTER

The following five California content standards are included in the Polynomials and Rational Expressions reporting cluster and are represented in this booklet by 23 test questions. These questions represent only some ways in which these standards may be assessed on the Algebra II California Mathematics Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Algebra II	
1.0*	Students solve equations and inequalities involving absolute value.
2.0*	Students solve systems of linear equations and inequalities (in two or three variables) by substitution, with graphs, or with matrices.
3.0*	Students are adept at operations on polynomials, including long division.
4.0*	Students factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes.
7.0*	Students add, subtract, multiply, divide, reduce, and evaluate rational expressions with monomial and polynomial denominators and simplify complicated rational expressions, including those with negative exponents in the denominator.

* Denotes key standards

THE QUADRATICS, CONICS, AND COMPLEX NUMBERS REPORTING CLUSTER

The following seven California content standards are included in the Quadratics, Conics, and Complex Numbers reporting cluster and are represented in this booklet by 20 test questions. These questions represent only some ways in which these standards may be assessed on the Algebra II California Mathematics Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Algebra II	
5.0*	Students demonstrate knowledge of how real and complex numbers are related both arithmetically and graphically. In particular, they can plot complex numbers as points in the plane.
6.0*	Students add, subtract, multiply, and divide complex numbers.
8.0*	Students solve and graph quadratic equations by factoring, completing the square, or using the quadratic formula. Students apply these techniques in solving word problems. They also solve quadratic equations in the complex number system.
9.0*	Students demonstrate and explain the effect that changing a coefficient has on the graph of quadratic functions; that is, students can determine how the graph of a parabola changes as a, b, and c vary in the equation $y = a(x - b)^2 + c$.
10.0*	Students graph quadratic functions and determine the maxima, minima, and zeros of the function.
16.0	Students demonstrate and explain how the geometry of the graph of a conic section (e.g., asymptotes, foci, eccentricity) depends on the coefficients of the quadratic equation representing it.
17.0	Given a quadratic equation of the form $ax^2 + by^2 + cx + dy + e = 0$, students can use the method for completing the square to put the equation into standard form and can recognize whether the graph of the equation is a circle, ellipse, parabola, or hyperbola. Students can then graph the equation.

* Denotes key standards

THE EXPONENTS AND LOGARITHMS REPORTING CLUSTER

The following six California content standards are included in the Exponents and Logarithms reporting cluster and are represented in this booklet by 19 test questions. These questions represent only some ways in which these standards may be assessed on the Algebra II California Mathematics Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Algebra II	
Standard Set 11.0* Students prove simple laws of logarithms.	
11.1*	Students understand the inverse relationship between exponents and logarithms, and use this relationship to solve problems involving logarithms and exponents.
11.2*	Students judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step.
12.0*	Students know the laws of fractional exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay.
13.0	Students use the definition of logarithms to translate between logarithms in any base.
14.0	Students understand and use the properties of logarithms to simplify logarithmic numeric expressions and to identify their approximate values.
15.0*	Students determine whether a specific algebraic statement involving rational expressions, radical expressions, or logarithmic or exponential functions is sometimes true, always true, or never true.

* Denotes key standards

THE SERIES, COMBINATORICS, AND PROBABILITY AND STATISTICS REPORTING CLUSTER

The following 10 California content standards are included in the Series, Combinatorics, and Probability and Statistics reporting cluster and are represented in this booklet by 18 test questions. These questions represent only some ways in which these standards may be assessed on the Algebra II California Mathematics Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Algebra II	
18.0*	Students use fundamental counting principles to compute combinations and permutations.
19.0*	Students use combinations and permutations to compute probabilities.
20.0*	Students know the binomial theorem and use it to expand binomial expressions that are raised to positive integer powers.
21.0	Students apply the method of mathematical induction to prove general statements about the positive integers.
22.0	Students find the general term and the sums of arithmetic series and of both finite and infinite geometric series.
24.0	Students solve problems involving functional concepts, such as composition, defining the inverse function and performing arithmetic operations on functions.
25.0	Students use properties from number systems to justify steps in combining and simplifying functions.
Probability and Statistics	
PS1.0	Students know the definition of the notion of *independent events* and can use the rules for addition, multiplication, and complementation to solve for probabilities of particular events in finite sample spaces.
PS2.0	Students know the definition of *conditional probability* and use it to solve for probabilities in finite sample spaces.
PS7.0	Students compute the variance and the standard deviation of a distribution of data.

* Denotes key standards

Algebra II — Released Test Questions

1 **What is the complete solution to the equation $|3-6x|=15$?**

A $x=2; x=3$

B $x=-2; x=3$

C $x=2; x=-3$

D $x=-2; x=-3$

CST00507

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2 **What are the possible values of x in $|12-4x|=2$?**

A $x=-2.50$ or $x=-3.50$

B $-3.50<x<-2.50$

C $3.5>x>2.5$

D $x=2.50$ or $x=3.50$

CST20085

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3 **For a wedding, Shereda bought several dozen roses and several dozen carnations. The roses cost $15 per dozen, and the carnations cost $8 per dozen. Shereda bought a total of 17 dozen flowers and paid a total of $192. How many roses did she buy?**

A 6 dozen

B 7 dozen

C 8 dozen

D 9 dozen

CST00099

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4 **What is the solution to the system of equations shown below?**

$$\begin{cases} 2x-y+3z=8 \\ x-6y-z=0 \\ -6x+3y-9z=24 \end{cases}$$

A $(0,4,4)$

B $\left(1,4,\frac{10}{3}\right)$

C no solution

D infinitely many solutions

CST00203

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5 **A restaurant manager bought 20 packages of bagels. Some packages contained 6 bagels each, and the rest contained 12 bagels each. There were 168 bagels in all. How many packages of 12 bagels did the manager buy?**

A 6

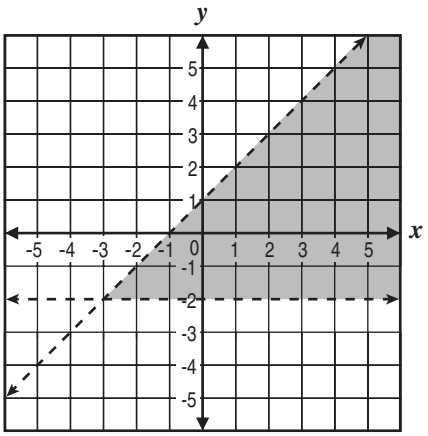
B 8

C 9

D 12

CST00491

6 **What system of inequalities *best* represents the graph shown below?**



A $y > -2$ and $y > x + 1$

B $y > -2$ and $y < x + 1$

C $y < -2$ and $y > x + 1$

D $y < -2$ and $y < x + 1$

CST00500

7 **Which point lies in the solution set for the system** $\begin{cases} 2y - x \geq -6 \\ 2y - 3x < -6 \end{cases}$ **?**

A $(-4, -1)$

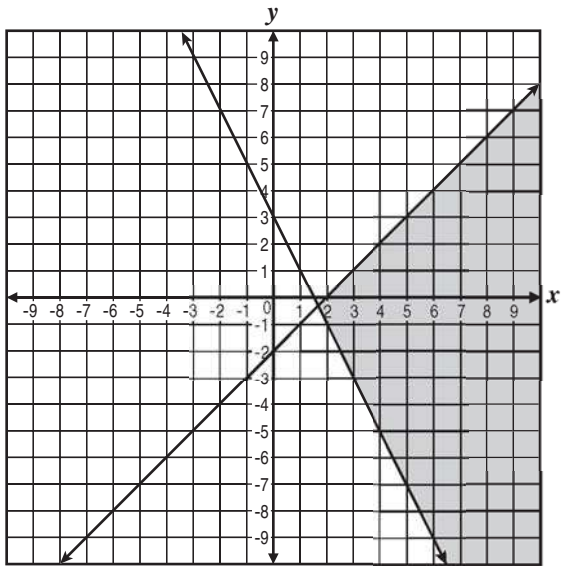
B $(3, 1)$

C $(0, -3)$

D $(4, 3)$

CST10059

8 **Which system of linear inequalities is represented by this graph?**



A $\begin{cases} y \geq \frac{1}{2}x + 3 \\ y \geq x - 2 \end{cases}$

B $\begin{cases} y \geq 2x + 3 \\ y \leq x - 2 \end{cases}$

C $\begin{cases} 2x - y \geq 3 \\ x + y \leq 2 \end{cases}$

D $\begin{cases} 2x + y \geq 3 \\ x - y \geq 2 \end{cases}$

CST20079

9 $2x+7\overline{)2x^4+21x^3+35x^2-37x+46}$

A $x^3+7x^2-7x+6-\frac{4}{2x+7}$

B $2x^3+14x^2-14x+12-\frac{4}{2x+7}$

C $x^3-7x^2+7x-6+\frac{4}{2x+7}$

D $x^3+7x^2-7x+6+\frac{4}{2x+7}$

CST00109

10 **Which polynomial represents $(3x^2+x-4)(2x-5)$?**

A $6x^3-13x^2-13x-20$

B $6x^3-13x^2-13x+20$

C $6x^3+13x^2+3x-20$

D $6x^3+13x^2+3x+20$

CST10024

11 $(-2x^2+6x+1)-2(4x^2-3x+1)=$

A $6x^2-1$

B $-10x^2-1$

C $6x^2+12x-1$

D $-10x^2+12x-1$

CST00233

12 **Which expression is equivalent to $(6y^2-2)(6y+2)$?**

A $36y^2-4$

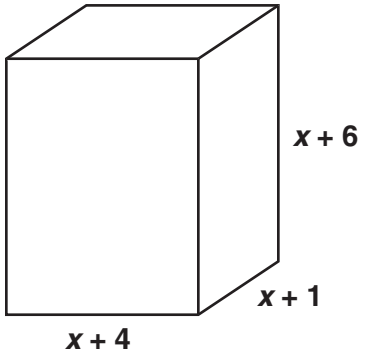
B $36y^3-4$

C $36y^2+12y^2+12y-4$

D $36y^3+12y^2-12y-4$

CST20008

13 **What is the volume of the figure below?**



A $x^3+10x^2+34x+24$

B $x^3+11x^2+34x+24$

C $x^3+10x^2+24x+24$

D $x^3+11x^2+24x+24$

CST10285

14 $8a^3+c^3=$

A $(2a+c)(2a+c)(2a+c)$

B $(2a-c)(4a^2+2ac+c^2)$

C $(2a-c)(4a^2+4ac+c^2)$

D $(2a+c)(4a^2-2ac+c^2)$

CST00118

15 **The total area of a rectangle is $4x^4 - 9y^2$. Which factors could represent the length times width?**

A $(2x^2 - 3y)(2x^2 + 3y)$

B $(2x^2 + 3y)(2x^2 + 3y)$

C $(2x - 3y)(2x - 3y)$

D $(2x + 3y)(2x - 3y)$

CST10028

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16 **Which product of factors is equivalent to $(x+1)^2 - y^2$?**

A $(x + 1 + y)^2$

B $(x + 1 - y)^2$

C $(x - 1 + y)(x - 1 - y)$

D $(x + 1 + y)(x + 1 - y)$

CST10030

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17 **Which expression shows the complete factorization of $12x^2 - 147$?**

A $(3x - 7)(4x + 2)$

B $(4x - 21)(3x + 7)$

C $12(x - 7)(x + 7)$

D $3(2x - 7)(2x + 7)$

CST20117

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18 $$\frac{x+3}{x+5} + \frac{6}{x^2+3x-10} =$$

A $\dfrac{x^2 + x}{x^2 + 3x - 10}$

B $\dfrac{7x - 9}{x^2 + 3x - 10}$

C $\dfrac{x^2 + x + 12}{x^2 + 3x - 10}$

D $\dfrac{x^2 + x + 1}{x^2 + 3x - 10}$

CST00295

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19 **Which is a simplified form of $\dfrac{3a^2b^3c^{-2}}{(a^{-1}b^2c)^3}$?**

A $\dfrac{3a^5}{b^3c^5}$

B $\dfrac{3ab}{c^5}$

C $\dfrac{3}{b^2c^5}$

D $\dfrac{3}{ab^3c^5}$

CST00267

20 What is $\frac{20x^{-4}}{27y^2} \div \frac{8x^{-3}}{15y^{-5}}$?

A $\frac{32y^3}{81x}$

B $\frac{32}{81xy^7}$

C $\frac{25y^3}{18x}$

D $\frac{25}{18xy^7}$

CST20321

21 Which product is equivalent to $\frac{4x^2-16}{2-x}$?

A $4(x-2)$

B $4(x+2)$

C $-4(x-2)$

D $-4(x+2)$

CST10041

22 $\frac{x^2+4x}{x+3} \bullet \frac{x^2-9}{x^2+x-12} =$

A 1

B x

C $x+4$

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

CST10043

23 What is the simplest form of $\frac{5x^3y+20x^2y^2+20xy^3}{5xy}$?

A $(x+2)^2$

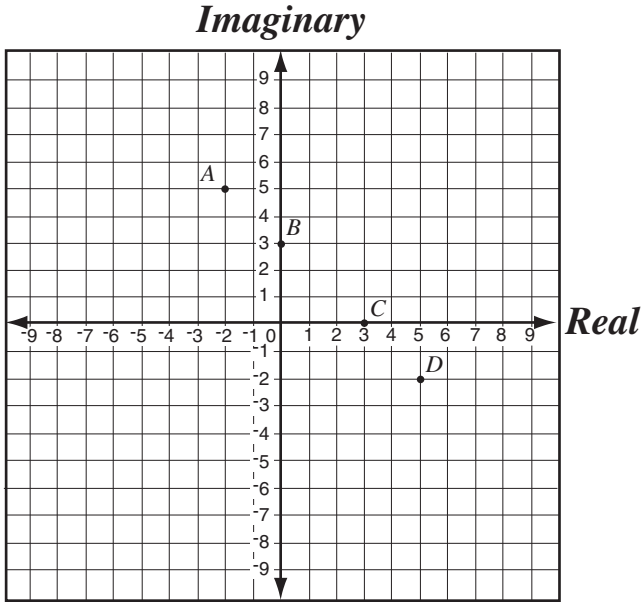
B $(x+2y)^2$

C x^2+y^2

D x^2+4y^2

CST10049

24 If $i=\sqrt{-1}$, which point shows the location of $5-2i$ on the plane?



A point A

B point B

C point C

D point D

CST00510

25 If $i = \sqrt{-1}$, what is the value of i^4?

A i

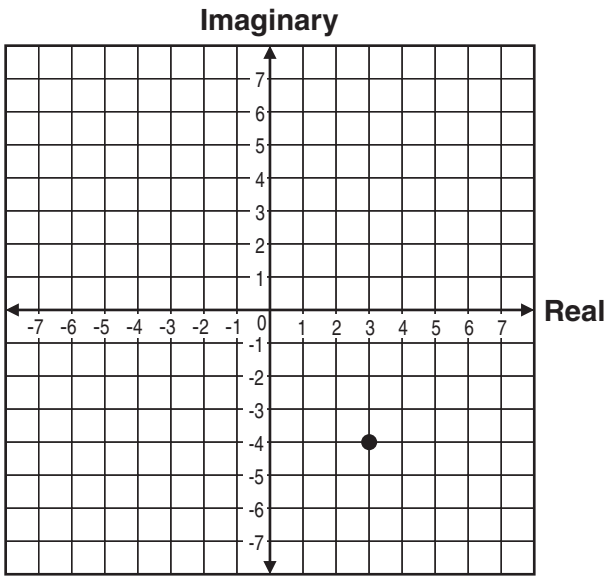
B $-i$

C 1

D -1

CST00238

26 Which of the following complex numbers is represented by the point on the graph below?



A $4+3i$

B $4-3i$

C $3-4i$

D $3+4i$

CST30142

27 If $i = \sqrt{-1}$, then $4i(6i) =$

A 48

B 24

C -24

D -48

CST00512

28 What is an equivalent form of $\frac{2}{3+i}$?

A $\frac{3-i}{4}$

B $\frac{3-i}{5}$

C $\frac{4-i}{4}$

D $\frac{4-i}{5}$

CST10040

29 What is the product of the complex numbers $(3+i)$ and $(3-i)$?

A 8

B 10

C $9-i$

D $10-6i$

CST10038

30 If $i = \sqrt{-1}$ and a and b are non-zero real numbers, what is $\frac{1}{a+bi}$?

A $\frac{a+bi}{a^2+b^2}$

B $\frac{a-bi}{a^2+b^2}$

C $\frac{a+bi}{a^2-b^2}$

D $\frac{a-bi}{a^2-b^2}$

CST10371

31 What are the solutions to the equation $x^2+2x+2=0$?

A $x=0; x=-2$

B $x=0; x=-2i$

C $x=-1+i; x=-1-i$

D $x=-1+2\sqrt{2}; x=-1-2\sqrt{2}$

CST00114

32 What are the solutions to the equation $1+\frac{1}{x^2}=\frac{3}{x}$?

A $x=\frac{3}{2}+\frac{\sqrt{5}}{2}; x=\frac{3}{2}-\frac{\sqrt{5}}{2}$

B $x=3+\frac{\sqrt{5}}{2}; x=3-\frac{\sqrt{5}}{2}$

C $x=\frac{3}{2}+\frac{\sqrt{13}}{2}; x=\frac{3}{2}-\frac{\sqrt{13}}{2}$

D $x=3+\frac{\sqrt{13}}{2}; x=3-\frac{\sqrt{13}}{2}$

CST00197

33 There are two numbers with the following properties.

1) The second number is 3 more than the first number.

2) The product of the two numbers is 9 more than their sum.

Which of the following represents possible values of these two numbers?

A $-6, -3$

B $-4, -1$

C $-1, 4$

D $-3, 6$

CST20109

34 Jenny is solving the equation $x^2-8x=9$ by completing the square. What number should be added to both sides of the equation to complete the square?

A 2

B 4

C 8

D 16

CST00508

35 Which of the following *most* accurately describes the translation of the graph $y=(x+3)^2-2$ to the graph of $y=(x-2)^2+2$?

A up 4 and 5 to the right

B down 2 and 2 to the right

C down 2 and 3 to the left

D up 4 and 2 to the left

CST10074

36 **Which of the following sentences is true about the graphs of $y = 3(x-5)^2 + 1$ and $y = 3(x+5)^2 + 1$?**

A Their vertices are maximums.

B The graphs have the same shape with different vertices.

C The graphs have different shapes with different vertices.

D One graph has a vertex that is a maximum, while the other graph has a vertex that is a minimum.

CST10294

37 **What are the x-intercepts of the graph of $y = 12x^2 - 5x - 2$?**

A 1 and $-\frac{1}{6}$

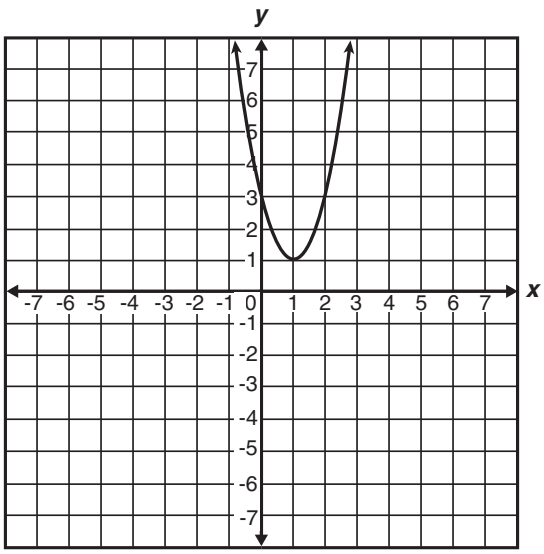
B -1 and $\frac{1}{6}$

C $\frac{2}{3}$ and $-\frac{1}{4}$

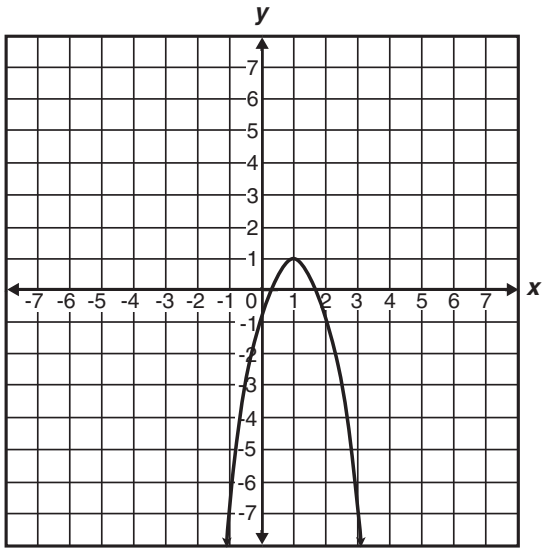
D $-\frac{2}{3}$ and $\frac{1}{4}$

CST00297

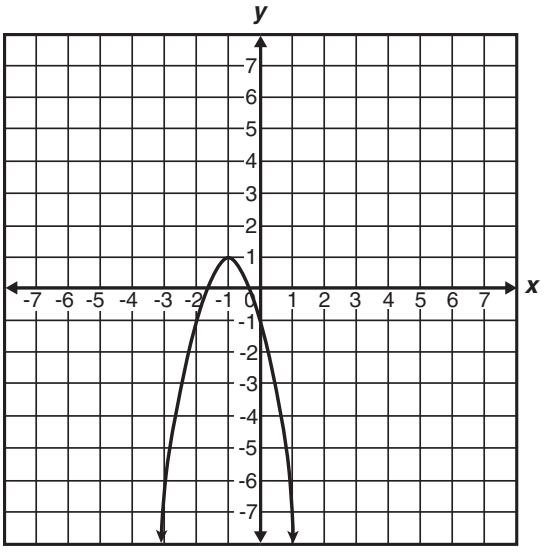
38 Which is the graph of $y = -2(x-1)^2 + 1$?



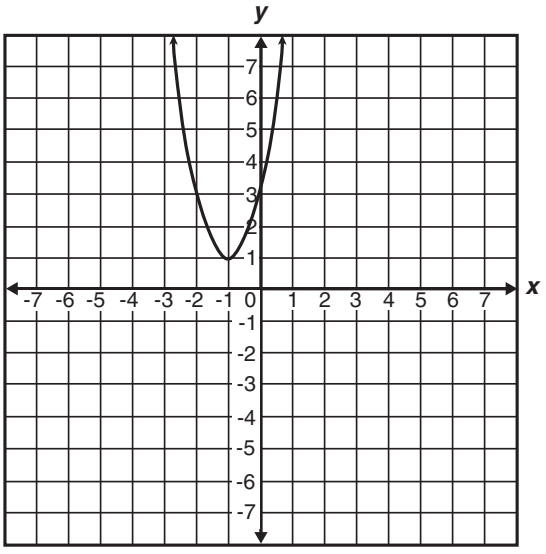
A



C



B



D

CST10292

39 **Which ordered pair is the vertex of $f(x) = x^2 + 6x + 5$?**

A $(-3, -4)$

B $(-2, -3)$

C $(-1, 0)$

D $(0, -5)$

CST10084

40 **The graph of $\left(\frac{x}{2}\right)^2 - \left(\frac{y}{3}\right)^2 = 1$ is a hyperbola. Which set of equations represents the asymptotes of the hyperbola's graph?**

A $y = \frac{3}{2}x,\ y = -\frac{3}{2}x$

B $y = \frac{2}{3}x,\ y = -\frac{2}{3}x$

C $y = \frac{1}{2}x,\ y = -\frac{1}{2}x$

D $y = \frac{1}{3}x,\ y = -\frac{1}{3}x$

CST10304

41 **Which of the following represents a parabola?**

A $x^2 + y^2 = r^2$

B $\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$

C $4px = y^2$

D $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$

CST20065

42 $$4x^2 - 5y^2 - 16x - 30y - 9 = 0$$

What is the standard form of the equation of the conic given above?

A $\frac{(x-4)^2}{11} - \frac{(y-3)^2}{4} = 1$

B $\frac{(y+3)^2}{4} - \frac{(x-2)^2}{5} = 1$

C $\frac{(y-3)^2}{6} - \frac{(x+2)^2}{9} = 1$

D $\frac{(x-4)^2}{11} + \frac{(y-3)^2}{4} = 1$

CST00146

43 **Which statement describes the graph of the equation $x^2 + y^2 + 4x - 6y - 3 = 0$?**

A a hyperbola with center $(-2, 3)$ and vertices $(4, -3)$ and $(-4, 3)$

B a hyperbola with center $(-2, 3)$ and vertices $(2, -3)$ and $(3, -2)$

C a circle with center $(-2, 3)$ and radius 8

D a circle with center $(-2, 3)$ and radius 4

CST20127

44 **What is the solution to the equation $5^x = 17$?**

A $x = 2$

B $x = \log_{10} 2$

C $x = \log_{10} 17 + \log_{10} 5$

D $x = \dfrac{\log_{10} 17}{\log_{10} 5}$

CST00132

45 **If $\log_{10} x = -2$, what is the value of x ?**

A $x = -\sqrt{\dfrac{1}{10}}$

B $x = \sqrt{\dfrac{1}{10}}$

C $x = \dfrac{1}{100}$

D $x = 100$

CST10255

46 **Which equation is equivalent to $\log_3 \dfrac{1}{9} = x$?**

A $\left(\dfrac{1}{9}\right)^3 = x^3$

B $\left(\dfrac{1}{9}\right)^3 = x$

C $3^x = \dfrac{1}{9}$

D $3^{\frac{1}{9}} = x$

CST10151

47 **Which is the first *incorrect* step in simplifying $\log_4 \dfrac{4}{64}$?**

Step 1: $\log_4 \dfrac{4}{64} = \log_4 4 - \log_4 64$

Step 2: $= 1 - 16$

Step 3: $= -15$

A Step 1

B Step 2

C Step 3

D Each step is correct.

CST00517

48 **Jeremy, Michael, Shanan, and Brenda each worked the same math problem at the chalkboard. Each student's work is shown below. Their teacher said that while two of them had the correct answer, only one of them had arrived at the correct conclusion using correct steps.**

Jeremy's work

$$x^3x^{-7} = \frac{x^3}{x^{-7}} = x^{10}, x \neq 0$$

Shanan's work

$$x^3x^{-7} = \frac{x^3}{x^7} = \frac{1}{x^4}, x \neq 0$$

Michael's work

$$x^3x^{-7} = \frac{x^3}{x^{-7}} = x^{-4}, x \neq 0$$

Brenda's work

$$x^3x^{-7} = \frac{x^3}{x^7} = x^4, x \neq 0$$

Which is a completely correct solution?

A Jeremy's work

B Michael's work

C Shanan's work

D Brenda's work

CST10301

49 **A student showed the following steps in his solution of the equation below, but his answer was not correct.**

$$\log_5(2x^2 - 3x + 1) - \log_5(x - 1) + \log_5 125 = 6$$

Step 1: $\log_5(2x - 1)(x - 1) - \log_5(x - 1) + 3 = 6$

Step 2: $\log_5(2x - 1)(x - 1) - \log_5(x - 1) = 3$

Step 3: $\log_5(x - 1) = 3$

Step 4: $x - 1 = 125$

Step 5: $x = 126$

In which step did he make his first error?

A Step 1

B Step 2

C Step 3

D Step 4

CST10336

50 **A certain radioactive element decays over time according to the equation** $y = A\left(\frac{1}{2}\right)^{\frac{t}{300}}$, **where A = the number of grams present initially and *t* = time in years. If 1000 grams were present initially, how many grams will remain after 900 years?**

A 500 grams

B 250 grams

C 125 grams

D 62.5 grams

CST00367

51 **Bacteria in a culture are growing exponentially with time, as shown in the table below.**

Bacteria Growth

Day	Bacteria
0	100
1	200
2	400

Which of the following equations expresses the number of bacteria, y, present at any time, t?

A $y = 100 + 2^t$

B $y = (100) \cdot (2)^t$

C $y = 2^t$

D $y = (200) \cdot (2)^t$

CST10253

52 **If the equation $y = 2^x$ is graphed, which of the following values of x would produce a point closest to the x-axis?**

A $\frac{1}{4}$

B $\frac{3}{4}$

C $\frac{5}{3}$

D $\frac{8}{3}$

CST20145

53 **Which table below correctly describes points of the exponential function $f(x) = 3^{-x} - 2$?**

A

x	-2	-1	0
$f(x)$	-18	-6	-2

B

x	-2	-1	0
$f(x)$	-4	-5	-2

C

x	-2	-1	0
$f(x)$	$-1\frac{8}{9}$	$-1\frac{2}{3}$	-1

D

x	-2	-1	0
$f(x)$	7	1	-1

CST20196

54 $\log_6 40 =$

A $\log_{10} 6 + \log_{10} 40$

B $\log_{10} 6 - \log_{10} 40$

C $(\log_{10} 6)(\log_{10} 40)$

D $\frac{\log_{10} 40}{\log_{10} 6}$

CST00199

55 **Jonathan wrote the equation $\log_6(x-4)=0$ on the board. He needs one clue for problem solving. Which fact provides the correct information that he needs to solve the equation?**

A $6^0=1$

B $6^1=6$

C $4-4=0$

D $6-4=2$

CST10484

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56 **What is the value of $\log_3 27$?**

A 2

B 3

C 6

D 9

CST00519

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57 **If $\log 2 \approx 0.301$ and $\log 3 \approx 0.477$, what is the approximate value of log 72?**

A 0.051

B 0.778

C 0.861

D 1.857

CST10362

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58 **If x is a real number, for what values of x is the equation $\frac{3x-9}{3}=x-3$ true?**

A all values of x

B some values of x

C no values of x

D impossible to determine

CST00032

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59 **On a recent test, Jeremy wrote the equation $\frac{x^2-16}{x-4}=x+4$. 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 $x=4$.

C The equation is never true.

D The equation is sometimes true when $x=4$.

CST10260

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60 **Given the equation $y=x^n$ where $x>0$ and $n<0$, which statement is valid for real values of y?**

A $y>0$

B $y=0$

C $y<0$

D $y\leq 0$

CST20140

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61 **If x is a real number, which *best* describes the values of x for which the inequality $\sqrt{x}>0$ is true?**

A all $x>0$

B all $x\geq 0$

C all values of x

D no values of x

CST00396

62 **Which of the following conclusions is true about the statement below?**

$$x^2 = \sqrt{x}$$

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.

CST10162

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63 **Abelardo wants to create several different 7-character screen names. He wants to use arrangements of the first 3 letters of his first name (abe), *followed by* arrangements of 4 digits in 1984, the year of his birth. How many different screen names can he create in this way?**

A 72

B 144

C 288

D 576

CST10401

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64 **A train is made up of a locomotive, 7 different cars, and a caboose. If the locomotive must be first, and the caboose must be last, how many different ways can the train be ordered?**

A 5040

B 181,440

C 362,880

D 823,543

CST10391

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65 **Teresa and Julia are among 10 students who have applied for a trip to Washington, D.C. Two students from the group will be selected at random for the trip. What is the probability that Teresa and Julia will be the 2 students selected?**

A $\frac{1}{45}$

B $\frac{2}{45}$

C $\frac{1}{5}$

D $\frac{2}{5}$

CST00071

---

66 $(3y-1)^4 =$

A $81y^4 - 108y^3 + 54y^2 - 12y + 1$

B $81y^4 + 108y^3 - 54y^2 - 12y + 1$

C $81y^4 - 54y^3 - 108y^2 - 12y + 1$

D $81y^4 + 54y^3 - 108y^2 - 12y + 1$

CST00308

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67 **How many terms does the binomial expansion of $\left(x^2 + 2y^3\right)^{20}$ contain?**

A 20

B 21

C 40

D 60

CST10316

68 **What are the first 4 terms in the expansion of $(1+2x)^6$?**

A $1+12x+30x^2+40x^3$

B $1+12x+24x^2+48x^3$

C $1+12x+30x^2+120x^3$

D $1+12x+60x^2+160x^3$

CST20022

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69 **What is the sum of the infinite geometric series**

$$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\ldots?$$

A 1

B 1.5

C 2

D 2.5

CST20167

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70 **What is the *n*th term in the arithmetic series below?**

$$3+7+11+15+19\ldots$$

A $4n$

B $3+4n$

C $2n+1$

D $4n-1$

CST10178

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71 **Which expression represents $f(g(x))$ if $f(x)=x^2-1$ and $g(x)=x+3$?**

A x^3+3x^2-x-3

B x^2+6x+8

C x^2+x+2

D x^2+8

CST20032

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72 **Given that $f(x)=3x^2-4$ and $g(x)=2x-6$, what is $g(f(2))$?**

A -2

B 6

C 8

D 10

CST30049

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73 **If $f(x)=x^2+2x+1$ and $g(x)=3(x+1)^2$, which is an equivalent form of $f(x)+g(x)$?**

A x^2+4x+2

B $4x^2+2x+4$

C $4x^2+8x+4$

D $10x^2+20x+10$

CST10204

74 **A math teacher is randomly distributing 15 rulers with centimeter labels and 10 rulers without centimeter labels. What is the probability that the first ruler she hands out will have centimeter labels and the second ruler will *not* have labels?**

A $\frac{1}{24}$

B $\frac{1}{4}$

C $\frac{2}{5}$

D $\frac{23}{25}$

CST10435

75 **On a certain day the chance of rain is 80% in San Francisco and 30% in Sydney. Assume that the chance of rain in the two cities is independent. What is the probability that it will *not* rain in either city?**

A 7%

B 14%

C 24%

D 50%

CST20180

76 **One bag contains 2 green marbles and 4 white marbles, and a second bag contains 3 green marbles and 1 white marble. If Trent randomly draws one marble from each bag, what is the probability that they are both green?**

A $\frac{1}{4}$

B $\frac{2}{5}$

C $\frac{1}{2}$

D $\frac{5}{6}$

CST20181

77 **A box contains 7 large red marbles, 5 large yellow marbles, 3 small red marbles, and 5 small yellow marbles. If a marble is drawn at random, what is the probability that it is yellow, given that it is one of the large marbles?**

A $\frac{5}{12}$

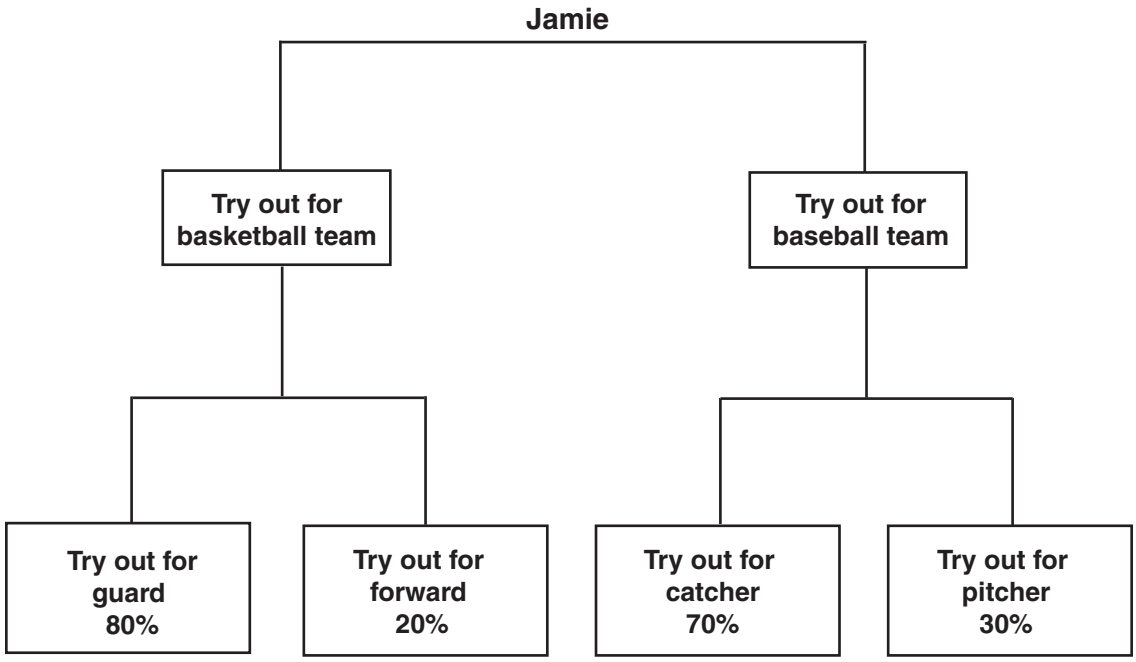
B $\frac{7}{20}$

C $\frac{5}{8}$

D $\frac{1}{5}$

CSN00211

78 **The probabilities that Jamie will try out for various sports and team positions are shown in the chart below.**



Jamie will definitely try out for either basketball or baseball, but not both. The probability that Jamie will try out for baseball and try out for catcher is 42%. What is the probability that Jamie will try out for basketball?

A 40%

B 60%

C 80%

D 90%

CST10210

79 **A small-business owner must hire seasonal workers as the need arises. The following list shows the number of employees hired monthly for a 5-month period.**

4, 13, 5, 6, 9

If the mean of these data is approximately 7, what is the population standard deviation for these data? (Round the answer to the nearest tenth.)

A 3.3

B 7.4

C 10.8

D 13.5

CST20052

80 **3, 6, 2, 1, 7, 5**

James found the mean and standard deviation of the set of numbers given above. If he adds 5 to each number, which of the following will result?

A The mean will be multiplied by 5.

B The standard deviation will increase by 5.

C The mean will not change.

D The standard deviation will not change.

CSN00127

Question Number	Correct Answer	Standard	Year of Release
1	*B*	1.0	2004
2	*D*	1.0	2007
3	*C*	2.0	2003
4	*C*	2.0	2004
5	*B*	2.0	2006
6	*B*	2.0	2006
7	*B*	2.0	2007
8	*D*	2.0	2007
9	*D*	3.0	2003
10	*B*	3.0	2004
11	*D*	3.0	2005
12	*D*	3.0	2006
13	*B*	3.0	2007
14	*D*	4.0	2003
15	*A*	4.0	2005
16	*D*	4.0	2006
17	*D*	4.0	2007
18	*A*	7.0	2003
19	*A*	7.0	2004
20	*D*	7.0	2005
21	*D*	7.0	2006
22	*B*	7.0	2006
23	*B*	7.0	2006
24	*D*	5.0	2003
25	*C*	5.0	2005
26	*C*	5.0	2007
27	*C*	6.0	2003
28	*B*	6.0	2004
29	*B*	6.0	2005
30	*B*	6.0	2007
31	*C*	8.0	2003
32	*A*	8.0	2004
33	*B*	8.0	2005
34	*D*	8.0	2006
35	*A*	9.0	2004

Question Number	Correct Answer	Standard	Year of Release
36	*B*	9.0	2005
37	*C*	10.0	2003
38	*C*	10.0	2004
39	*A*	10.0	2006
40	*A*	16.0	2004
41	*C*	16.0	2007
42	*B*	17.0	2003
43	*D*	17.0	2007
44	*D*	11.1	2003
45	*C*	11.1	2004
46	*C*	11.1	2005
47	*B*	11.2	2003
48	*C*	11.2	2005
49	*C*	11.2	2007
50	*C*	12.0	2003
51	*B*	12.0	2004
52	*A*	12.0	2005
53	*D*	12.0	2007
54	*D*	13.0	2004
55	*A*	13.0	2007
56	*B*	14.0	2003
57	*D*	14.0	2004
58	*A*	15.0	2003
59	*B*	15.0	2004
60	*A*	15.0	2006
61	*A*	15.0	2006
62	*C*	15.0	2007
63	*B*	18.0	2005
64	*A*	18.0	2006
65	*A*	19.0	2005
66	*A*	20.0	2003
67	*B*	20.0	2006
68	*D*	20.0	2007
69	*A*	22.0	2005
70	*D*	22.0	2006

Question Number	Correct Answer	Standard	Year of Release
71	*B*	24.0	2005
72	*D*	24.0	2007
73	*C*	25.0	2004
74	*B*	PS1.0	2004
75	*B*	PS1.0	2006
76	*A*	PS1.0	2007
77	*A*	PS2.0	2003
78	*A*	PS2.0	2006
79	*A*	PS7.0	2005
80	*D*	PS7.0	2006