

JEFFERSON MATH PROJECT REGENTS BY PERFORMANCE INDICATOR: TOPIC

NY Algebra 2/Trigonometry Regents Exam Questions
from Fall 2009 to June 2012 Sorted by PI: Topic

www.jmap.org

Dear Sir

I have to acknowledge the receipt of your favor of May 14. in which you mention that you have finished the 6. first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. there are some propositions in the latter books of Euclid, & some of Archimedes, which are useful, & I have no doubt you have been made acquainted with them. trigonometry, so far as this, is most valuable to every man, there is scarcely a day in which he will not resort to it for some of the purposes of common life. the science of calculation also is indispensable as far as the extraction of the square & cube roots; Algebra as far as the quadratic equation & the use of logarithms are often of value in ordinary cases: but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence. in this light I view the conic sections, curves of the higher orders, perhaps even spherical trigonometry, Algebraical operations beyond the 2d dimension, and fluxions.

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.

TABLE OF CONTENTS

<u>TOPIC</u>	<u>PI: SUBTOPIC</u>	<u>QUESTION NUMBER</u>
GRAPHS AND STATISTICS	A2.S.1-2: Analysis of Data	1-5
	A2.S.3: Average Known with Missing Data	6-7
	A2.S.4: Dispersion	8-10
	A2.S.6-7: Regression	11-15
	A2.S.8: Correlation Coefficient	16-18
	A2.S.5: Normal Distributions	19-23
PROBABILITY	A2.S.10: Permutations	24-27
	A2.S.11: Combinations	28-31
	A2.S.9: Differentiating Permutations and Combinations	32-33
	A2.S.12: Sample Space	34
	A2.S.13: Geometric Probability	35
	A2.S.15: Binomial Probability	36-41
ABSOLUTE VALUE	A2.A.1: Absolute Value Equations and Equalities	42-45
QUADRATICS	A2.A.20-21: Roots of Quadratics	46-51
	A2.A.7: Factoring Polynomials	52-54
	A2.A.7: Factoring the Difference of Perfect Squares	55
	A2.A.7: Factoring by Grouping	56
	A2.A.25: Quadratic Formula	57-58
	A2.A.2: Using the Discriminant	59-61
	A2.A.24: Completing the Square	62-64
	A2.A.4: Quadratic Inequalities	65-67
SYSTEMS	A2.A.3: Quadratic-Linear Systems	68-69
POWERS	A2.N.3: Operations with Polynomials	70-74
	A2.N.1, A.8-9: Negative and Fractional Exponents	75-81
	A2.A.12: Evaluating Exponential Expressions	82-84
	A2.A.18: Evaluating Logarithmic Expressions	85-86
	A2.A.53: Graphing Exponential Functions	87-88
	A2.A.54: Graphing Logarithmic Functions	89-90
	A2.A.19: Properties of Logarithms	91-94
	A2.A.28: Logarithmic Equations	95-99
	A2.A.6, 27: Exponential Equations	100-106
	A2.A.36: Binomial Expansions	107-111
	A2.A.26, 50: Solving Polynomial Equations	112-117
RADICALS	A2.A.13: Simplifying Radicals	118-119
	A2.N.2, A.14: Operations with Radicals	120-123
	A2.N.5, A.15: Rationalizing Denominators	124-128
	A2.A.22: Solving Radicals	129-132
	A2.A.10-11: Exponents as Radicals	133-135
	A2.N.6: Square Roots of Negative Numbers	136
	A2.N.7: Imaginary Numbers	137-139
	A2.N.8: Conjugates of Complex Numbers	140-143
	A2.N.9: Multiplication and Division of Complex Numbers	144

RATIONALS	A2.N.9: Multiplication and Division of Rationals 145-146 A2.A.23: Solving Rationals 147-148 A2.A.17: Complex Fractions 149-150 A2.A.5: Inverse Variation 151-152
FUNCTIONS	A2.A.40-41: Functional Notation 153-154 A2.A.52: Families of Functions 155 A2.A.46: Properties of Graphs of Functions and Relations 156 A2.A.52: Identifying the Equation of a Graph 157-158 A2.A.38, 43: Defining Functions 159-166 A2.A.39, 51: Domain and Range 167-172 A2.A.42: Compositions of Functions 173-177 A2.A.44: Inverse of Functions 178-179 A2.A.46: Transformations with Functions and Relations . . . 180-181
SEQUENCES AND SERIES	A2.A.29-33: Sequences 182-191 A2.N.10, A.34: Sigma Notation 192-198 A2.A.35: Series 199-200
TRIGONOMETRY	A2.A.55: Trigonometric Ratios 201-203 A2.M.1-2: Radian Measure 204-210 A2.A.60: Unit Circle 211-213 A2.A.62, 66: Determining Trigonometric Functions 214-217 A2.A.64: Using Inverse Trigonometric Functions 218-220 A2.A.57: Reference Angles 221 A2.A.61: Arc Length 222-223 A2.A.58-59: Cofunction/Reciprocal Trigonometric Functions 224-227 A2.A.67: Proving Trigonometric Identities 228-229 A2.A.76: Angle Sum and Difference Identities 230-233 A2.A.77: Double and Half Angle Identities 234-236 A2.A.68: Trigonometric Equations 237-240 A2.A.69: Properties of Trigonometric Functions 241-242 A2.A.72: Identifying the Equation of a Trigonometric Graph 243-244 A2.A.65, 70-71: Graphing Trigonometric Functions 245-250 A2.A.63: Domain and Range 251-252 A2.A.74: Using Trigonometry to Find Area 253-257 A2.A.73: Law of Sines 258-259 A2.A.75: Law of Sines - The Ambiguous Case 260-263 A2.A.73: Law of Cosines 264-266 A2.A.73: Vectors 267-268
CONICS	A2.A.47, 49: Equations of Circles 269-273

Algebra 2/Trigonometry Regents Exam Questions by Performance Indicator: Topic

GRAPHS AND STATISTICS

A2.S.1-2: ANALYSIS OF DATA

- Which task is *not* a component of an observational study?
 - The researcher decides who will make up the sample.
 - The researcher analyzes the data received from the sample.
 - The researcher gathers data from the sample, using surveys or taking measurements.
 - The researcher divides the sample into two groups, with one group acting as a control group.
- A doctor wants to test the effectiveness of a new drug on her patients. She separates her sample of patients into two groups and administers the drug to only one of these groups. She then compares the results. Which type of study *best* describes this situation?
 - census
 - survey
 - observation
 - controlled experiment
- Howard collected fish eggs from a pond behind his house so he could determine whether sunlight had an effect on how many of the eggs hatched. After he collected the eggs, he divided them into two tanks. He put both tanks outside near the pond, and he covered one of the tanks with a box to block out all sunlight. State whether Howard's investigation was an example of a controlled experiment, an observation, or a survey. Justify your response.

- A survey completed at a large university asked 2,000 students to estimate the average number of hours they spend studying each week. Every tenth student entering the library was surveyed. The data showed that the mean number of hours that students spend studying was 15.7 per week. Which characteristic of the survey could create a bias in the results?
 - the size of the sample
 - the size of the population
 - the method of analyzing the data
 - the method of choosing the students who were surveyed
- The yearbook staff has designed a survey to learn student opinions on how the yearbook could be improved for this year. If they want to distribute this survey to 100 students and obtain the most reliable data, they should survey
 - every third student sent to the office
 - every third student to enter the library
 - every third student to enter the gym for the basketball game
 - every third student arriving at school in the morning

A2.S.3: AVERAGE KNOWN WITH MISSING DATA

- The number of minutes students took to complete a quiz is summarized in the table below.

Minutes	14	15	16	17	18	19	20
Number of Students	5	3	x	5	2	10	1

If the mean number of minutes was 17, which equation could be used to calculate the value of x ?

- $17 = \frac{119 + x}{x}$
- $17 = \frac{119 + 16x}{x}$
- $17 = \frac{446 + x}{26 + x}$
- $17 = \frac{446 + 16x}{26 + x}$

- 7 The table below displays the results of a survey regarding the number of pets each student in a class has. The average number of pets per student in this class is 2.

Number of Pets	0	1	2	3	4	5
Number of Students	4	6	10	0	k	2

What is the value of k for this table?

- 1 9
- 2 2
- 3 8
- 4 4

A2.S.4: DISPERSION

- 8 The table below shows the first-quarter averages for Mr. Harper’s statistics class.

Statistics Class Averages

Quarter Averages	Frequency
99	1
97	5
95	4
92	4
90	7
87	2
84	6
81	2
75	1
70	2
65	1

What is the population variance for this set of data?

- 1 8.2
- 2 8.3
- 3 67.3
- 4 69.3

- 9 The scores of one class on the Unit 2 mathematics test are shown in the table below.

Unit 2 Mathematics Test

Test Score	Frequency
96	1
92	2
84	5
80	3
76	6
72	3
68	2

Find the population standard deviation of these scores, to the *nearest tenth*.

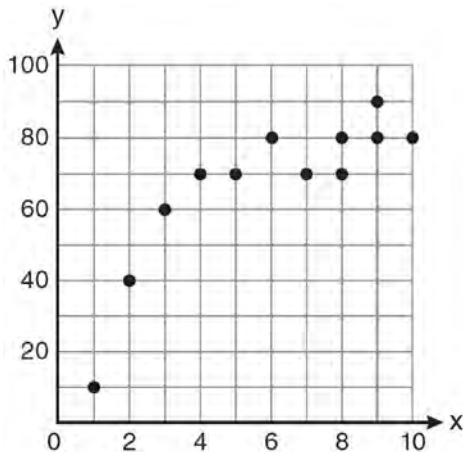
- 10 During a particular month, a local company surveyed all its employees to determine their travel times to work, in minutes. The data for all 15 employees are shown below.

25 55 40 65 29
45 59 35 25 37
52 30 8 40 55

Determine the number of employees whose travel time is within one standard deviation of the mean.

A2.S.6-7: REGRESSION

- 11 Samantha constructs the scatter plot below from a set of data.



Based on her scatter plot, which regression model would be most appropriate?

- 1 exponential
 - 2 linear
 - 3 logarithmic
 - 4 power
- 12 A cup of soup is left on a countertop to cool. The table below gives the temperatures, in degrees Fahrenheit, of the soup recorded over a 10-minute period.

Time in Minutes (x)	0	2	4	6	8	10
Temperature in $^{\circ}\text{F}$ (y)	180.2	165.8	146.3	135.4	127.7	110.5

Write an exponential regression equation for the data, rounding all values to the *nearest thousandth*.

- 13 A population of single-celled organisms was grown in a Petri dish over a period of 16 hours. The number of organisms at a given time is recorded in the table below.

Time, hrs (x)	Number of Organisms (y)
0	25
2	36
4	52
6	68
8	85
10	104
12	142
16	260

Determine the exponential regression equation model for these data, rounding all values to the *nearest ten-thousandth*. Using this equation, predict the number of single-celled organisms, to the *nearest whole number*, at the end of the 18th hour.

- 14 The table below shows the number of new stores in a coffee shop chain that opened during the years 1986 through 1994.

Year	Number of New Stores
1986	14
1987	27
1988	48
1989	80
1990	110
1991	153
1992	261
1993	403
1994	681

Using $x = 1$ to represent the year 1986 and y to represent the number of new stores, write the exponential regression equation for these data. Round all values to the *nearest thousandth*.

- 15 The table below shows the results of an experiment involving the growth of bacteria.

Time (x) (in minutes)	1	3	5	7	9	11
Number of Bacteria (y)	2	25	81	175	310	497

Write a power regression equation for this set of data, rounding all values to *three decimal places*. Using this equation, predict the bacteria's growth, to the *nearest integer*, after 15 minutes.

A2.S.8: CORRELATION COEFFICIENT

- 16 Which value of r represents data with a strong negative linear correlation between two variables?
- 1 -1.07
 - 2 -0.89
 - 3 -0.14
 - 4 0.92

- 17 Which calculator output shows the strongest linear relationship between x and y ?

Lin Reg

$$y = a + bx$$

$$a = 59.026$$

$$b = 6.767$$

1 $r = .8643$

Lin Reg

$$y = a + bx$$

$$a = .7$$

$$b = 24.2$$

2 $r = .8361$

Lin Reg

$$y = a + bx$$

$$a = 2.45$$

$$b = .95$$

3 $r = .6022$

Lin Reg

$$y = a + bx$$

$$a = -2.9$$

$$b = 24.1$$

4 $r = -.8924$

- 18 As shown in the table below, a person's target heart rate during exercise changes as the person gets older.

Age (years)	Target Heart Rate (beats per minute)
20	135
25	132
30	129
35	125
40	122
45	119
50	115

Which value represents the linear correlation coefficient, rounded to the *nearest thousandth*, between a person's age, in years, and that person's target heart rate, in beats per minute?

- 1 -0.999
- 2 -0.664
- 3 0.998
- 4 1.503

A2.S.5: NORMAL DISTRIBUTIONS

- 19 The lengths of 100 pipes have a normal distribution with a mean of 102.4 inches and a standard deviation of 0.2 inch. If one of the pipes measures exactly 102.1 inches, its length lies
- 1 below the 16th percentile
 - 2 between the 50th and 84th percentiles
 - 3 between the 16th and 50th percentiles
 - 4 above the 84th percentile
- 20 If the amount of time students work in any given week is normally distributed with a mean of 10 hours per week and a standard deviation of 2 hours, what is the probability a student works between 8 and 11 hours per week?
- 1 34.1%
 - 2 38.2%
 - 3 53.2%
 - 4 68.2%

- 21 An amateur bowler calculated his bowling average for the season. If the data are normally distributed, about how many of his 50 games were within one standard deviation of the mean?

- 1 14
- 2 17
- 3 34
- 4 48

- 22 Assume that the ages of first-year college students are normally distributed with a mean of 19 years and standard deviation of 1 year. To the *nearest integer*, find the percentage of first-year college students who are between the ages of 18 years and 20 years, inclusive. To the *nearest integer*, find the percentage of first-year college students who are 20 years old or older.

- 23 In a study of 82 video game players, the researchers found that the ages of these players were normally distributed, with a mean age of 17 years and a standard deviation of 3 years. Determine if there were 15 video game players in this study over the age of 20. Justify your answer.

PROBABILITY

A2.S.10: PERMUTATIONS

- 24 A four-digit serial number is to be created from the digits 0 through 9. How many of these serial numbers can be created if 0 can *not* be the first digit, no digit may be repeated, and the last digit must be 5?
- 1 448
 - 2 504
 - 3 2,240
 - 4 2,520

- 25 Which formula can be used to determine the total number of different eight-letter arrangements that can be formed using the letters in the word

DEADLINE?

1 $8!$

2 $\frac{8!}{4!}$

3 $\frac{8!}{2!+2!}$

4 $\frac{8!}{2! \cdot 2!}$

- 26 Find the total number of different twelve-letter arrangements that can be formed using the letters in the word *PENNSYLVANIA*.

- 27 The letters of any word can be rearranged. Carol believes that the number of different 9-letter arrangements of the word "TENNESSEE" is greater than the number of different 7-letter arrangements of the word "VERMONT." Is she correct? Justify your answer.

A2.S.11: COMBINATIONS

- 28 Ms. Bell's mathematics class consists of 4 sophomores, 10 juniors, and 5 seniors. How many different ways can Ms. Bell create a four-member committee of juniors if each junior has an equal chance of being selected?

1 210

2 3,876

3 5,040

4 93,024

- 29 The principal would like to assemble a committee of 8 students from the 15-member student council. How many different committees can be chosen?

1 120

2 6,435

3 32,432,400

4 259,459,200

- 30 If order does *not* matter, which selection of students would produce the most possible committees?

1 5 out of 15

2 5 out of 25

3 20 out of 25

4 15 out of 25

- 31 A blood bank needs twenty people to help with a blood drive. Twenty-five people have volunteered. Find how many different groups of twenty can be formed from the twenty-five volunteers.

A2.S.9: DIFFERENTIATING BETWEEN PERMUTATIONS AND COMBINATIONS

- 32 Twenty different cameras will be assigned to several boxes. Three cameras will be randomly selected and assigned to box A. Which expression can be used to calculate the number of ways that three cameras can be assigned to box A?

1 $20!$

2 $\frac{20!}{3!}$

3 ${}_{20}C_3$

4 ${}_{20}P_3$

- 33 Three marbles are to be drawn at random, without replacement, from a bag containing 15 red marbles, 10 blue marbles, and 5 white marbles. Which expression can be used to calculate the probability of drawing 2 red marbles and 1 white marble from the bag?

1 $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}C_3}$

2 $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}C_3}$

3 $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}P_3}$

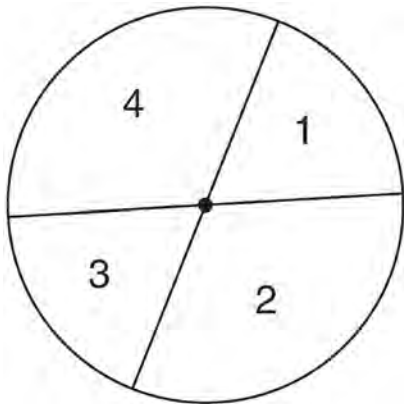
4 $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}P_3}$

A2.S.12: SAMPLE SPACE

- 34 A committee of 5 members is to be randomly selected from a group of 9 teachers and 20 students. Determine how many different committees can be formed if 2 members must be teachers and 3 members must be students.

A2.S.13: GEOMETRIC PROBABILITY

- 35 A dartboard is shown in the diagram below. The two lines intersect at the center of the circle, and the central angle in sector 2 measures $\frac{2\pi}{3}$.



If darts thrown at this board are equally likely to land anywhere on the board, what is the probability that a dart that hits the board will land in either sector 1 or sector 3?

- 1 $\frac{1}{6}$
- 2 $\frac{1}{3}$
- 3 $\frac{1}{2}$
- 4 $\frac{2}{3}$

A2.S.15: BINOMIAL PROBABILITY

- 36 A study finds that 80% of the local high school students text while doing homework. Ten students are selected at random from the local high school. Which expression would be part of the process used to determine the probability that, *at most*, 7 of the 10 students text while doing homework?

- 1 ${}_{10}C_6 \left(\frac{4}{5}\right)^6 \left(\frac{1}{5}\right)^4$
- 2 ${}_{10}C_7 \left(\frac{4}{5}\right)^{10} \left(\frac{1}{5}\right)^7$
- 3 ${}_{10}C_8 \left(\frac{7}{10}\right)^{10} \left(\frac{3}{10}\right)^2$
- 4 ${}_{10}C_9 \left(\frac{7}{10}\right)^9 \left(\frac{3}{10}\right)^1$

- 37 A spinner is divided into eight equal sections. Five sections are red and three are green. If the spinner is spun three times, what is the probability that it lands on red *exactly* twice?

- 1 $\frac{25}{64}$
- 2 $\frac{45}{512}$
- 3 $\frac{75}{512}$
- 4 $\frac{225}{512}$

- 38 The members of a men's club have a choice of wearing black or red vests to their club meetings. A study done over a period of many years determined that the percentage of black vests worn is 60%. If there are 10 men at a club meeting on a given night, what is the probability, to the *nearest thousandth*, that *at least* 8 of the vests worn will be black?
- 39 A study shows that 35% of the fish caught in a local lake had high levels of mercury. Suppose that 10 fish were caught from this lake. Find, to the *nearest tenth of a percent*, the probability that *at least* 8 of the 10 fish caught did *not* contain high levels of mercury.

- 40 The probability that the Stormville Sluggers will win a baseball game is $\frac{2}{3}$. Determine the probability, to the *nearest thousandth*, that the Stormville Sluggers will win *at least* 6 of their next 8 games.

- 41 The probability that a professional baseball player will get a hit is $\frac{1}{3}$. Calculate the exact probability that he will get *at least* 3 hits in 5 attempts.

ABSOLUTE VALUE

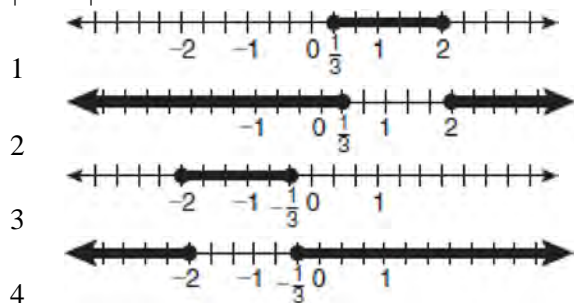
A2.A.1: ABSOLUTE VALUE EQUATIONS AND INEQUALITIES

- 42 What is the solution set of the equation

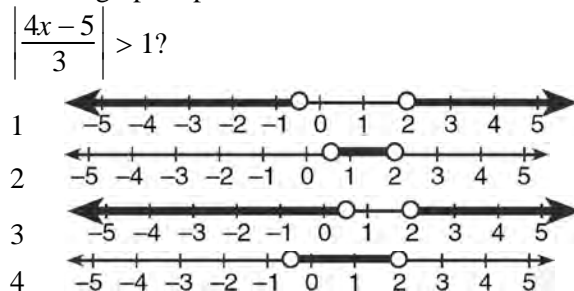
$$|4a + 6| - 4a = -10?$$

- 1 \emptyset
- 2 $\{0\}$
- 3 $\left\{\frac{1}{2}\right\}$
- 4 $\left\{0, \frac{1}{2}\right\}$

- 43 Which graph represents the solution set of $|6x - 7| \leq 5$?



- 44 Which graph represents the solution set of $\left|\frac{4x-5}{3}\right| > 1$?



- 45 Graph the inequality $-3|6-x| < -15$ for x . Graph the solution on the line below.



QUADRATICS

A2.A.20-21: ROOTS OF QUADRATICS

- 46 What are the sum and product of the roots of the equation $6x^2 - 4x - 12 = 0$?

- 1 sum = $-\frac{2}{3}$; product = -2
- 2 sum = $\frac{2}{3}$; product = -2
- 3 sum = -2 ; product = $\frac{2}{3}$
- 4 sum = -2 ; product = $-\frac{2}{3}$

- 47 Find the sum and product of the roots of the equation $5x^2 + 11x - 3 = 0$.

- 48 For which equation does the sum of the roots equal -3 and the product of the roots equal 2 ?

- 1 $x^2 + 2x - 3 = 0$
- 2 $x^2 - 3x + 2 = 0$
- 3 $2x^2 + 6x + 4 = 0$
- 4 $2x^2 - 6x + 4 = 0$

- 49 For which equation does the sum of the roots equal $\frac{3}{4}$ and the product of the roots equal -2 ?

- 1 $4x^2 - 8x + 3 = 0$
- 2 $4x^2 + 8x + 3 = 0$
- 3 $4x^2 - 3x - 8 = 0$
- 4 $4x^2 + 3x - 2 = 0$

50 Which equation has roots with the sum equal to $\frac{9}{4}$

and the product equal to $\frac{3}{4}$?

- 1 $4x^2 + 9x + 3 = 0$
- 2 $4x^2 + 9x - 3 = 0$
- 3 $4x^2 - 9x + 3 = 0$
- 4 $4x^2 - 9x - 3 = 0$

51 Write a quadratic equation such that the sum of its roots is 6 and the product of its roots is -27 .

A2.A.7: FACTORING POLYNOMIALS

52 Factored completely, the expression $6x - x^3 - x^2$ is equivalent to

- 1 $x(x+3)(x-2)$
- 2 $x(x-3)(x+2)$
- 3 $-x(x-3)(x+2)$
- 4 $-x(x+3)(x-2)$

53 Factored completely, the expression $12x^4 + 10x^3 - 12x^2$ is equivalent to

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

54 Factor completely: $10ax^2 - 23ax - 5a$

A2.A.7: FACTORING THE DIFFERENCE OF PERFECT SQUARES

55 Factor the expression $12t^8 - 75t^4$ completely.

A2.A.7: FACTORING BY GROUPING

56 When factored completely, $x^3 + 3x^2 - 4x - 12$ equals

- 1 $(x+2)(x-2)(x-3)$
- 2 $(x+2)(x-2)(x+3)$
- 3 $(x^2-4)(x+3)$
- 4 $(x^2-4)(x-3)$

A2.A.25: QUADRATIC FORMULA

57 The roots of the equation $2x^2 + 7x - 3 = 0$ are

- 1 $-\frac{1}{2}$ and -3
- 2 $\frac{1}{2}$ and 3
- 3 $\frac{-7 \pm \sqrt{73}}{4}$
- 4 $\frac{7 \pm \sqrt{73}}{4}$

58 The solutions of the equation $y^2 - 3y = 9$ are

- 1 $\frac{3 \pm 3i\sqrt{3}}{2}$
- 2 $\frac{3 \pm 3i\sqrt{5}}{2}$
- 3 $\frac{-3 \pm 3\sqrt{5}}{2}$
- 4 $\frac{3 \pm 3\sqrt{5}}{2}$

A2.A.2: USING THE DISCRIMINANT

59 The roots of the equation $x^2 - 10x + 25 = 0$ are

- 1 imaginary
- 2 real and irrational
- 3 real, rational, and equal
- 4 real, rational, and unequal

60 The roots of the equation $9x^2 + 3x - 4 = 0$ are

- 1 imaginary
- 2 real, rational, and equal
- 3 real, rational, and unequal
- 4 real, irrational, and unequal

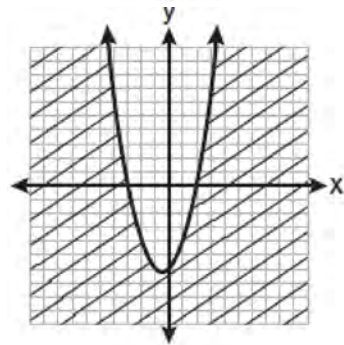
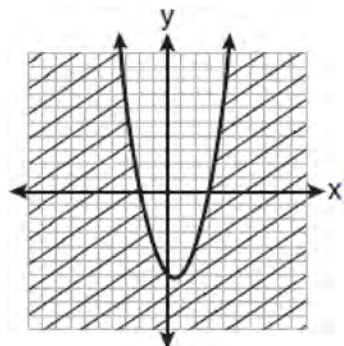
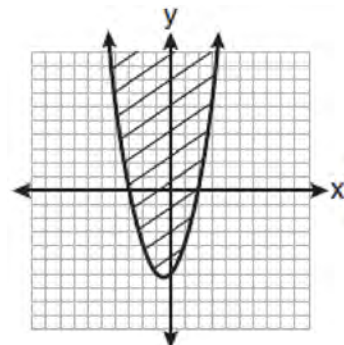
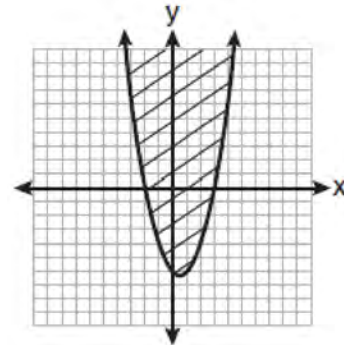
61 Use the discriminant to determine all values of k that would result in the equation $x^2 - kx + 4 = 0$ having equal roots.

A2.A.24: COMPLETING THE SQUARE

- 62 Brian correctly used a method of completing the square to solve the equation $x^2 + 7x - 11 = 0$. Brian's first step was to rewrite the equation as $x^2 + 7x = 11$. He then added a number to both sides of the equation. Which number did he add?
- 1 $\frac{7}{2}$
 - 2 $\frac{49}{4}$
 - 3 $\frac{49}{2}$
 - 4 49
- 63 If $x^2 + 2 = 6x$ is solved by completing the square, an intermediate step would be
- 1 $(x + 3)^2 = 7$
 - 2 $(x - 3)^2 = 7$
 - 3 $(x - 3)^2 = 11$
 - 4 $(x - 6)^2 = 34$
- 64 Solve $2x^2 - 12x + 4 = 0$ by completing the square, expressing the result in simplest radical form.

A2.A.4: QUADRATIC INEQUALITIES

- 65 Which graph best represents the inequality $y + 6 \geq x^2 - x$?



- 66 The solution set of the inequality $x^2 - 3x > 10$ is
- 1 $\{x | -2 < x < 5\}$
 - 2 $\{x | 0 < x < 3\}$
 - 3 $\{x | x < -2 \text{ or } x > 5\}$
 - 4 $\{x | x < -5 \text{ or } x > 2\}$

- 67 Find the solution of the inequality $x^2 - 4x > 5$, algebraically.

SYSTEMS

A2.A.3: QUADRATIC-LINEAR SYSTEMS

- 68 Which values of x are in the solution set of the following system of equations?

$$y = 3x - 6$$

$$y = x^2 - x - 6$$

- 1 0, -4
 - 2 0, 4
 - 3 6, -2
 - 4 -6, 2
- 69 Solve the following systems of equations algebraically: $5 = y - x$
- $$4x^2 = -17x + y + 4$$

POWERS

A2.N.3: OPERATIONS WITH POLYNOMIALS

- 70 When $\frac{3}{2}x^2 - \frac{1}{4}x - 4$ is subtracted from

$$\frac{5}{2}x^2 - \frac{3}{4}x + 1, \text{ the difference is}$$

- 1 $-x^2 + \frac{1}{2}x - 5$
- 2 $x^2 - \frac{1}{2}x + 5$
- 3 $-x^2 - x - 3$
- 4 $x^2 - x - 3$

- 71 What is the product of $\left(\frac{x}{4} - \frac{1}{3}\right)$ and $\left(\frac{x}{4} + \frac{1}{3}\right)$?

- 1 $\frac{x^2}{8} - \frac{1}{9}$
- 2 $\frac{x^2}{16} - \frac{1}{9}$
- 3 $\frac{x^2}{8} - \frac{x}{6} - \frac{1}{9}$
- 4 $\frac{x^2}{16} - \frac{x}{6} - \frac{1}{9}$

- 72 What is the product of $\left(\frac{2}{5}x - \frac{3}{4}y^2\right)$ and

$$\left(\frac{2}{5}x + \frac{3}{4}y^2\right)?$$

- 1 $\frac{4}{25}x^2 - \frac{9}{16}y^4$
- 2 $\frac{4}{25}x - \frac{9}{16}y^2$
- 3 $\frac{2}{5}x^2 - \frac{3}{4}y^4$
- 4 $\frac{4}{5}x$

- 73 Express $\left(\frac{2}{3}x - 1\right)^2$ as a trinomial.

- 74 Express the product of $\left(\frac{1}{2}y^2 - \frac{1}{3}y\right)$ and $\left(12y + \frac{3}{5}\right)$ as a trinomial.

A2.N.1, A.8-9: NEGATIVE AND FRACTIONAL EXPONENTS

- 75 If $a = 3$ and $b = -2$, what is the value of the expression $\frac{a^{-2}}{b^{-3}}$?

- 1 $-\frac{9}{8}$
- 2 -1
- 3 $-\frac{8}{9}$
- 4 $\frac{8}{9}$

76 When simplified, the expression $\left(\frac{w^{-5}}{w^{-9}}\right)^{\frac{1}{2}}$ is

equivalent to

- 1 w^{-7}
- 2 w^2
- 3 w^7
- 4 w^{14}

77 The expression $\frac{a^2b^{-3}}{a^{-4}b^2}$ is equivalent to

- 1 $\frac{a^6}{b^5}$
- 2 $\frac{b^5}{a^6}$
- 3 $\frac{a^2}{b}$
- 4 $a^{-2}b^{-1}$

78 Which expression is equivalent to $\frac{x^{-1}y^4}{3x^{-5}y^{-1}}$?

- 1 $\frac{x^4y^5}{3}$
- 2 $\frac{x^5y^4}{3}$
- 3 $3x^4y^5$
- 4 $\frac{y^4}{3x^5}$

79 Simplify the expression $\frac{3x^{-4}y^5}{(2x^3y^{-7})^{-2}}$ and write the answer using only positive exponents.

80 When $x^{-1} - 1$ is divided by $x - 1$, the quotient is

- 1 -1
- 2 $-\frac{1}{x}$
- 3 $\frac{1}{x^2}$
- 4 $\frac{1}{(x-1)^2}$

81 When $x^{-1} + 1$ is divided by $x + 1$, the quotient equals

- 1 $\frac{1}{x}$
- 2 $\frac{1}{x}$
- 3 x
- 4 $-\frac{1}{x}$

A2.A.12: EVALUATING EXPONENTIAL EXPRESSIONS

82 Evaluate $e^{x \ln y}$ when $x = 3$ and $y = 2$.

83 The formula for continuously compounded interest is $A = Pe^{rt}$, where A is the amount of money in the account, P is the initial investment, r is the interest rate, and t is the time in years. Using the formula, determine, to the *nearest dollar*, the amount in the account after 8 years if \$750 is invested at an annual rate of 3%.

84 Matt places \$1,200 in an investment account earning an annual rate of 6.5%, compounded continuously. Using the formula $V = Pe^{rt}$, where V is the value of the account in t years, P is the principal initially invested, e is the base of a natural logarithm, and r is the rate of interest, determine the amount of money, to the *nearest cent*, that Matt will have in the account after 10 years.

A2.A.18: EVALUATING LOGARITHMIC EXPRESSIONS

85 The expression $\log_8 64$ is equivalent to

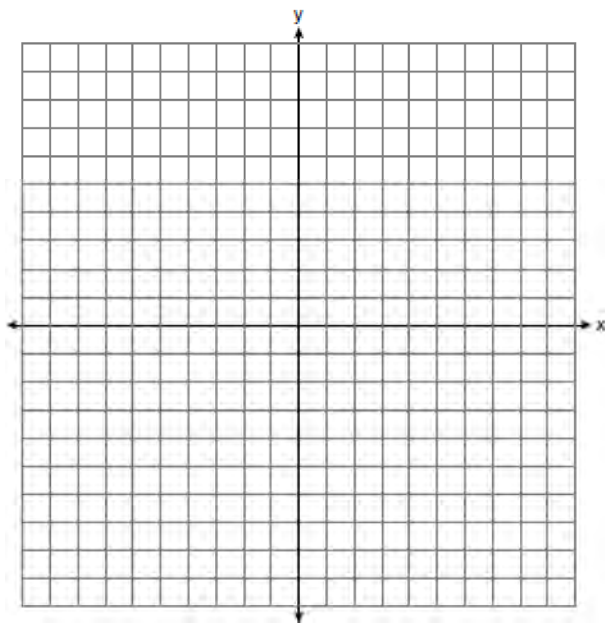
- 1 8
- 2 2
- 3 $\frac{1}{2}$
- 4 $\frac{1}{8}$

86 The expression $\log_5\left(\frac{1}{25}\right)$ is equivalent to

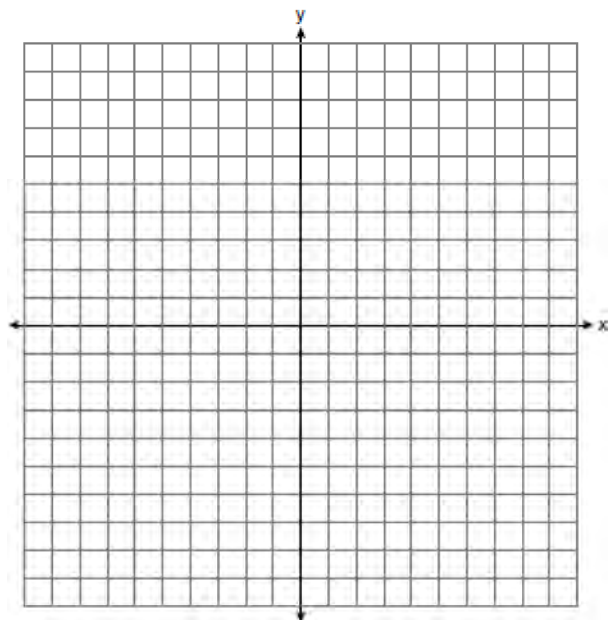
- 1 $\frac{1}{2}$
- 2 2
- 3 $-\frac{1}{2}$
- 4 -2

A2.A.53: GRAPHING EXPONENTIAL FUNCTIONS

87 The graph of the equation $y = \left(\frac{1}{2}\right)^x$ has an asymptote. On the grid below, sketch the graph of $y = \left(\frac{1}{2}\right)^x$ and write the equation of this asymptote.

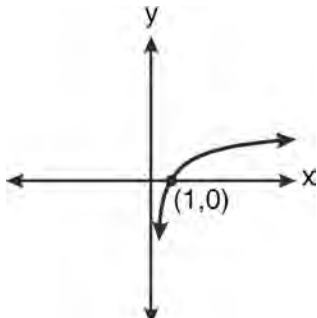
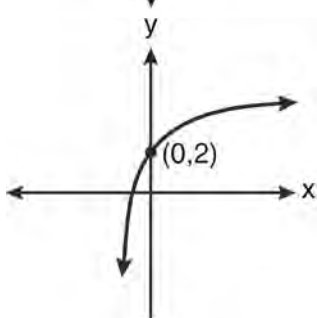
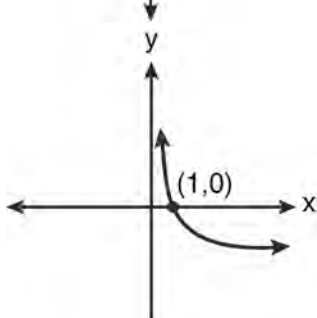
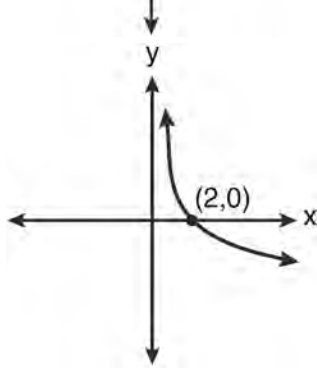


88 On the axes below, for $-2 \leq x \leq 2$, graph $y = 2^{x+1} - 3$.

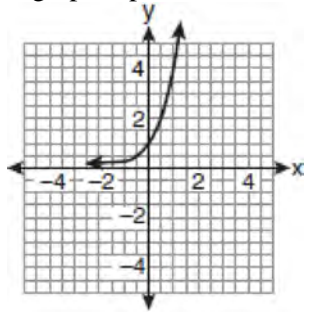
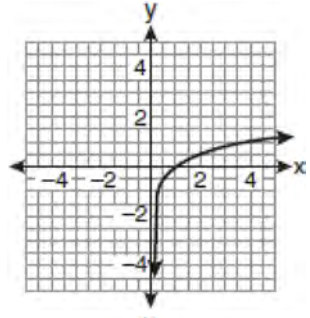
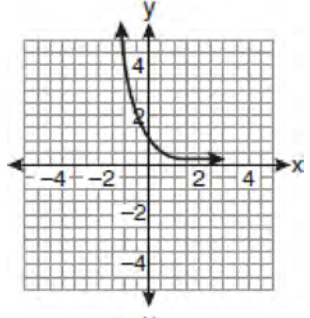
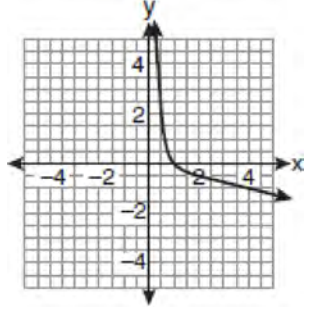


A2.A.54: GRAPHING LOGARITHMIC FUNCTIONS

89 Which graph represents the function $\log_2 x = y$?

- 1 
- 2 
- 3 
- 4 

90 If a function is defined by the equation $f(x) = 4^x$, which graph represents the inverse of this function?

- 1 
- 2 
- 3 
- 4 

A2.A.19: PROPERTIES OF LOGARITHMS

91 The expression $2\log x - (3\log y + \log z)$ is equivalent to

1 $\log \frac{x^2}{y^3z}$

2 $\log \frac{x^2z}{y^3}$

3 $\log \frac{2x}{3yz}$

4 $\log \frac{2xz}{3y}$

92 If $r = \sqrt[3]{\frac{A^2B}{C}}$, then $\log r$ can be represented by

1 $\frac{1}{6}\log A + \frac{1}{3}\log B - \log C$

2 $3(\log A^2 + \log B - \log C)$

3 $\frac{1}{3}\log(A^2 + B) - C$

4 $\frac{2}{3}\log A + \frac{1}{3}\log B - \frac{1}{3}\log C$

93 If $\log x^2 - \log 2a = \log 3a$, then $\log x$ expressed in terms of $\log a$ is equivalent to

1 $\frac{1}{2}\log 5a$

2 $\frac{1}{2}\log 6 + \log a$

3 $\log 6 + \log a$

4 $\log 6 + 2\log a$

94 If $\log_b x = 3\log_b p - \left(2\log_b t + \frac{1}{2}\log_b r\right)$, then the value of x is

1 $\frac{p^3}{\sqrt{t^2r}}$

2 $p^3t^2r^{\frac{1}{2}}$

3 $\frac{p^3t^2}{\sqrt{r}}$

4 $\frac{p^3}{t^2\sqrt{r}}$

A2.A.28: LOGARITHMIC EQUATIONS

95 What is the value of x in the equation $\log_5 x = 4$?

1 1.16

2 20

3 625

4 1,024

96 What is the solution of the equation $2\log_4(5x) = 3$?

1 6.4

2 2.56

3 $\frac{9}{5}$

4 $\frac{8}{5}$

97 If $\log_4 x = 2.5$ and $\log_y 125 = -\frac{3}{2}$, find the numerical value of $\frac{x}{y}$, in simplest form.

98 Solve algebraically for x : $\log_{x+3} \frac{x^3 + x - 2}{x} = 2$

- 99 The temperature, T , of a given cup of hot chocolate after it has been cooling for t minutes can best be modeled by the function below, where T_0 is the temperature of the room and k is a constant.

$$\ln(T - T_0) = -kt + 4.718$$

A cup of hot chocolate is placed in a room that has a temperature of 68° . After 3 minutes, the temperature of the hot chocolate is 150° . Compute the value of k to the nearest thousandth. [Only an algebraic solution can receive full credit.] Using this value of k , find the temperature, T , of this cup of hot chocolate if it has been sitting in this room for a total of 10 minutes. Express your answer to the *nearest degree*. [Only an algebraic solution can receive full credit.]

A2.A.6.27: EXPONENTIAL EQUATIONS

- 100 A population of rabbits doubles every 60 days

according to the formula $P = 10(2)^{\frac{t}{60}}$, where P is the population of rabbits on day t . What is the value of t when the population is 320?

- 1 240
- 2 300
- 3 660
- 4 960

- 101 Akeem invests \$25,000 in an account that pays 4.75% annual interest compounded continuously. Using the formula $A = Pe^{rt}$, where A = the amount in the account after t years, P = principal invested, and r = the annual interest rate, how many years, to the *nearest tenth*, will it take for Akeem's investment to triple?

- 1 10.0
- 2 14.6
- 3 23.1
- 4 24.0

- 102 What is the value of x in the equation $9^{3x+1} = 27^{x+2}$?

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

- 103 The value of x in the equation $4^{2x+5} = 8^{3x}$ is

- 1 1
- 2 2
- 3 5
- 4 -10

- 104 The solution set of $4^{x^2+4x} = 2^{-6}$ is

- 1 {1,3}
- 2 {-1,3}
- 3 {-1,-3}
- 4 {1,-3}

- 105 Solve algebraically for x : $16^{2x+3} = 64^{x+2}$

- 106 Solve algebraically for all values of x :

$$81^{x^3+2x^2} = 27^{\frac{5x}{3}}$$

A2.A.36: BINOMIAL EXPANSIONS

- 107 What is the fourth term in the expansion of $(3x - 2)^5$?

- 1 $-720x^2$
- 2 $-240x$
- 3 $720x^2$
- 4 $1,080x^3$

- 108 What is the coefficient of the fourth term in the expansion of $(a - 4b)^9$?

- 1 -5,376
- 2 -336
- 3 336
- 4 5,376

109 Which expression represents the third term in the expansion of $(2x^4 - y)^3$?

- 1 $-y^3$
- 2 $-6x^4y^2$
- 3 $6x^4y^2$
- 4 $2x^4y^2$

110 What is the middle term in the expansion of

$$\left(\frac{x}{2} - 2y\right)^6?$$

- 1 $20x^3y^3$
- 2 $-\frac{15}{4}x^4y^2$
- 3 $-20x^3y^3$
- 4 $\frac{15}{4}x^4y^2$

111 Write the binomial expansion of $(2x - 1)^5$ as a polynomial in simplest form.

A2.A.26, 50: SOLVING POLYNOMIAL EQUATIONS

112 What is the solution set of the equation

$$3x^5 - 48x = 0?$$

- 1 $\{0, \pm 2\}$
- 2 $\{0, \pm 2, 3\}$
- 3 $\{0, \pm 2, \pm 2i\}$
- 4 $\{\pm 2, \pm 2i\}$

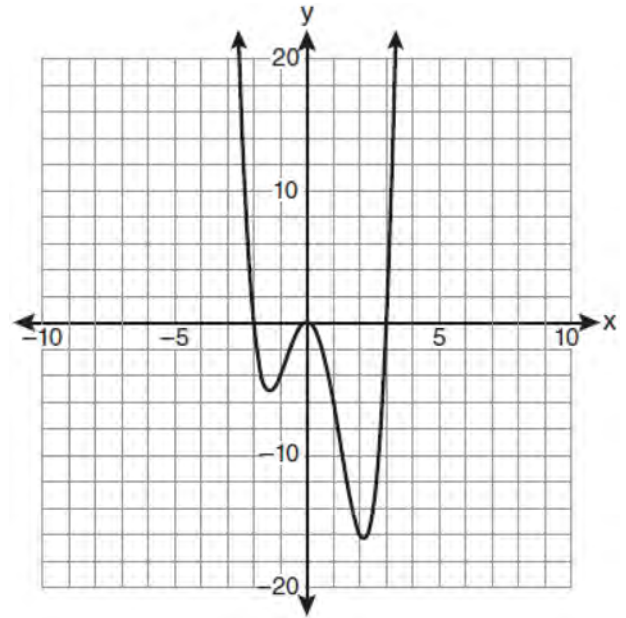
113 Which values of x are solutions of the equation

$$x^3 + x^2 - 2x = 0?$$

- 1 $0, 1, 2$
- 2 $0, 1, -2$
- 3 $0, -1, 2$
- 4 $0, -1, -2$

114 Solve the equation $8x^3 + 4x^2 - 18x - 9 = 0$ algebraically for all values of x .

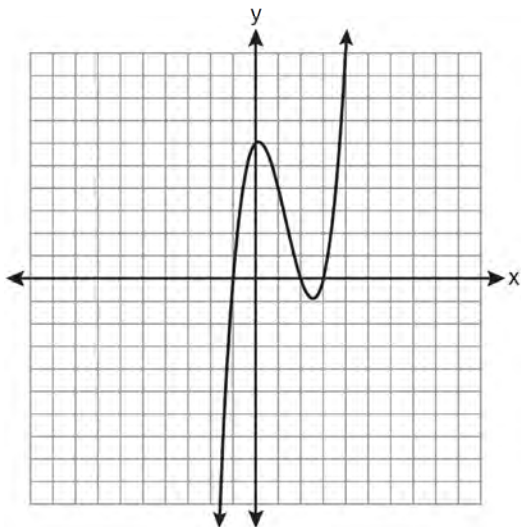
115 The graph of $y = f(x)$ is shown below.



Which set lists all the real solutions of $f(x) = 0$?

- 1 $\{-3, 2\}$
- 2 $\{-2, 3\}$
- 3 $\{-3, 0, 2\}$
- 4 $\{-2, 0, 3\}$

116 The graph of $y = x^3 - 4x^2 + x + 6$ is shown below.



What is the product of the roots of the equation

$$x^3 - 4x^2 + x + 6 = 0?$$

- 1 -36
- 2 -6
- 3 6
- 4 4

117 How many negative solutions to the equation

$$2x^3 - 4x^2 + 3x - 1 = 0$$
 exist?

- 1 1
- 2 2
- 3 3
- 4 0

RADICALS

A2.A.13: SIMPLIFYING RADICALS

118 The expression $\sqrt[3]{64a^{16}}$ is equivalent to

- 1 $8a^4$
- 2 $8a^8$
- 3 $4a^5 \sqrt[3]{a}$
- 4 $4a \sqrt[3]{a^5}$

119 Express in simplest form: $\sqrt[3]{\frac{a^6 b^9}{-64}}$

A2.N.2, A.14: OPERATIONS WITH RADICALS

120 The product of $(3 + \sqrt{5})$ and $(3 - \sqrt{5})$ is

- 1 $4 - 6\sqrt{5}$
- 2 $14 - 6\sqrt{5}$
- 3 14
- 4 4

121 Express $5\sqrt{3x^3} - 2\sqrt{27x^3}$ in simplest radical form.

122 The expression $4ab\sqrt{2b} - 3a\sqrt{18b^3} + 7ab\sqrt{6b}$ is equivalent to

- 1 $2ab\sqrt{6b}$
- 2 $16ab\sqrt{2b}$
- 3 $-5ab + 7ab\sqrt{6b}$
- 4 $-5ab\sqrt{2b} + 7ab\sqrt{6b}$

123 Express $\frac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}}$ in simplest radical form.

A2.N.5, A.15: RATIONALIZING DENOMINATORS

124 The expression $\frac{4}{5 - \sqrt{13}}$ is equivalent to

- 1 $\frac{4\sqrt{13}}{5\sqrt{13} - 13}$
- 2 $\frac{4(5 - \sqrt{13})}{38}$
- 3 $\frac{5 + \sqrt{13}}{3}$
- 4 $\frac{4(5 + \sqrt{13})}{38}$

125 Which expression is equivalent to $\frac{\sqrt{3}+5}{\sqrt{3}-5}$?

1 $-\frac{14+5\sqrt{3}}{11}$

2 $-\frac{17+5\sqrt{3}}{11}$

3 $\frac{14+5\sqrt{3}}{14}$

4 $\frac{17+5\sqrt{3}}{14}$

126 Express $\frac{5}{3-\sqrt{2}}$ with a rational denominator, in simplest radical form.

127 The fraction $\frac{3}{\sqrt{3a^2b}}$ is equivalent to

1 $\frac{1}{a\sqrt{b}}$

2 $\frac{\sqrt{b}}{ab}$

3 $\frac{\sqrt{3b}}{ab}$

4 $\frac{\sqrt{3}}{a}$

128 The expression $\frac{2x+4}{\sqrt{x+2}}$ is equivalent to

1 $\frac{(2x+4)\sqrt{x-2}}{x-2}$

2 $\frac{(2x+4)\sqrt{x-2}}{x-4}$

3 $2\sqrt{x-2}$

4 $2\sqrt{x+2}$

A2.A.22: SOLVING RADICALS

129 The solution set of the equation $\sqrt{x+3} = 3-x$ is

1 {1}

2 {0}

3 {1,6}

4 {2,3}

130 The solution set of $\sqrt{3x+16} = x+2$ is

1 {-3,4}

2 {-4,3}

3 {3}

4 {-4}

131 What is the solution set for the equation

$$\sqrt{5x+29} = x+3?$$

1 {4}

2 {-5}

3 {4,5}

4 {-5,4}

132 Solve algebraically for x : $4 - \sqrt{2x-5} = 1$

A2.A.10-11: EXPONENTS AS RADICALS

133 The expression $x^{\frac{2}{5}}$ is equivalent to

1 $-\sqrt[2]{x^5}$

2 $-\sqrt[5]{x^2}$

3 $\frac{1}{\sqrt[2]{x^5}}$

4 $\frac{1}{\sqrt[5]{x^2}}$

134 The expression $(x^2 - 1)^{-\frac{2}{3}}$ is equivalent to

- 1 $\sqrt[3]{(x^2 - 1)^2}$
- 2 $\frac{1}{\sqrt[3]{(x^2 - 1)^2}}$
- 3 $\sqrt{(x^2 - 1)^3}$
- 4 $\frac{1}{\sqrt{(x^2 - 1)^3}}$

135 The expression $\sqrt[4]{16x^2y^7}$ is equivalent to

- 1 $2x^{\frac{1}{2}}y^{\frac{7}{4}}$
- 2 $2x^8y^{28}$
- 3 $4x^{\frac{1}{2}}y^{\frac{7}{4}}$
- 4 $4x^8y^{28}$

A2.N.6: SQUARE ROOTS OF NEGATIVE NUMBERS

136 In simplest form, $\sqrt{-300}$ is equivalent to

- 1 $3i\sqrt{10}$
- 2 $5i\sqrt{12}$
- 3 $10i\sqrt{3}$
- 4 $12i\sqrt{5}$

A2.N.7: IMAGINARY NUMBERS

137 The product of i^7 and i^5 is equivalent to

- 1 1
- 2 -1
- 3 i
- 4 $-i$

138 The expression $2i^2 + 3i^3$ is equivalent to

- 1 $-2 - 3i$
- 2 $2 - 3i$
- 3 $-2 + 3i$
- 4 $2 + 3i$

139 Determine the value of n in simplest form:

$$i^{13} + i^{18} + i^{31} + n = 0$$

A2.N.8: CONJUGATES OF COMPLEX NUMBERS

140 What is the conjugate of $-2 + 3i$?

- 1 $-3 + 2i$
- 2 $-2 - 3i$
- 3 $2 - 3i$
- 4 $3 + 2i$

141 The conjugate of $7 - 5i$ is

- 1 $-7 - 5i$
- 2 $-7 + 5i$
- 3 $7 - 5i$
- 4 $7 + 5i$

142 What is the conjugate of $\frac{1}{2} + \frac{3}{2}i$?

- 1 $-\frac{1}{2} + \frac{3}{2}i$
- 2 $\frac{1}{2} - \frac{3}{2}i$
- 3 $\frac{3}{2} + \frac{1}{2}i$
- 4 $-\frac{1}{2} - \frac{3}{2}i$

143 The conjugate of the complex expression $-5x + 4i$ is

- 1 $5x - 4i$
- 2 $5x + 4i$
- 3 $-5x - 4i$
- 4 $-5x + 4i$

A2.N.9: MULTIPLICATION AND DIVISION OF COMPLEX NUMBERS

144 The expression $(3 - 7i)^2$ is equivalent to

- 1 $-40 + 0i$
- 2 $-40 - 42i$
- 3 $58 + 0i$
- 4 $58 - 42i$

RATIONALS**A2.A.16: MULTIPLICATION AND DIVISION OF RATIONALS**

145 Express in simplest form: $\frac{4-x^2}{x^2+7x+12} \cdot \frac{2x-4}{x+3}$

146 Perform the indicated operations and simplify completely:

$$\frac{x^3 - 3x^2 + 6x - 18}{x^2 - 4x} \cdot \frac{2x - 4}{x^4 - 3x^3} \div \frac{x^2 + 2x - 8}{16 - x^2}$$

A2.A.23: SOLVING RATIONALS

147 Solve for x : $\frac{4x}{x-3} = 2 + \frac{12}{x-3}$

148 Solve algebraically for x : $\frac{1}{x+3} - \frac{2}{3-x} = \frac{4}{x^2-9}$

A2.A.17: COMPLEX FRACTIONS

149 Written in simplest form, the expression $\frac{\frac{x}{4} - \frac{1}{x}}{\frac{1}{2x} + \frac{1}{4}}$ is

equivalent to

1 $x - 1$

2 $x - 2$

3 $\frac{x-2}{2}$

4 $\frac{x^2-4}{x+2}$

150 Express in simplest form: $\frac{\frac{1}{2} - \frac{4}{d}}{\frac{1}{d} + \frac{3}{2d}}$

A2.A.5: INVERSE VARIATION

151 If p varies inversely as q , and $p = 10$ when $q = \frac{3}{2}$,

what is the value of p when $q = \frac{3}{5}$?

1 25

2 15

3 9

4 4

152 For a given set of rectangles, the length is inversely proportional to the width. In one of these rectangles, the length is 12 and the width is 6. For this set of rectangles, calculate the width of a rectangle whose length is 9.

FUNCTIONS**A2.A.40-41: FUNCTIONAL NOTATION**

153 The equation $y - 2 \sin \theta = 3$ may be rewritten as

1 $f(y) = 2 \sin x + 3$

2 $f(y) = 2 \sin \theta + 3$

3 $f(x) = 2 \sin \theta + 3$

4 $f(\theta) = 2 \sin \theta + 3$

154 If $f(x) = \frac{x}{x^2 - 16}$, what is the value of $f(-10)$?

1 $-\frac{5}{2}$

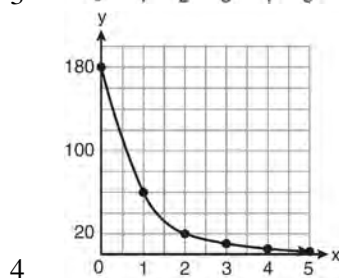
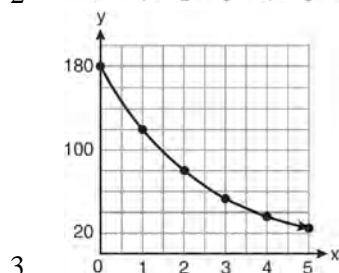
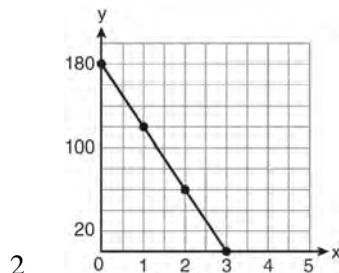
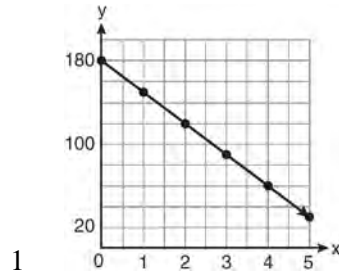
2 $-\frac{5}{42}$

3 $\frac{5}{58}$

4 $\frac{5}{18}$

A2.A.52: FAMILIES OF FUNCTIONS

- 155 On January 1, a share of a certain stock cost \$180. Each month thereafter, the cost of a share of this stock decreased by one-third. If x represents the time, in months, and y represents the cost of the stock, in dollars, which graph best represents the cost of a share over the following 5 months?



A2.A.52: PROPERTIES OF GRAPHS OF FUNCTIONS AND RELATIONS

- 156 Which statement about the graph of the equation $y = e^x$ is *not* true?
- 1 It is asymptotic to the x -axis.
 - 2 The domain is the set of all real numbers.
 - 3 It lies in Quadrants I and II.
 - 4 It passes through the point $(e, 1)$.

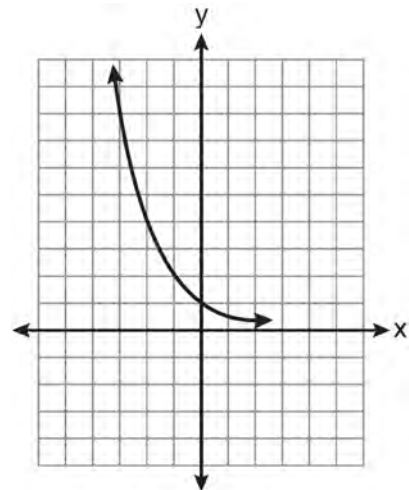
A2.A.52: IDENTIFYING THE EQUATION OF A GRAPH

- 157 Four points on the graph of the function $f(x)$ are shown below.

$$\{(0, 1), (1, 2), (2, 4), (3, 8)\}$$

Which equation represents $f(x)$?

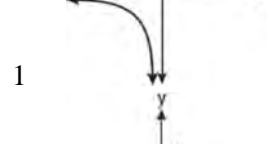
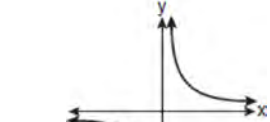
- 1 $f(x) = 2^x$
 - 2 $f(x) = 2x$
 - 3 $f(x) = x + 1$
 - 4 $f(x) = \log_2 x$
- 158 Which equation is represented by the graph below?



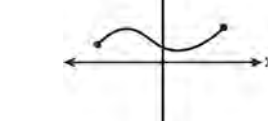
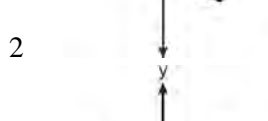
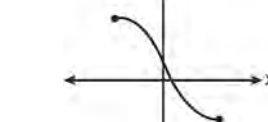
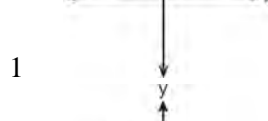
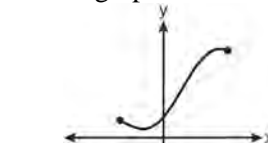
- 1 $y = 5^x$
- 2 $y = 0.5^x$
- 3 $y = 5^{-x}$
- 4 $y = 0.5^{-x}$

A2.A.38, 43: DEFINING FUNCTIONS

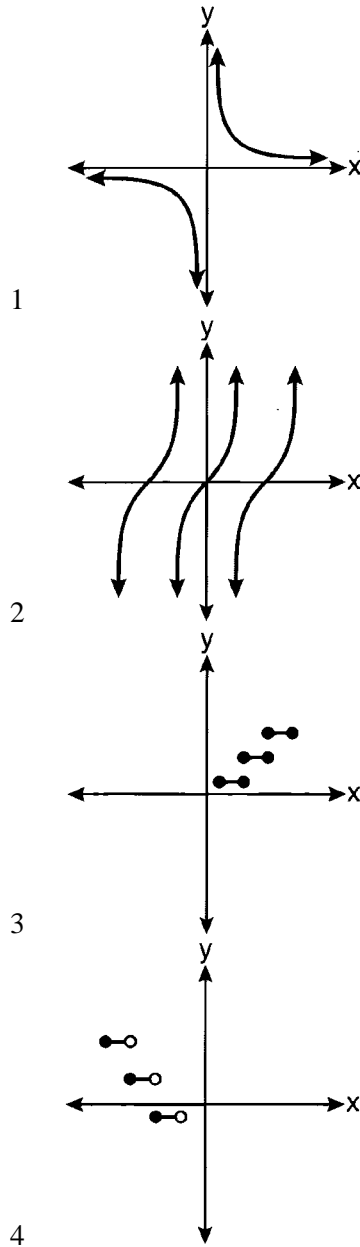
159 Which graph does *not* represent a function?



160 Which graph does *not* represent a function?



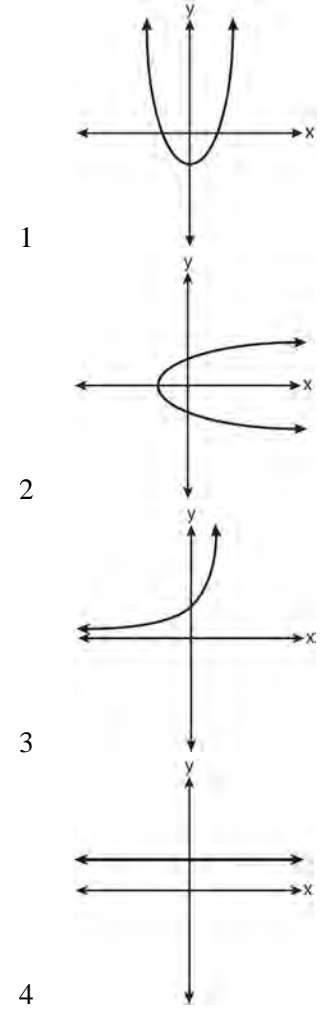
161 Which graph represents a relation that is *not* a function?



162 Which relation is *not* a function?

- 1 $(x-2)^2 + y^2 = 4$
- 2 $x^2 + 4x + y = 4$
- 3 $x + y = 4$
- 4 $xy = 4$

163 Which graph represents a one-to-one function?



164 Which function is *not* one-to-one?

- 1 $\{(0,1), (1,2), (2,3), (3,4)\}$
- 2 $\{(0,0), (1,1), (2,2), (3,3)\}$
- 3 $\{(0,1), (1,0), (2,3), (3,2)\}$
- 4 $\{(0,1), (1,0), (2,0), (3,2)\}$

165 Which function is one-to-one?

- 1 $f(x) = |x|$
- 2 $f(x) = 2^x$
- 3 $f(x) = x^2$
- 4 $f(x) = \sin x$

166 Which function is one-to-one?

- 1 $k(x) = x^2 + 2$
- 2 $g(x) = x^3 + 2$
- 3 $f(x) = |x| + 2$
- 4 $j(x) = x^4 + 2$

A2.A.39, 51: DOMAIN AND RANGE

167 What is the domain of the function

$$f(x) = \sqrt{x-2} + 3?$$

- 1 $(-\infty, \infty)$
- 2 $(2, \infty)$
- 3 $[2, \infty)$
- 4 $[3, \infty)$

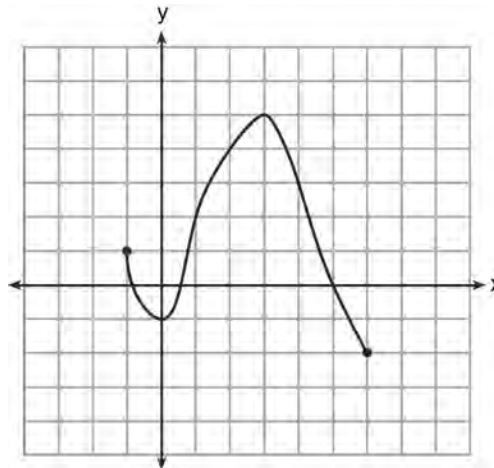
168 What is the range of $f(x) = (x+4)^2 + 7$?

- 1 $y \geq -4$
- 2 $y \geq 4$
- 3 $y = 7$
- 4 $y \geq 7$

169 What is the range of $f(x) = |x-3| + 2$?

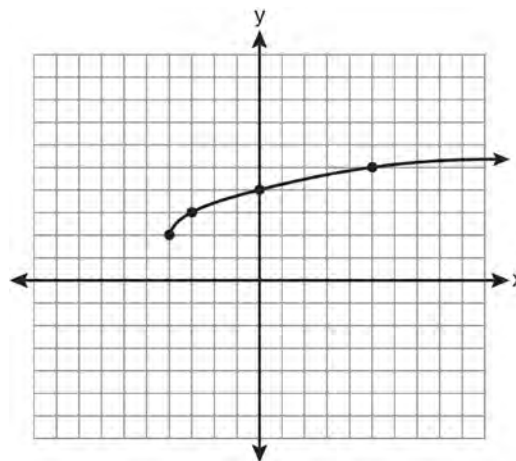
- 1 $\{x|x \geq 3\}$
- 2 $\{y|y \geq 2\}$
- 3 $\{x|x \in \text{real numbers}\}$
- 4 $\{y|y \in \text{real numbers}\}$

170 What is the domain of the function shown below?



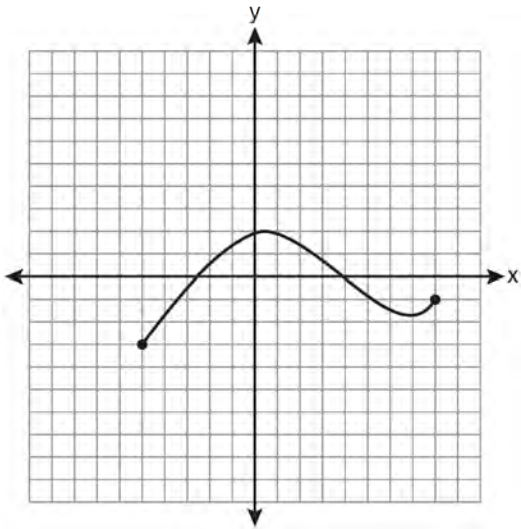
- 1 $-1 \leq x \leq 6$
- 2 $-1 \leq y \leq 6$
- 3 $-2 \leq x \leq 5$
- 4 $-2 \leq y \leq 5$

171 What are the domain and the range of the function shown in the graph below?



- 1 $\{x|x > -4\}; \{y|y > 2\}$
- 2 $\{x|x \geq -4\}; \{y|y \geq 2\}$
- 3 $\{x|x > 2\}; \{y|y > -4\}$
- 4 $\{x|x \geq 2\}; \{y|y \geq -4\}$

172 The graph below represents the function $y = f(x)$.



State the domain and range of this function.

A2.A.42: COMPOSITIONS OF FUNCTIONS

- 173 If $f(x) = \frac{1}{2}x - 3$ and $g(x) = 2x + 5$, what is the value of $(g \circ f)(4)$?
- 1 -13
 - 2 3.5
 - 3 3
 - 4 6

- 174 If $f(x) = x^2 - 5$ and $g(x) = 6x$, then $g(f(x))$ is equal to
- 1 $6x^3 - 30x$
 - 2 $6x^2 - 30$
 - 3 $36x^2 - 5$
 - 4 $x^2 + 6x - 5$

- 175 If $f(x) = 4x - x^2$ and $g(x) = \frac{1}{x}$, then $(f \circ g)\left(\frac{1}{2}\right)$ is equal to
- 1 $\frac{4}{7}$
 - 2 -2
 - 3 $\frac{7}{2}$
 - 4 4

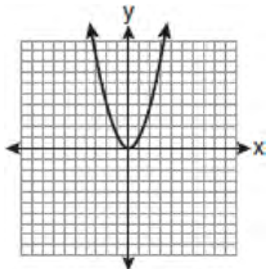
- 176 Which expression is equivalent to $(n \circ m \circ p)(x)$, given $m(x) = \sin x$, $n(x) = 3x$, and $p(x) = x^2$?
- 1 $\sin(3x)^2$
 - 2 $3 \sin x^2$
 - 3 $\sin^2(3x)$
 - 4 $3 \sin^2 x$
- 177 If $f(x) = x^2 - 6$ and $g(x) = 2^x - 1$, determine the value of $(g \circ f)(-3)$.

A2.A.44: INVERSE OF FUNCTIONS

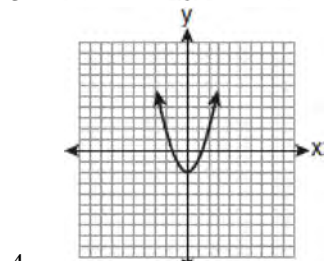
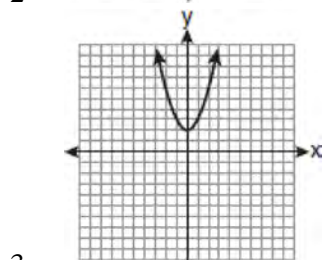
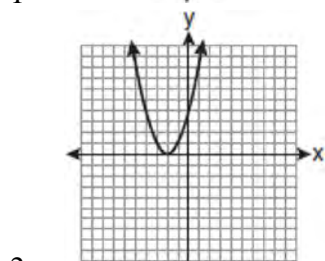
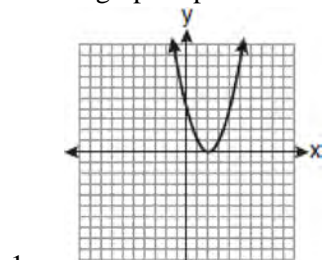
- 178 Which two functions are inverse functions of each other?
- 1 $f(x) = \sin x$ and $g(x) = \cos(x)$
 - 2 $f(x) = 3 + 8x$ and $g(x) = 3 - 8x$
 - 3 $f(x) = e^x$ and $g(x) = \ln x$
 - 4 $f(x) = 2x - 4$ and $g(x) = -\frac{1}{2}x + 4$
- 179 If $f(x) = x^2 - 6$, find $f^{-1}(x)$.

A2.A.46: TRANSFORMATIONS WITH FUNCTIONS AND RELATIONS

180 The graph below shows the function $f(x)$.



Which graph represents the function $f(x + 2)$?



181 The minimum point on the graph of the equation $y = f(x)$ is $(-1, -3)$. What is the minimum point on the graph of the equation $y = f(x) + 5$?

- 1 $(-1, 2)$
- 2 $(-1, -8)$
- 3 $(4, -3)$
- 4 $(-6, -3)$

SEQUENCES AND SERIES

A2.A.29-33: SEQUENCES

182 What is a formula for the n th term of sequence B shown below?

$$B = 10, 12, 14, 16, \dots$$

- 1 $b_n = 8 + 2n$
- 2 $b_n = 10 + 2n$
- 3 $b_n = 10(2)^n$
- 4 $b_n = 10(2)^{n-1}$

183 A sequence has the following terms: $a_1 = 4$, $a_2 = 10$, $a_3 = 25$, $a_4 = 62.5$. Which formula represents the n th term in the sequence?

- 1 $a_n = 4 + 2.5n$
- 2 $a_n = 4 + 2.5(n - 1)$
- 3 $a_n = 4(2.5)^n$
- 4 $a_n = 4(2.5)^{n-1}$

184 What is the formula for the n th term of the sequence $54, 18, 6, \dots$?

- 1 $a_n = 6\left(\frac{1}{3}\right)^n$
- 2 $a_n = 6\left(\frac{1}{3}\right)^{n-1}$
- 3 $a_n = 54\left(\frac{1}{3}\right)^n$
- 4 $a_n = 54\left(\frac{1}{3}\right)^{n-1}$

Algebra 2/Trigonometry Regents Exam Questions by Performance Indicator: Topic

www.jmap.org

- 185 What is the common difference of the arithmetic sequence 5, 8, 11, 14?

- 1 $\frac{8}{5}$
- 2 -3
- 3 3
- 4 9

- 186 Which arithmetic sequence has a common difference of 4?

- 1 $\{0, 4n, 8n, 12n, \dots\}$
- 2 $\{n, 4n, 16n, 64n, \dots\}$
- 3 $\{n + 1, n + 5, n + 9, n + 13, \dots\}$
- 4 $\{n + 4, n + 16, n + 64, n + 256, \dots\}$

- 187 What is the common ratio of the geometric sequence whose first term is 27 and fourth term is 64?

- 1 $\frac{3}{4}$
- 2 $\frac{64}{81}$
- 3 $\frac{4}{3}$
- 4 $\frac{37}{3}$

- 188 What is the fifteenth term of the sequence 5, -10, 20, -40, 80, ...?

- 1 $-163,840$
- 2 $-81,920$
- 3 $81,920$
- 4 $327,680$

- 189 What is the fifteenth term of the geometric sequence $-\sqrt{5}, \sqrt{10}, -2\sqrt{5}, \dots$?

- 1 $-128\sqrt{5}$
- 2 $128\sqrt{10}$
- 3 $-16384\sqrt{5}$
- 4 $16384\sqrt{10}$

- 190 Find the third term in the recursive sequence $a_{k+1} = 2a_k - 1$, where $a_1 = 3$.

- 191 Find the first four terms of the recursive sequence defined below.

$$a_1 = -3$$

$$a_n = a_{(n-1)} - n$$

A2.N.10, A.34: SIGMA NOTATION

- 192 The value of the expression $\sum_{r=3}^5 (-r^2 + r)$ is

- 1 -38
- 2 -12
- 3 26
- 4 62

- 193 The value of the expression $2\sum_{n=0}^2 (n^2 + 2^n)$ is

- 1 12
- 2 22
- 3 24
- 4 26

- 194 Evaluate: $\sum_{n=1}^3 (-n^4 - n)$

- 195 Evaluate: $10 + \sum_{n=1}^5 (n^3 - 1)$

- 196 Mrs. Hill asked her students to express the sum $1 + 3 + 5 + 7 + 9 + \dots + 39$ using sigma notation. Four different student answers were given. Which student answer is correct?

1 $\sum_{k=1}^{20} (2k - 1)$

2 $\sum_{k=2}^{40} (k - 1)$

3 $\sum_{k=-1}^{37} (k + 2)$

4 $\sum_{k=1}^{39} (2k - 1)$

- 197 Which summation represents $5 + 7 + 9 + 11 + \dots + 43$?

1 $\sum_{n=5}^{43} n$

2 $\sum_{n=1}^{20} (2n + 3)$

3 $\sum_{n=4}^{24} (2n - 3)$

4 $\sum_{n=3}^{23} (3n - 4)$

- 198 Express the sum $7 + 14 + 21 + 28 + \dots + 105$ using sigma notation.

A2.A.35: SERIES

- 199 An auditorium has 21 rows of seats. The first row has 18 seats, and each succeeding row has two more seats than the previous row. How many seats are in the auditorium?

- 1 540
2 567
3 760
4 798

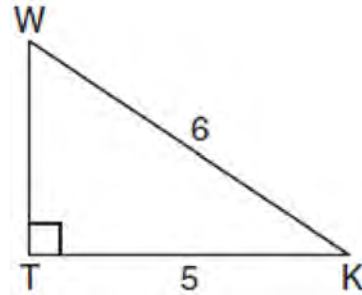
- 200 What is the sum of the first 19 terms of the sequence $3, 10, 17, 24, 31, \dots$?

- 1 1188
2 1197
3 1254
4 1292

TRIGONOMETRY

A2.A.55: TRIGONOMETRIC RATIOS

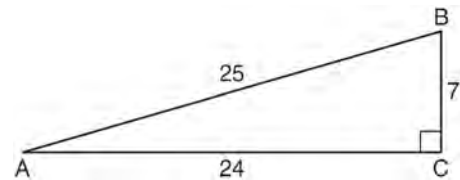
- 201 In the diagram below of right triangle KTW , $KW = 6$, $KT = 5$, and $m\angle KTW = 90$.



What is the measure of $\angle K$, to the nearest minute?

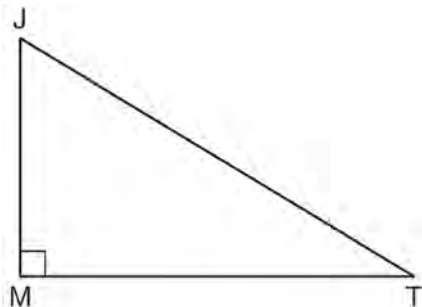
- 1 $33^\circ 33'$
2 $33^\circ 34'$
3 $33^\circ 55'$
4 $33^\circ 56'$

- 202 Which ratio represents $\csc A$ in the diagram below?



- 1 $\frac{25}{24}$
2 $\frac{25}{7}$
3 $\frac{24}{7}$
4 $\frac{7}{24}$

- 203 In the diagram below of right triangle JTM , $JT = 12$, $JM = 6$, and $m\angle JMT = 90$.



What is the value of $\cot J$?

- 1 $\frac{\sqrt{3}}{3}$
 - 2 2
 - 3 $\sqrt{3}$
 - 4 $\frac{2\sqrt{3}}{3}$
- A2.M.1-2: RADIAN MEASURE
- 204 What is the radian measure of the smaller angle formed by the hands of a clock at 7 o'clock?
- 1 $\frac{\pi}{2}$
 - 2 $\frac{2\pi}{3}$
 - 3 $\frac{5\pi}{6}$
 - 4 $\frac{7\pi}{6}$
- 205 What is the radian measure of an angle whose measure is -420° ?
- 1 $-\frac{7\pi}{3}$
 - 2 $-\frac{7\pi}{6}$
 - 3 $\frac{7\pi}{6}$
 - 4 $\frac{7\pi}{3}$

- 206 What is the number of degrees in an angle whose measure is 2 radians?

- 1 $\frac{360}{\pi}$
- 2 $\frac{\pi}{360}$
- 3 360
- 4 90

- 207 What is the number of degrees in an angle whose radian measure is $\frac{11\pi}{12}$?

- 1 150
- 2 165
- 3 330
- 4 518

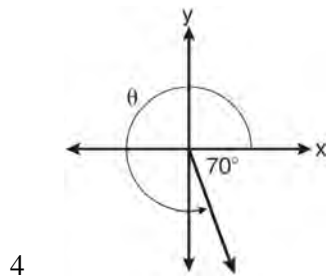
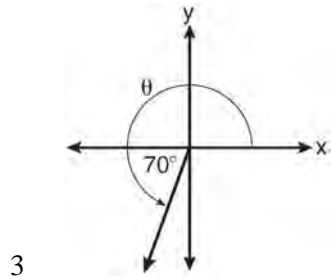
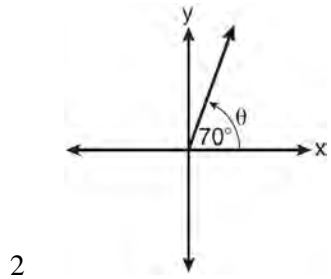
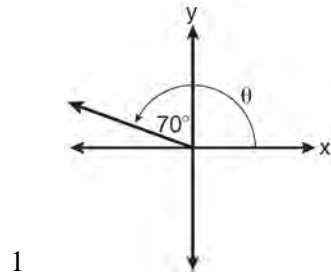
- 208 Find, to the *nearest minute*, the angle whose measure is 3.45 radians.

- 209 Find, to the *nearest tenth of a degree*, the angle whose measure is 2.5 radians.

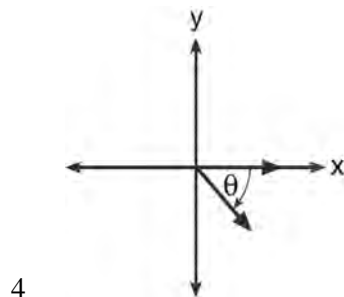
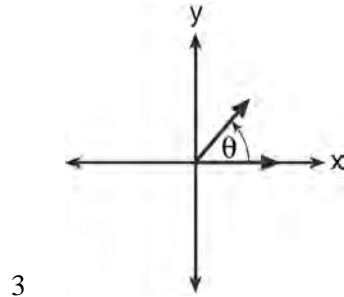
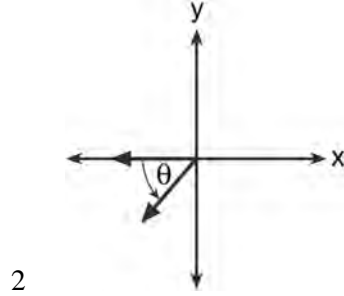
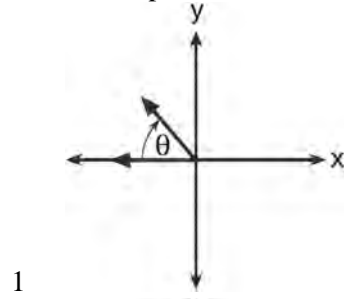
- 210 Find, to the *nearest tenth*, the radian measure of 216° .

A2.A.60: UNIT CIRCLE

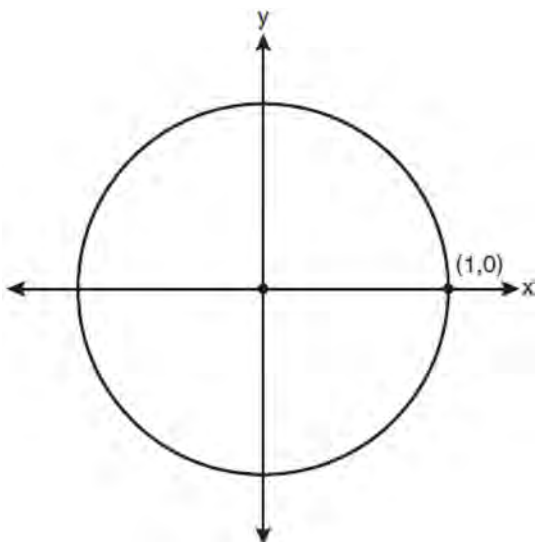
211 In which graph is θ coterminal with an angle of -70° ?



212 If $m\angle\theta = -50$, which diagram represents θ drawn in standard position?



- 213 On the unit circle shown in the diagram below, sketch an angle, in standard position, whose degree measure is 240° and find the exact value of $\sin 240^\circ$.



A2.A.62, 66: DETERMINING TRIGONOMETRIC FUNCTIONS

- 214 If θ is an angle in standard position and its terminal side passes through the point $(-3,2)$, find the exact value of $\csc \theta$.

- 215 The value of $\tan 126^\circ 43'$ to the *nearest ten-thousandth* is

- 1 -1.3407
- 2 -1.3408
- 3 -1.3548
- 4 -1.3549

- 216 The value of $\csc 138^\circ 23'$ rounded to four decimal places is

- 1 -1.3376
- 2 -1.3408
- 3 1.5012
- 4 1.5057

- 217 Which expression, when rounded to three decimal places, is equal to -1.155 ?

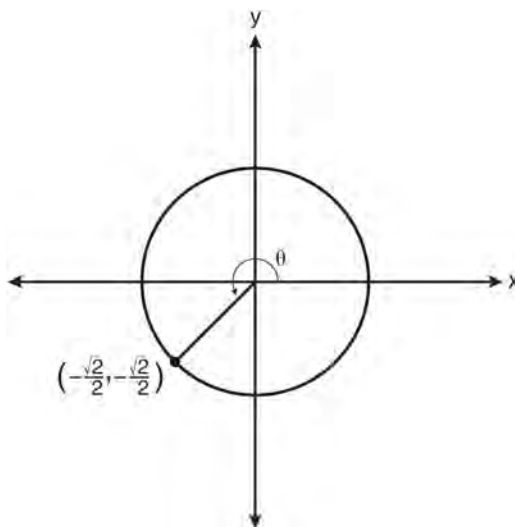
- 1 $\sec\left(\frac{5\pi}{6}\right)$
- 2 $\tan(49^\circ 20')$
- 3 $\sin\left(-\frac{3\pi}{5}\right)$
- 4 $\csc(-118^\circ)$

A2.A.64: USING INVERSE TRIGONOMETRIC FUNCTIONS

- 218 What is the principal value of $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$?

- 1 -30°
- 2 60°
- 3 150°
- 4 240°

- 219 In the diagram below of a unit circle, the ordered pair $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ represents the point where the terminal side of θ intersects the unit circle.



What is $m\angle\theta$?

- 1 45
- 2 135
- 3 225
- 4 240

220 If $\sin^{-1}\left(\frac{5}{8}\right) = A$, then

1 $\sin A = \frac{5}{8}$

2 $\sin A = \frac{8}{5}$

3 $\cos A = \frac{5}{8}$

4 $\cos A = \frac{8}{5}$

A2.A.57: REFERENCE ANGLES221 Expressed as a function of a positive acute angle, $\cos(-305^\circ)$ is equal to

1 $-\cos 55^\circ$

2 $\cos 55^\circ$

3 $-\sin 55^\circ$

4 $\sin 55^\circ$

A2.A.61: ARC LENGTH

222 A circle has a radius of 4 inches. In inches, what is the length of the arc intercepted by a central angle of 2 radians?

1 2π

2 2

3 8π

4 8

223 A circle is drawn to represent a pizza with a 12 inch diameter. The circle is cut into eight congruent pieces. What is the length of the outer edge of any one piece of this circle?

1 $\frac{3\pi}{4}$

2 π

3 $\frac{3\pi}{2}$

4 3π

A2.A.58-59: COFUNCTION AND RECIPROCAL TRIGONOMETRIC FUNCTIONS224 If $\angle A$ is acute and $\tan A = \frac{2}{3}$, then

1 $\cot A = \frac{2}{3}$

2 $\cot A = \frac{1}{3}$

3 $\cot(90^\circ - A) = \frac{2}{3}$

4 $\cot(90^\circ - A) = \frac{1}{3}$

225 The expression $\frac{\sin^2 \theta + \cos^2 \theta}{1 - \sin^2 \theta}$ is equivalent to

1 $\cos^2 \theta$

2 $\sin^2 \theta$

3 $\sec^2 \theta$

4 $\csc^2 \theta$

226 Express $\cos \theta(\sec \theta - \cos \theta)$, in terms of $\sin \theta$.227 Express the exact value of $\csc 60^\circ$, with a rational denominator.A2.A.67: PROVING TRIGONOMETRIC IDENTITIES

228 Which expression always equals 1?

1 $\cos^2 x - \sin^2 x$

2 $\cos^2 x + \sin^2 x$

3 $\cos x - \sin x$

4 $\cos x + \sin x$

229 Starting with $\sin^2 A + \cos^2 A = 1$, derive the formula $\tan^2 A + 1 = \sec^2 A$.

A2.A.76: ANGLE SUM AND DIFFERENCE IDENTITIES

- 230 The expression $\cos 4x \cos 3x + \sin 4x \sin 3x$ is equivalent to
- 1 $\sin x$
 - 2 $\sin 7x$
 - 3 $\cos x$
 - 4 $\cos 7x$
- 231 Given angle A in Quadrant I with $\sin A = \frac{12}{13}$ and angle B in Quadrant II with $\cos B = -\frac{3}{5}$, what is the value of $\cos(A - B)$?
- 1 $\frac{33}{65}$
 - 2 $-\frac{33}{65}$
 - 3 $\frac{63}{65}$
 - 4 $-\frac{63}{65}$
- 232 If $\tan A = \frac{2}{3}$ and $\sin B = \frac{5}{\sqrt{41}}$ and angles A and B are in Quadrant I, find the value of $\tan(A + B)$.
- 233 Express as a single fraction the exact value of $\sin 75^\circ$.

A2.A.77: DOUBLE AND HALF ANGLE IDENTITIES

- 234 The expression $\cos^2 \theta - \cos 2\theta$ is equivalent to
- 1 $\sin^2 \theta$
 - 2 $-\sin^2 \theta$
 - 3 $\cos^2 \theta + 1$
 - 4 $-\cos^2 \theta - 1$

- 235 If $\sin A = \frac{2}{3}$ where $0^\circ < A < 90^\circ$, what is the value of $\sin 2A$?
- 1 $\frac{2\sqrt{5}}{3}$
 - 2 $\frac{2\sqrt{5}}{9}$
 - 3 $\frac{4\sqrt{5}}{9}$
 - 4 $-\frac{4\sqrt{5}}{9}$

- 236 What is a positive value of $\tan \frac{1}{2}x$, when $\sin x = 0.8$?
- 1 0.5
 - 2 0.4
 - 3 0.33
 - 4 0.25

A2.A.68: TRIGONOMETRIC EQUATIONS

- 237 What is the solution set for $2 \cos \theta - 1 = 0$ in the interval $0^\circ \leq \theta < 360^\circ$?
- 1 $\{30^\circ, 150^\circ\}$
 - 2 $\{60^\circ, 120^\circ\}$
 - 3 $\{30^\circ, 330^\circ\}$
 - 4 $\{60^\circ, 300^\circ\}$
- 238 What are the values of θ in the interval $0^\circ \leq \theta < 360^\circ$ that satisfy the equation $\tan \theta - \sqrt{3} = 0$?
- 1 $60^\circ, 240^\circ$
 - 2 $72^\circ, 252^\circ$
 - 3 $72^\circ, 108^\circ, 252^\circ, 288^\circ$
 - 4 $60^\circ, 120^\circ, 240^\circ, 300^\circ$
- 239 Solve the equation $2 \tan C - 3 = 3 \tan C - 4$ algebraically for all values of C in the interval $0^\circ \leq C < 360^\circ$.
- 240 Find all values of θ in the interval $0^\circ \leq \theta < 360^\circ$ that satisfy the equation $\sin 2\theta = \sin \theta$.

Algebra 2/Trigonometry Regents Exam Questions by Performance Indicator: Topic

A2.A.69: PROPERTIES OF TRIGONOMETRIC FUNCTIONS

241 What is the period of the function $f(\theta) = -2 \cos 3\theta$?

- 1 π
- 2 $\frac{2\pi}{3}$
- 3 $\frac{3\pi}{2}$
- 4 2π

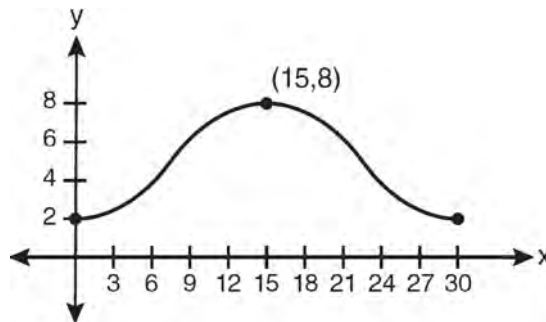
242 What is the period of the function

$$y = \frac{1}{2} \sin\left(\frac{x}{3} - \pi\right)?$$

- 1 $\frac{1}{2}$
- 2 $\frac{1}{3}$
- 3 $\frac{2}{3}\pi$
- 4 6π

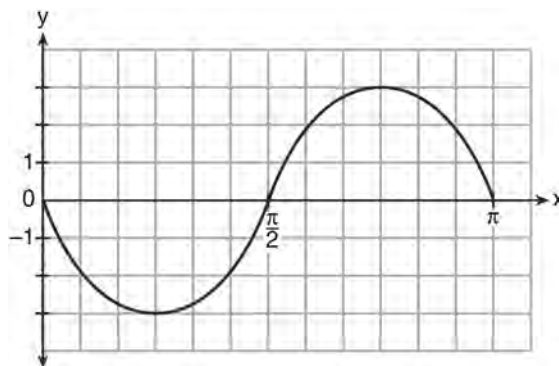
A2.A.72: IDENTIFYING THE EQUATION OF A TRIGONOMETRIC GRAPH

243 Which equation is graphed in the diagram below?



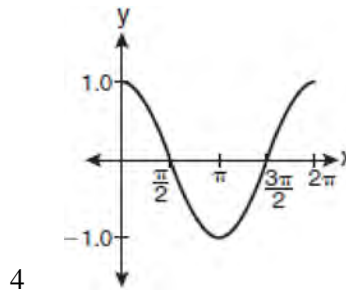
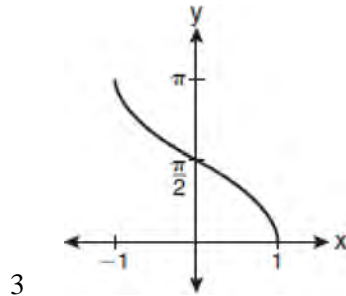
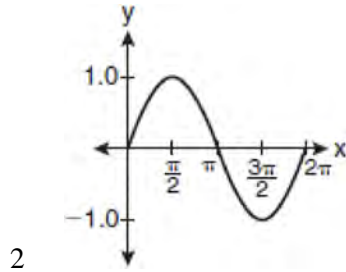
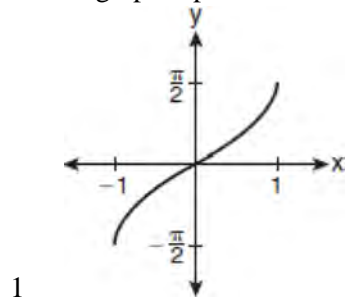
- 1 $y = 3 \cos\left(\frac{\pi}{30}x\right) + 8$
- 2 $y = 3 \cos\left(\frac{\pi}{15}x\right) + 5$
- 3 $y = -3 \cos\left(\frac{\pi}{30}x\right) + 8$
- 4 $y = -3 \cos\left(\frac{\pi}{15}x\right) + 5$

244 Write an equation for the graph of the trigonometric function shown below.

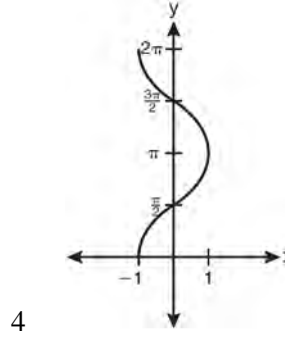
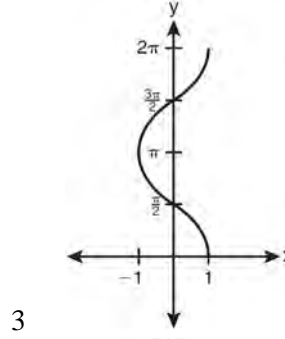
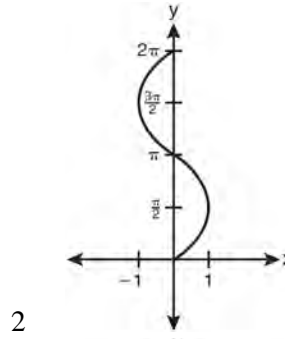
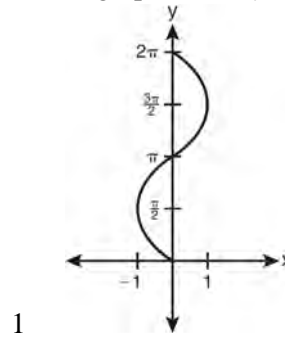


A2.A.65, 70-71: GRAPHING TRIGONOMETRIC FUNCTIONS

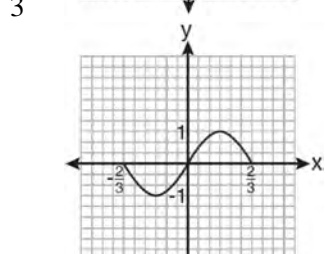
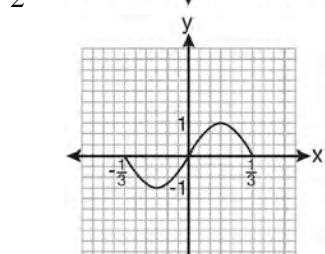
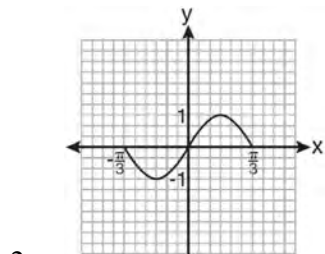
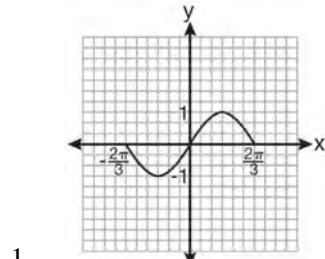
245 Which graph represents the equation $y = \cos^{-1} x$?



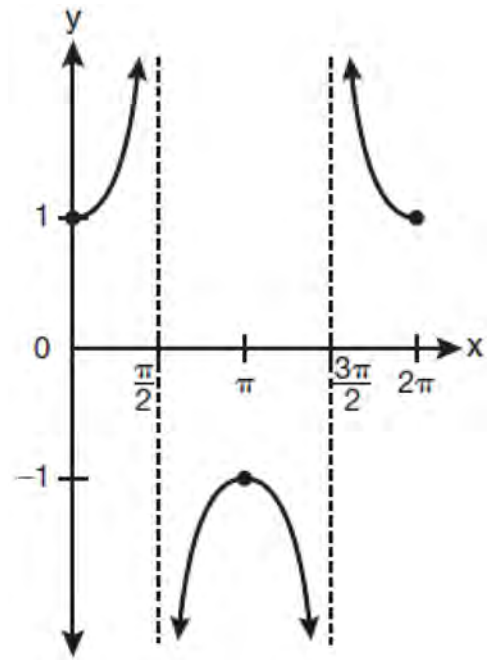
246 Which graph shows $y = \cos^{-1} x$?



247 Which graph represents one complete cycle of the equation $y = \sin 3\pi x$?

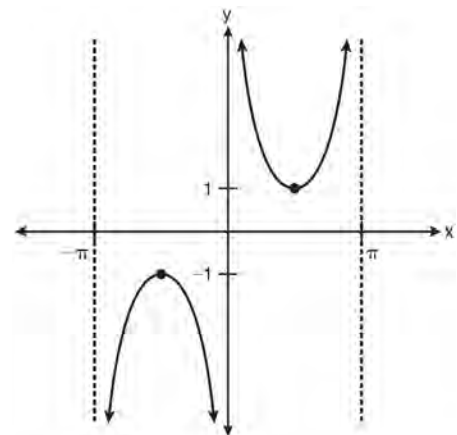


248 Which equation is represented by the graph below?



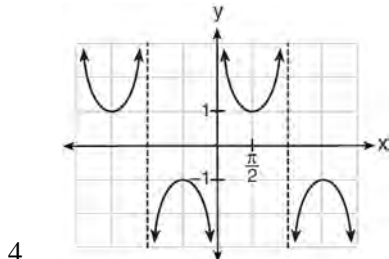
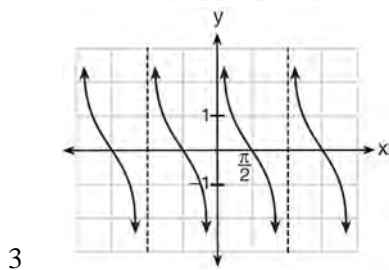
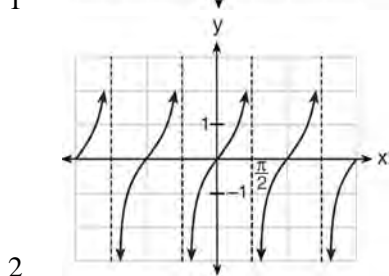
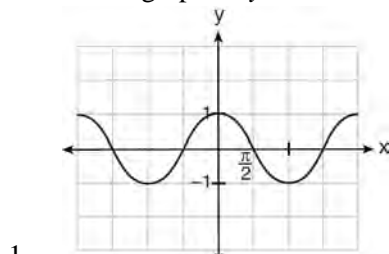
- 1 $y = \cot x$
- 2 $y = \csc x$
- 3 $y = \sec x$
- 4 $y = \tan x$

249 Which equation is sketched in the diagram below?



- 1 $y = \csc x$
- 2 $y = \sec x$
- 3 $y = \cot x$
- 4 $y = \tan x$

250 Which is a graph of $y = \cot x$?



A2.A.63: DOMAIN AND RANGE

251 The function $f(x) = \tan x$ is defined in such a way that $f^{-1}(x)$ is a function. What can be the domain of $f(x)$?

- 1 $\{x \mid 0 \leq x \leq \pi\}$
- 2 $\{x \mid 0 \leq x \leq 2\pi\}$
- 3 $\left\{x \mid -\frac{\pi}{2} < x < \frac{\pi}{2}\right\}$
- 4 $\left\{x \mid -\frac{\pi}{2} < x < \frac{3\pi}{2}\right\}$

252 In which interval of $f(x) = \cos(x)$ is the inverse also a function?

- 1 $-\frac{\pi}{2} < x < \frac{\pi}{2}$
- 2 $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$
- 3 $0 \leq x \leq \pi$
- 4 $\frac{\pi}{2} \leq x \leq \frac{3\pi}{2}$

A2.A.74: USING TRIGONOMETRY TO FIND AREA

253 In $\triangle ABC$, $m\angle A = 120$, $b = 10$, and $c = 18$. What is the area of $\triangle ABC$ to the nearest square inch?

- 1 52
- 2 78
- 3 90
- 4 156

254 The sides of a parallelogram measure 10 cm and 18 cm. One angle of the parallelogram measures 46 degrees. What is the area of the parallelogram, to the nearest square centimeter?

- 1 65
- 2 125
- 3 129
- 4 162

255 In parallelogram $BFLO$, $OL = 3.8$, $LF = 7.4$, and $m\angle O = 126$. If diagonal BL is drawn, what is the area of $\triangle BLF$?

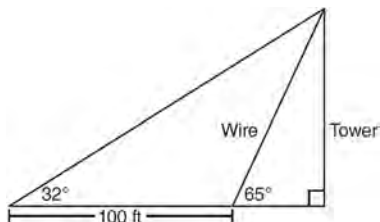
- 1 11.4
- 2 14.1
- 3 22.7
- 4 28.1

256 Two sides of a parallelogram are 24 feet and 30 feet. The measure of the angle between these sides is 57° . Find the area of the parallelogram, to the nearest square foot.

257 The two sides and included angle of a parallelogram are 18, 22, and 60° . Find its exact area in simplest form.

A2.A.73: LAW OF SINES

- 258 The diagram below shows the plans for a cell phone tower. A guy wire attached to the top of the tower makes an angle of 65 degrees with the ground. From a point on the ground 100 feet from the end of the guy wire, the angle of elevation to the top of the tower is 32 degrees. Find the height of the tower, to the *nearest foot*.



- 259 In $\triangle ABC$, $m\angle A = 32$, $a = 12$, and $b = 10$. Find the measures of the missing angles and side of $\triangle ABC$. Round each measure to the *nearest tenth*.

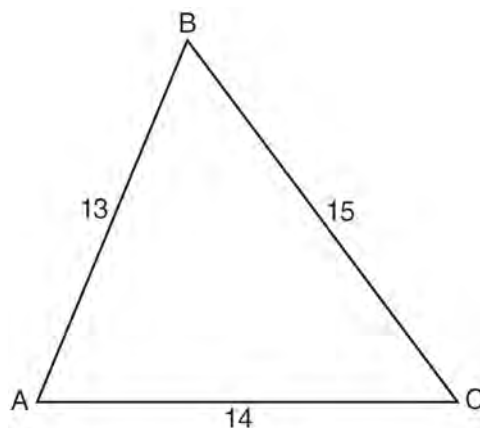
A2.A.75: LAW OF SINES-THE AMBIGUOUS CASE

- 260 How many distinct triangles can be formed if $m\angle A = 35$, $a = 10$, and $b = 13$?
- 1 1
 - 2 2
 - 3 3
 - 4 0
- 261 Given $\triangle ABC$ with $a = 9$, $b = 10$, and $m\angle B = 70$, what type of triangle can be drawn?
- 1 an acute triangle, only
 - 2 an obtuse triangle, only
 - 3 both an acute triangle and an obtuse triangle
 - 4 neither an acute triangle nor an obtuse triangle
- 262 In $\triangle ABC$, $m\angle A = 74$, $a = 59.2$, and $c = 60.3$. What are the two possible values for $m\angle C$, to the *nearest tenth*?
- 1 73.7 and 106.3
 - 2 73.7 and 163.7
 - 3 78.3 and 101.7
 - 4 78.3 and 168.3

- 263 In $\triangle MNP$, $m = 6$ and $n = 10$. Two distinct triangles can be constructed if the measure of angle M is
- 1 35
 - 2 40
 - 3 45
 - 4 50

A2.A.73: LAW OF COSINES

- 264 In $\triangle ABC$, $a = 15$, $b = 14$, and $c = 13$, as shown in the diagram below. What is the $m\angle C$, to the *nearest degree*?



- 1 53
 - 2 59
 - 3 67
 - 4 127
- 265 In $\triangle ABC$, $a = 3$, $b = 5$, and $c = 7$. What is $m\angle C$?
- 1 22
 - 2 38
 - 3 60
 - 4 120
- 266 In a triangle, two sides that measure 6 cm and 10 cm form an angle that measures 80° . Find, to the *nearest degree*, the measure of the smallest angle in the triangle.

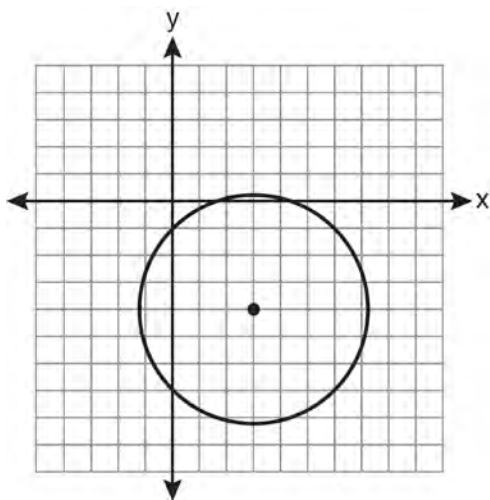
A2.A.73: VECTORS

- 267 Two forces of 25 newtons and 85 newtons acting on a body form an angle of 55° . Find the magnitude of the resultant force, to the *nearest hundredth of a newton*. Find the measure, to the *nearest degree*, of the angle formed between the resultant and the larger force.
- 268 The measures of the angles between the resultant and two applied forces are 60° and 45° , and the magnitude of the resultant is 27 pounds. Find, to the *nearest pound*, the magnitude of each applied force.

CONICS

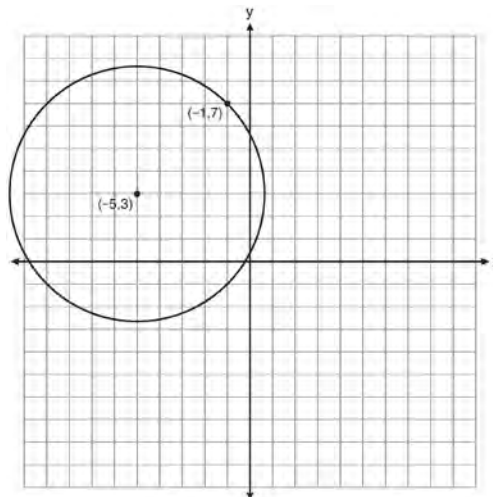
A2.A.47, 49: EQUATIONS OF CIRCLES

- 269 Which equation represents the circle shown in the graph below that passes through the point $(0, -1)$?



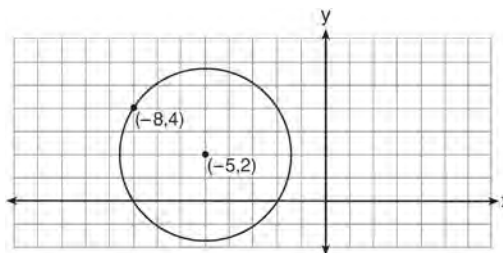
- 1 $(x - 3)^2 + (y + 4)^2 = 16$
- 2 $(x - 3)^2 + (y + 4)^2 = 18$
- 3 $(x + 3)^2 + (y - 4)^2 = 16$
- 4 $(x + 3)^2 + (y - 4)^2 = 18$

- 270 A circle shown in the diagram below has a center of $(-5, 3)$ and passes through point $(-1, 7)$.

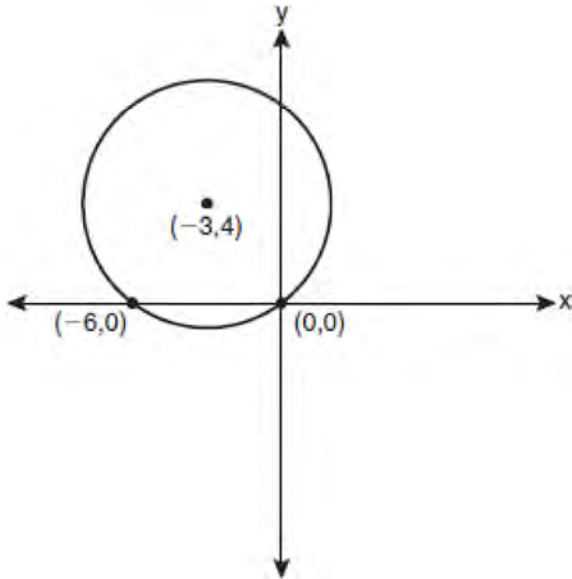


Write an equation that represents the circle.

- 271 Write an equation of the circle shown in the diagram below.



- 272 Write an equation of the circle shown in the graph below.



- 273 The equation $x^2 + y^2 - 2x + 6y + 3 = 0$ is equivalent to
- to
- 1 $(x - 1)^2 + (y + 3)^2 = -3$
 - 2 $(x - 1)^2 + (y + 3)^2 = 7$
 - 3 $(x + 1)^2 + (y + 3)^2 = 7$
 - 4 $(x + 1)^2 + (y + 3)^2 = 10$