JEFFERSON MATH PROJECT REGENTS BY PERFORMANCE INDICATOR: TOPIC

NY Algebra 2/Trigonometry Regents Exam Questions from Fall 2009 to August 2010 Sorted by PI: Topic

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Dear Sir

I have to acknolege the reciept 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 indispensible 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.

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

GRAPHS AND STATISTICS

A2.S.1: ANALYSIS OF DATA

1 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.

A2.S.2: ANALYSIS OF DATA

2 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?

1 the size of the sample
2 the size of the population
3 the method of analyzing the data
4 the method of choosing the students who were surveyed

A2.S.3: DISPERSION

3 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*.

4 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

A2.S.7: REGRESSION

5 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.*

6 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

7 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

A2.S.5: NORMAL DISTRIBUTIONS

8 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

9 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

PROBABILITY

A2.S.10: PERMUTATIONS

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

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

12 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

13 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

A2.S.9: DIFFERENTIATING PERMUATIONS AND COMBINATIONS

14 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 ${}_{20}P_3$

A2.S.12: SAMPLE SPACE

15 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.15: BINOMIAL PROBABILITY

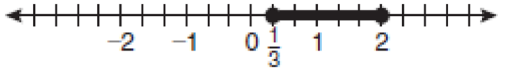
16 The members of a men's club have a choice of wearing black or red vests to their club meetings. A study done over a period of many years determined that the percentage of black vests worn is 60%. If there are 10 men at a club meeting on a given night, what is the probability, to the *nearest thousandth*, that *at least* 8 of the vests worn will be black?

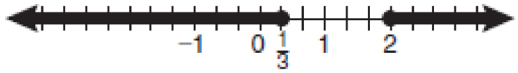
17 A study shows that 35% of the fish caught in a local lake had high levels of mercury. Suppose that 10 fish were caught from this lake. Find, to the *nearest tenth of a percent,* the probability that *at least* 8 of the 10 fish caught did *not* contain high levels of mercury.

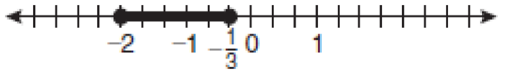
ABSOLUTE VALUE

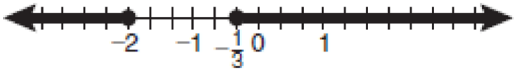
A2.A.1: ABSOLUTE VALUE INEQUALITIES

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

1 

2 

3 

4 

QUADRATICS

A2.A.20: ROOTS OF QUADRATICS

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

A2.A.21: ROOTS OF QUADRATICS

20 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 $4x^2 + 3x - 2 = 0$

A2.A.7: FACTORING POLYNOMIALS

21 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 $2x^2(2x + 3)(3x - 2)$

22 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 $-x(x + 3)(x - 2)$

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

A2.A.25: QUADRATIC FORMULA

24 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 $\frac{7 \pm \sqrt{73}}{4}$

25 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

26 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

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

A2.A.24: COMPLETING THE SQUARE

28 Solve $2x^2 - 12x + 4 = 0$ by completing the square, expressing the result in simplest radical form.

A2.A.4: QUADRATIC INEQUALITIES

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

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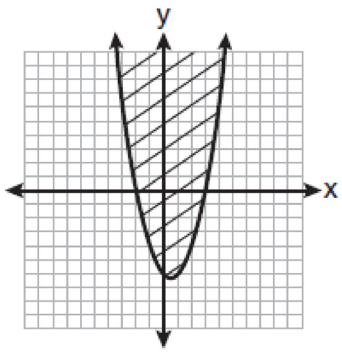

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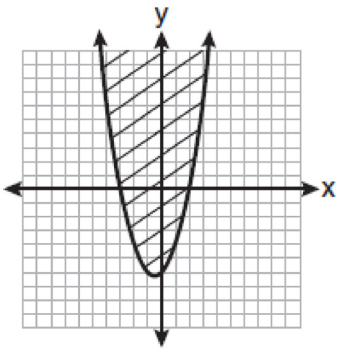

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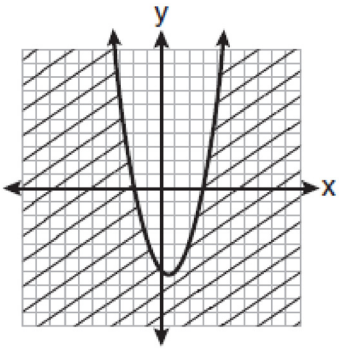

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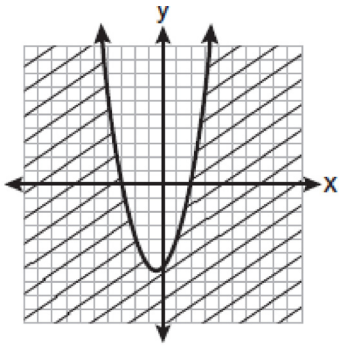


SYSTEMS

A2.A.3: QUADRATIC-LINEAR SYSTEMS

30 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 $-6, 2$

POWERS

A2.N.3: OPERATIONS WITH POLYNOMIALS

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

A2.A.8: NEGATIVE AND FRACTIONAL EXPONENTS

32 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 $a^{-2}b^{-1}$

33 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 $\frac{8}{9}$

34 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}

A2.A.9: NEGATIVE AND FRACTIONAL EXPONENTS

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

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

A2.A.12: EVALUATING EXPONENTIAL EXPRESSIONS

36 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.

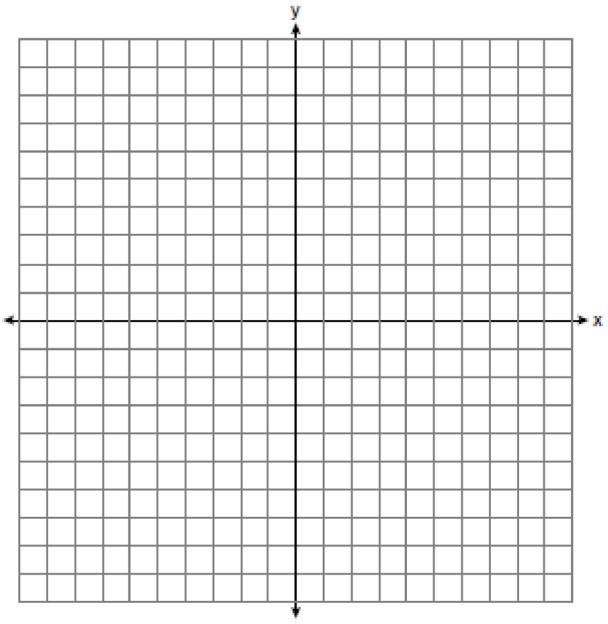
A2.A.18: EVALUATING LOGARITHMIC EXPRESSIONS

37 The expression $\log_8 64$ is equivalent to

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

A2.A.53: GRAPHING EXPONENTIAL FUNCTIONS

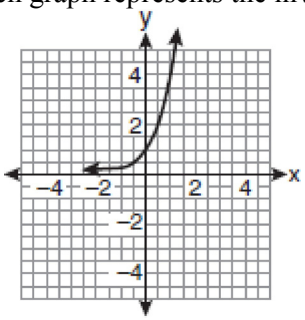
38 The graph of the equation $y = \left(\frac{1}{2}\right)^x$ has an asymptote. On the grid below, sketch the graph of $y = \left(\frac{1}{2}\right)^x$ and write the equation of this asymptote.



A2.A.54: GRAPHING LOGARITHMIC FUNCTIONS

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

1



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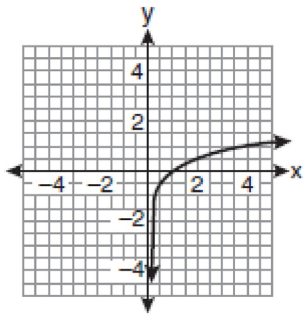

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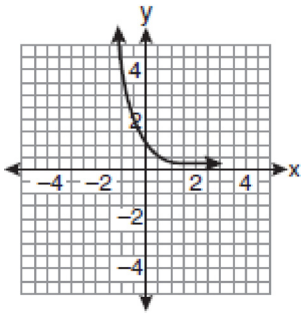

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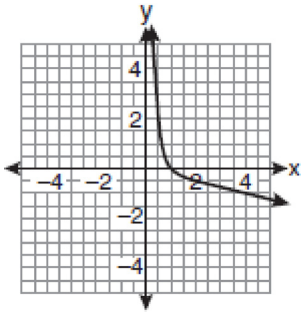


A2.A.19: PROPERTIES OF LOGARITHMS

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

A2.A.28: LOGARITHMIC EQUATIONS

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

1 6.4

2 2.56

3 $\frac{9}{5}$

4 $\frac{8}{5}$

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

A2.A.27: EXPONENTIAL EQUATIONS

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

1 $\{1,3\}$

2 $\{-1,3\}$

3 $\{-1,-3\}$

4 $\{1,-3\}$

44 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 $\frac{4}{3}$

A2.A.36: BINOMIAL EXPANSIONS

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

1 $-720x^2$

2 $-240x$

3 $720x^2$

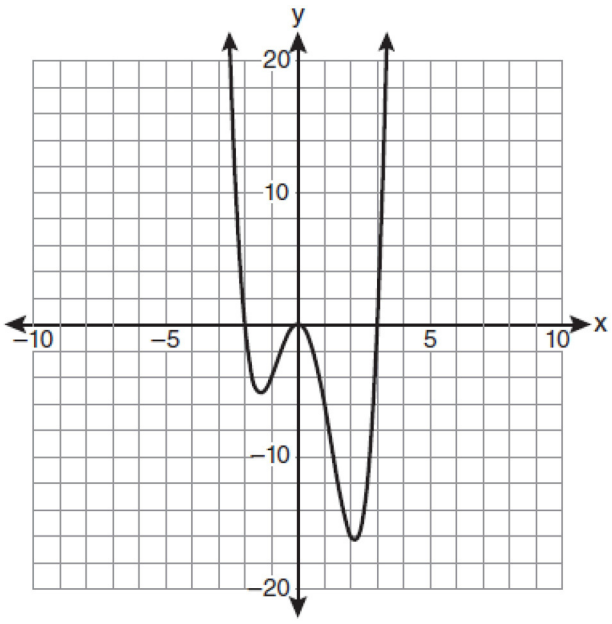
4 $1,080x^3$

A2.A.26: SOLVING POLYNOMIAL EQUATIONS

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

A2.A.50: SOLVING POLYNOMIAL EQUATIONS

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



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

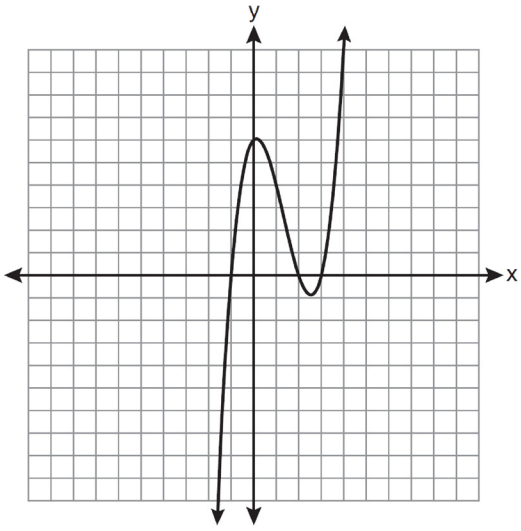
1 $\{-3,2\}$

2 $\{-2,3\}$

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

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

48 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

RADICALS

A2.N.2: OPERATIONS WITH RADICALS

49 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

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

A2.A.14: OPERATIONS WITH RADICALS

51 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 $-5ab\sqrt{2b} + 7ab\sqrt{6b}$

A2.N.5: RATIONALIZING DENOMINATORS

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

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

A2.A.15: RATIONALIZING DENOMINATORS

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

A2.A.22: SOLVING RADICALS

55 The solution set of the equation $\sqrt{x+3} = 3-x$ is
1 $\{1\}$
2 $\{0\}$
3 $\{1,6\}$
4 $\{2,3\}$

A2.A.10: EXPONENTS AS RADICALS

56 The expression $(x^2-1)^{-\frac{2}{3}}$ is equivalent to
1 $\sqrt[3]{(x^2-1)^2}$
2 $\dfrac{1}{\sqrt[3]{(x^2-1)^2}}$
3 $\sqrt{(x^2-1)^3}$
4 $\dfrac{1}{\sqrt{(x^2-1)^3}}$

A2.N.6: SQUARE ROOTS OF NEGATIVE NUMBERS

57 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

58 The product of i^7 and i^5 is equivalent to
1 1
2 -1
3 i
4 $-i$

59 The expression $2i^2 + 3i^3$ is equivalent to
1 $-2-3i$
2 $2-3i$
3 $-2+3i$
4 $2+3i$

A2.N.8: CONJUGATES OF COMPLEX NUMBERS

60 What is the conjugate of $-2+3i$?
1 $-3+2i$
2 $-2-3i$
3 $2-3i$
4 $3+2i$

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

61 The expression $(3-7i)^2$ is equivalent to
1 $-40+0i$
2 $-40-42i$
3 $58+0i$
4 $58-42i$

RATIONALS

A2.A.23: SOLVING RATIONALS

62 Solve for x: $\dfrac{4x}{x-3} = 2 + \dfrac{12}{x-3}$

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

A2.A.17: COMPLEX FRACTIONS

64 Written in simplest form, the expression $\dfrac{\frac{x}{4}-\frac{1}{x}}{\frac{1}{2x}+\frac{1}{4}}$ is equivalent to
1 $x-1$
2 $x-2$
3 $\dfrac{x-2}{2}$
4 $\dfrac{x^2-4}{x+2}$

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

FUNCTIONS

A2.A.40: FUNCTIONAL NOTATION

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

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

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

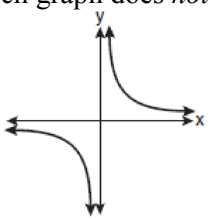
$$\{(0,1),(1,2),(2,4),(3,8)\}$$

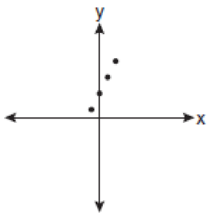
Which equation represents $f(x)$?

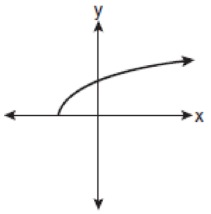
1 $f(x) = 2^x$
2 $f(x) = 2x$
3 $f(x) = x + 1$
4 $f(x) = \log_2 x$

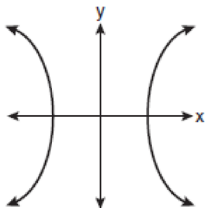
A2.A.38: DEFINING FUNCTIONS

68 Which graph does *not* represent a function?

1 

2 

3 

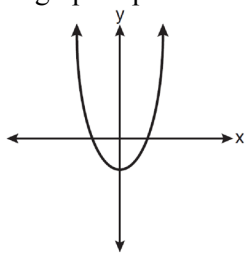
4 

69 Which relation is *not* a function?

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

A2.A.43: DEFINING FUNCTIONS

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

1


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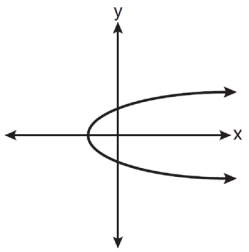

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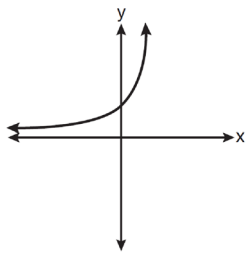

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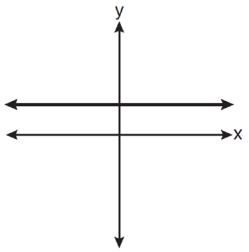


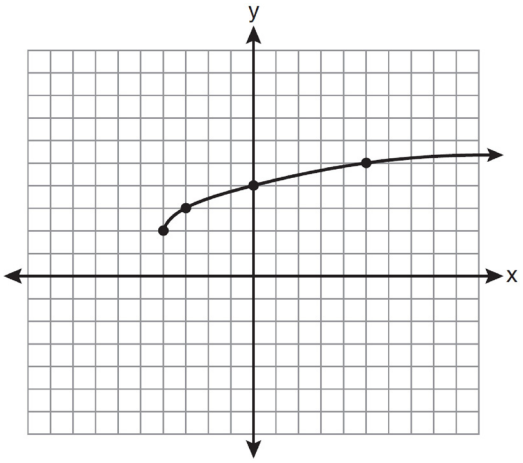
71 Which function is *not* one-to-one?
1 $\{(0,1),(1,2),(2,3),(3,4)\}$
2 $\{(0,0),(1,1),(2,2),(3,3)\}$
3 $\{(0,1),(1,0),(2,3),(3,2)\}$
4 $\{(0,1),(1,0),(2,0),(3,2)\}$

A2.A.39: DOMAIN AND RANGE

72 What is the domain of the function $f(x) = \sqrt{x-2} + 3$?
1 $(-\infty, \infty)$
2 $(2, \infty)$
3 $[2, \infty)$
4 $[3, \infty)$

A2.A.51: DOMAIN AND RANGE

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



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

A2.A.42: COMPOSITIONS OF FUNCTIONS

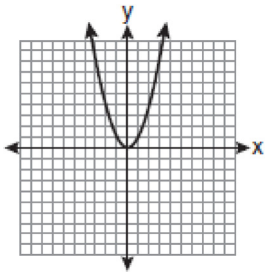
74 If $f(x) = \frac{1}{2}x - 3$ and $g(x) = 2x + 5$, what is the value of $(g \circ f)(4)$?
1 –13
2 3.5
3 3
4 6

A2.A.44: INVERSE OF FUNCTIONS

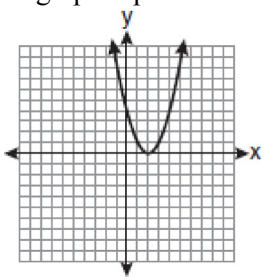
75 Which two functions are inverse functions of each other?
1 $f(x) = \sin x$ and $g(x) = \cos(x)$
2 $f(x) = 3 + 8x$ and $g(x) = 3 - 8x$
3 $f(x) = e^x$ and $g(x) = \ln x$
4 $f(x) = 2x - 4$ and $g(x) = -\frac{1}{2}x + 4$

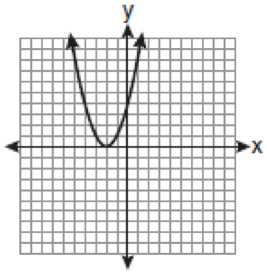
A2.A.46: TRANSFORMATIONS WITH FUNCTIONS AND RELATIONS

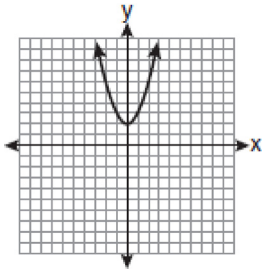
76 The graph below shows the function f(x).

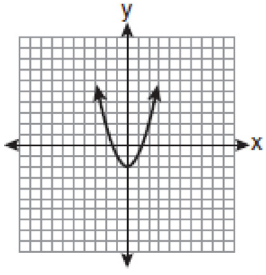


Which graph represents the function f($x+2$)?

1 

2 

3 

4 

77 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: SEQUENCES

78 What is a formula for the nth term of sequence B shown below?

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

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

79 What is the formula for the nth term of the sequence $54, 18, 6, \ldots$?

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

A2.A.30: SEQUENCES

80 What is the common difference of the arithmetic sequence $5, 8, 11, 14$?

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

A2.A.31: SEQUENCES

81 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 $\frac{37}{3}$

A2.A.33: RECURSIVE SEQUENCES

82 Find the first four terms of the recursive sequence defined below.

$$a_1 = -3$$

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

A2.N.10: SIGMA NOTATION

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

1 12
2 22
3 24
4 26

A2.A.34: SIGMA NOTATION

84 Mrs. Hill asked her students to express the sum $1+3+5+7+9+\ldots+39$ 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 $\sum_{k=-1}^{37}(k+2)$

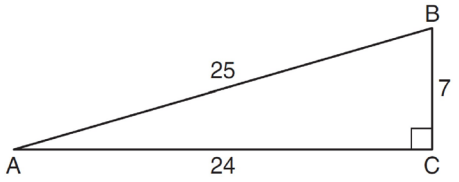
4 $\sum_{k=1}^{39}(2k-1)$

85 Express the sum $7+14+21+28+\ldots+105$ using sigma notation.

TRIGONOMETRY

A2.A.55: TRIGONOMETRIC RATIOS

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



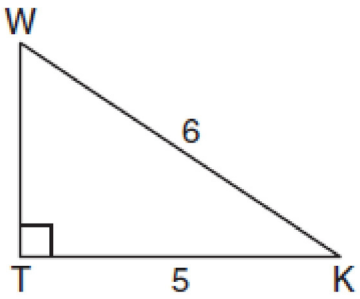
1 $\frac{25}{24}$

2 $\frac{25}{7}$

3 $\frac{24}{7}$

4 $\frac{7}{24}$

87 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°33'
2 33°34'
3 33°55'
4 33°56'

A2.M.2: RADIAN MEASURE

88 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

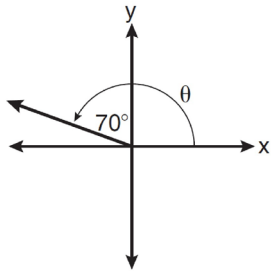
89 Find, to the *nearest minute*, the angle whose measure is 3.45 radians.

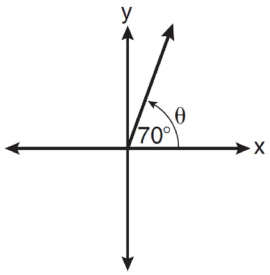
90 What is the radian measure of an angle whose measure is –420°?

1 $-\frac{7\pi}{3}$
2 $-\frac{7\pi}{6}$
3 $\frac{7\pi}{6}$
4 $\frac{7\pi}{3}$

A2.A.60: UNIT CIRCLE

91 In which graph is θ coterminal with an angle of –70°?

1


2


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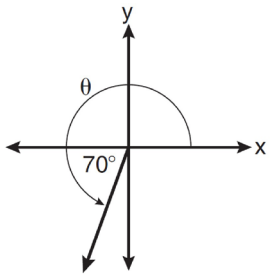

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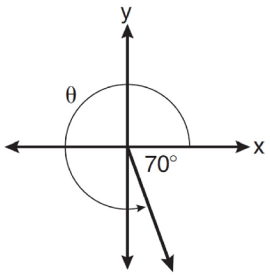
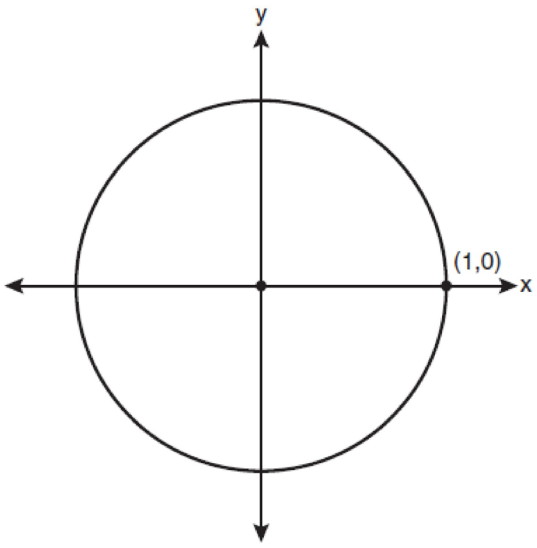


92 On the unit circle shown in the diagram below, sketch an angle, in standard position, whose degree measure is 240 and find the exact value of $\sin 240°$.



A2.A.62: DETERMINING TRIGONOMETRIC FUNCTIONS

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

A2.A.64: USING INVERSE TRIGONOMETRIC FUNCTIONS

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

1 $-30°$
2 $60°$
3 $150°$
4 $240°$

A2.A.61: ARC LENGTH

95 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

A2.A.58: COFUNCTION & RECIPROCAL TRIGONOMETRIC RELATIONSHIPS

96 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 $\cot(90° - A) = \frac{2}{3}$
4 $\cot(90° - A) = \frac{1}{3}$

A2.A.76: ANGLE SUM AND DIFFERENCE IDENTITIES

97 The expression $\cos 4x \cos 3x + \sin 4x \sin 3x$ is equivalent to

1 $\sin x$
2 $\sin 7x$
3 $\cos x$
4 $\cos 7x$

98 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 $\tan(A + B)$.

A2.A.77: DOUBLE AND HALF ANGLE IDENTITIES

99 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 $-\cos^2\theta - 1$

A2.A.68: TRIGONOMETRIC EQUATIONS

100 What are the values of θ in the interval $0° \le \theta < 360°$ that satisfy the equation $\tan\theta - \sqrt{3} = 0$?

1 60º, 240º
2 72º, 252º
3 72º, 108º, 252º, 288º
4 60º, 120º, 240º, 300º

101 Solve the equation $2\tan C - 3 = 3\tan C - 4$ algebraically for all values of C in the interval $0° \le C < 360°$.

102 Find all values of θ in the interval $0° \le \theta < 360°$ that satisfy the equation $\sin 2\theta = \sin\theta$.

A2.A.69: PROPERTIES OF TRIGONOMETRIC FUNCTIONS

103 What is the period of the function $y = \frac{1}{2}\sin\left(\frac{x}{3} - \pi\right)$?

1 $\frac{1}{2}$

2 $\frac{1}{3}$

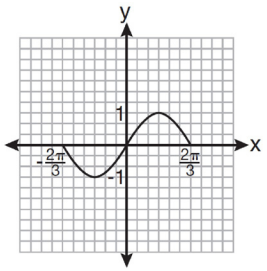
3 $\frac{2}{3}\pi$

4 6π

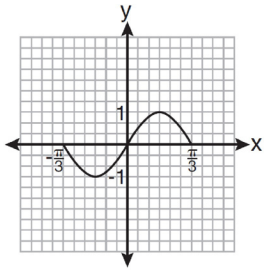
A2.A.70: GRAPHING TRIGONOMETRIC FUNCTIONS

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

1



2



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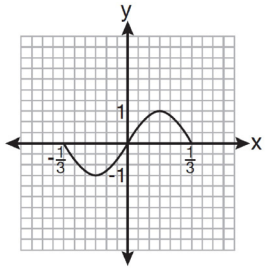
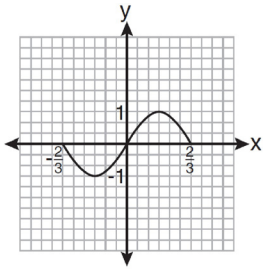


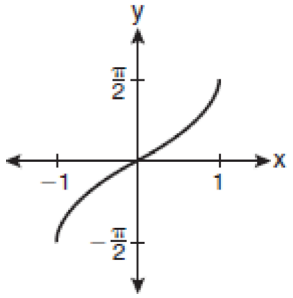
4



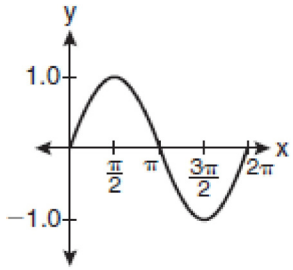
A2.A.65: GRAPHING TRIGONOMETRIC FUNCTIONS

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

1



2



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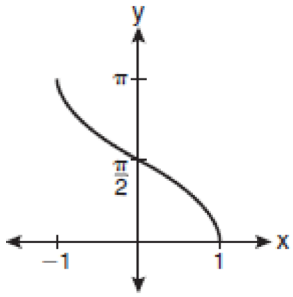

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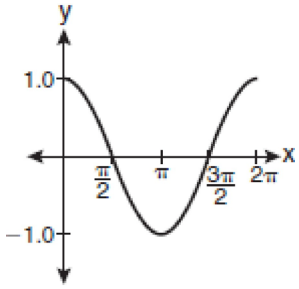
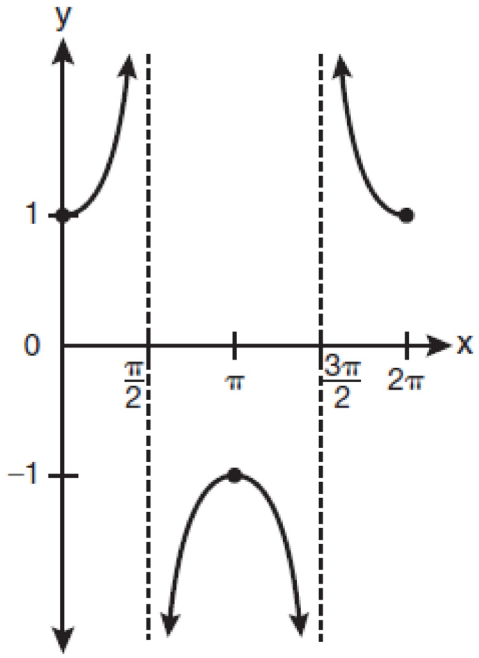


A2.A.71: GRAPHING TRIGONOMETRIC FUNCTIONS

106 Which equation is represented by the graph below?



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

A2.A.63: DOMAIN AND RANGE

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

A2.A.74: USING TRIGONOMETRY TO FIND AREA

108 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

109 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

110 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*.

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

111 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

A2.A.73: LAW OF COSINES

112 In $\triangle ABC$, $a = 3$, $b = 5$, and $c = 7$. What is $m\angle C$?
1 22
2 38
3 60
4 120

113 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

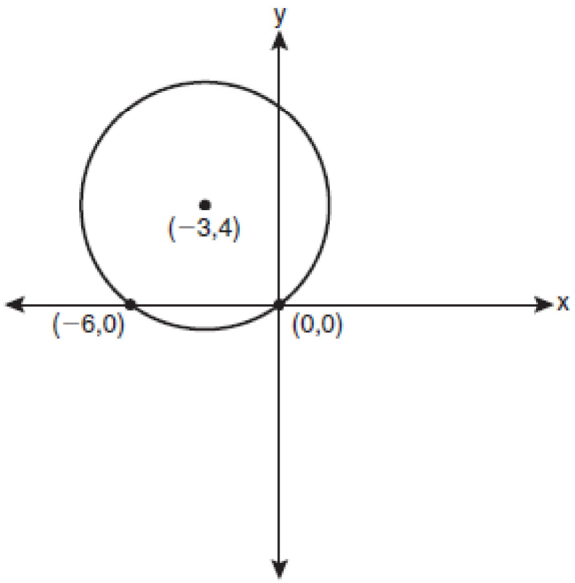
114 Two forces of 25 newtons and 85 newtons acting on a body form an angle of 55°. Find the magnitude of the resultant force, to the *nearest hundredth of a newton*. Find the measure, to the *nearest degree*, of the angle formed between the resultant and the larger force.

A2.A.47: EQUATIONS OF CIRCLES

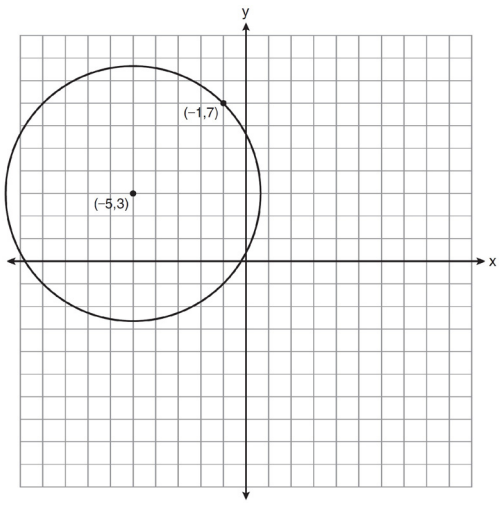
115 The equation $x^2 + y^2 - 2x + 6y + 3 = 0$ is equivalent to
1 $(x-1)^2 + (y+3)^2 = -3$
2 $(x-1)^2 + (y+3)^2 = 7$
3 $(x+1)^2 + (y+3)^2 = 7$
4 $(x+1)^2 + (y+3)^2 = 10$

A2.A.49: EQUATIONS OF CIRCLES

116 Write an equation of the circle shown in the graph below.



117 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.