Algebra II Honors Summer Review (150 problems)

COMPLETE THE PROBLEMS, SHOWING ALL YOUR WORK. DO NOT USE A CALCULATOR OR AI. USE THE ANSWER SHEET ATTACHED AT THE END OF THE THIS PACKET. REMEMBER, NO CREDIT WILL BE GIVEN UNLESS ALL THE WORK IS SHOWN.

Part 1 – Equations and Inequalities

Simplify each expression.

1. $25x + 14 - 17 - 6x$	2. $6y + 12x - 12y - 9x$	3. $5(2u + 3w) - 2(5u - 7w)$
4. $10m - 4(3m + 7) + 6m$	5. $9t^2 + 14 - 17t + 6t - 8t^2$	6. $5(2b + 3) + 8(b - 6)$
7. $3g + 9g^2 - 12g^2 + g$	8. $7t^4 + 7t^2 - 2t^2 - 9t^4$	9. $6(n - 2) - 8n + 40$
10. A New York City taxi charges \$2.50, plus \$.40 for each fifth of a mile if it is not delayed by traffic. Write an expression for the cost of the ride if you travel x miles in the taxi with no traffic delays.		

Solve each equation.

11. $24x + 16 = 12$	12. $-6y + 15 = -9$	13. $4(q - 5) = 16$	14. $7m + 38 = -5m - 16$
15. $48j + 25 = 12j - 11$	16. $8(2n - 5) = 3(6n - 2)$	17. $-10n + 3(8 + 8n) = -6(n - 4)$	
18. $10p + 9 - 11 - p = -2(2p + 4) - 3(2p - 2)$		19. $10(x + 3) - (-9x - 4) = x - 5 + 3$	
20. $12(2k + 11) = 12(2k + 12)$	21. $-12(x - 12) = -9(1 + 7x)$		
22. $-11 + 10(p + 10) = 4 - 5(2p + 11)$			

Complete each question.

23. At a vegetable stand, you bought 3 pounds of peppers for \$4.50. Green peppers cost \$1 per pound and orange peppers cost \$4 per pound. Find how many pounds of each kind of pepper you bought. (Pounds don't have to be in whole numbers.)
24. You can wash one window in 15 minutes and your sister can wash one window in 20 minutes. How many minutes will it take to wash 12 windows if you work together?

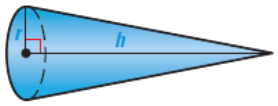
Solve for y. Then find the value of y for the given value of x.

25. $10x + y = 7; x = 3$	26. $8y - 3x = 18; x = 2$	27. $xy - 6y = -15; x = 5$
28. $4x = 6y + 9; x = 9$	29. $5x - 2y = 10; x = -6$	30. $x - 3xy = 1; x = -5$

31. While on vacation, your family rented a car for $293. The car rental cost $180, plus $.25 for every mile driven over 150 miles. How many miles did you drive while on vacation?

32. The formula $S = 2\pi rh + 2\pi r^2$ gives the surface area of a cylinder with height h and radius r. Solve the formula for h. Find h if r = 5 centimeters and S = 400 square centimeters.

33. The formula $\frac{1}{3}\pi r^2 h$ gives the volume of a cone with height h and base radius r. Solve the formula for h. Then find h when r = 2 inches and V = 45 cubic inches.



Solve the inequality. Then graph the solution.

34. $2x - 3 < -1$	35. $7 - 3x \geq -11$	36. $15x + 8 > 9x - 22$
37. $-5 < 10 - x < 5$	38. $-8 \leq 3x + 1 \leq 10$	39. $13x + 24 \leq 16 - 3x$

40. $9 + 2b < 7$ *or* $7 - 5b < -8$	41. $12 + 4n > 44$ *or* $10 - 12n > -38$

42. A triangle has sides of length 10, 2x, and 3x. As you learned in Geometry, the sum of the lengths of any two sides must be greater than the length of the third side. Write and solve three inequalities to find the possible values of x.

Solve the equation. Check for extraneous solutions.

43. $\|3p + 2\| = 7$	44. $\|9q - 5\| = 2q$	45. $\|8r + 1\| = 3r$

Solve the inequality. Then graph the solution on a number line.

46. $\|x - 5\| \geq 1$	47. $\|5 - 2y\| > 7$	48. $\|6z + 5\| \leq 25$
49. $\|x - 5\| \leq 30$	50. $\|3y + 4\| > 2$	51. $\left\|\frac{2}{3}z - 5\right\| < 5$
52. The circumference of a volleyball should be 26 inches, with a tolerance of 0.5 inches. Write and solve an absolute value inequality that describes the acceptable circumference of a volleyball. (Tolerance means it can be that much larger (+) or smaller (-).)		

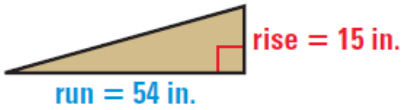
Part 2 – Linear Equations and Functions

Find Slope and Rate of Change

Find the slope of the line passing through the given points.

53. $(-2,-1),(4,3)$	54. $(1,-5),(1,2)$	55. $(5,-3),(1,7)$	56. $(6,2),(-8,2)$

57. A skateboard ramp has a rise of 15 inches and a run of 54 inches. What is its slope?



58. A new set of car tires has a tread depth of 8 millimeters. The tread depth decreases by 0.12 millimeter per thousand miles driven. Write an equation that gives the tread depth as a function of the distance driven. Then determine at what distance the tread depth will be 2 millimeters.

Graph equations of lines

Write the equation in slope-intercept form and then graph the equation.

59. $y = 5 - x$	60. $y - 5x = -4$	61. $x = 4$	62. $6x - 4y = 12$
63. $y = 4$	64. $y = \frac{3}{2}x + 3$	65. $x + 2y = 6$	66. $3y = 2x - 12$
67. $2x + 5y = 10$	68. $3x - 2y = 12$	69. $x = 1$	70. $y = -4$

Write Equations of Lines

Write an equation of the line that meets the following criteria.

71. $m = \frac{2}{3}, b = 4$	72. $m = -\frac{5}{4}, b = 7$	73. $m = -5, b = -1$	74. $(0,-2), m = 4$
75. Passes through: (3, -1) Slope: -3	76. Passes through: (-4, 3) Slope: 2	77. Passes Through: $(-3,4),(2,-6)$	78. Passes Through: $(-4,5),(12,-7)$
79. Passes Through: $(-4,1),(3,-6)$	80. Passes through: (9, -1) Parallel to: $y = -\frac{1}{3}x - 8$	81. Passes through: (9, -1) Perpendicular to: $y = -5x + 7$	

Graph Linear Inequalities in Two Variables

Tell whether the given ordered pair is a solution of the inequality.

82. $-y \leq 5x; (0,1)$	83. $y > -3x - 7; (-4, 6)$	84. $3x - 4y < -8; (-2, 0)$

Graph the inequality in a coordinate plane (not a number line!).

85. $\mathbf{-4y < 16}$	86. $\mathbf{y - 2x > 8}$	87. $\mathbf{12x - 8y \leq 24}$

Part 3 – Linear Systems

Solve Linear Systems by Graphing

Graph the system and estimate the solution. Check the solution algebraically.

88. $2x - y = 9$ $x + 3y = 8$	89. $2x - 3y = -2$ $x + y = -6$	90. $3x + y = 6$ $-x + 2y = 12$	91. $3x - y = 2$ $4x + y = 5$
92. $x + 2y = -6$ $-6x - 2y = -14$	93. $2x - 3y = 15$ $x - \frac{3}{2}y = -3$	94. $3x - y = 12$ $-x + 8y = -4$	

Solve Linear Systems Algebraically

Solve the system using any algebraic method.

95. $3x + y = -9$ $x - 2y = -10$	96. $2x + 3y = -2$ $4x + 7y = -6$	97. $x + 4y = -26$ $-5x - 2y = -14$
98. $3x + 4y = 6$ $4x + 5y = 7$	99. $2x - 7y = -36$ $x - 3y = -16$	100. $5x + 3y = -5$ $-9x - 6y = 12$
101. $3x + 2y = 5$ $-2x + 3y = 27$	102. $3x + 5y = 5$ $2x - 3y = 16$	103. $2x + 3y = 9$ $-3x + y = 25$

104. The cost of 14 gallons of regular gasoline and 10 gallons of premium gasoline is $100.96. Premium costs $.40 more per gallon than regular. What is the cost per gallon of each type of gasoline?

105. A total of $15,000 is invested in two corporate bonds that pay 5% and 7% simple annual interest. The investor wants to earn $880 in interest per year from the bonds. How much should be invested in each bond?

106. For the opening day of a carnival, 800 admission tickets were sold. The receipts totaled $3775. Tickets for children cost $3 each, tickets for adults for $8 each, and tickets for senior citizens cost $5 each. There were twice as many children's tickets sold as adult tickets. How many of each type of ticket were sold?

107. On a certain river, a motorboat can travel 34 miles per hour with the current and 28 miles per hour against it. Find the speed of the motorboat in still water and the speed of the current.

Systems of Linear Inequalities

Graph the system of linear inequalities.

108. $4x + y < 1$ $-x + 2y \leq 5$	109. $2x + 3y > 6$ $2x - y \leq 8$	110. $x + 3y \geq 5$ $-x + 2y < 4$
111. $x - 3y \geq 9$ $\frac{1}{3}x - y \leq 3$	112. $2x + y < 6$ $y > -2$	

Part 4 – Polynomials

Classifying polynomials

Write each polynomial in standard form, then name each polynomial by degree and number of terms.

113. $-6a + 8 - 7a^2$	114. $-5p^4 + 5p$	115. $3x^3$	116. $-2 + 3x$
117. 14	118. $2x^2 - 3x + 15x^5 + 4$		

Operations with polynomials

Add, subtract, or multiply the polynomials. Write your answer in standard form.

119. $(13a + 6a^4 - 6) - (13a^4 - 2 + 11a)$	120. $(7x - 5y)(-4x^2 + 4xy - 5)$	
121. $(11x^3 + 8x^3y^4) + (x^3y^4 - 9x^3 + 12xy^3) - (-5xy^3 + 5x^3y^4)$		122. $(6a^2 - 8b)^2$
123. $\left(\frac{3}{5}n + \frac{4}{3}\right)^2$	124. $(-x + 9y)(-x - 9y)$	125. $(2x^2 - 3y)(2x^2 + 3y)$

Factoring polynomials

Factor the polynomial completely.

126. $x^2 + 8x + 7$	127. $2n^2 - 11n + 15$	128. $21t^2 + 7t$
129. $y^3 + 2y^2 - 81y - 162$	130. $n^3 - 121n$	131. $2a^4 + 21a^3 + 49a^2$

Solve the equation.

132. $25a = 10a^2$	133. $t^2 + 7t = 60$	134. $4x^2 = 22x + 42$
135. $y^2 - 10y + 25 = 0$	136. $n^2 - 49 = 0$	137. $a^3 + a^2 = 64a + 64$

Part 5 – Exponents and Radicals

Properties of Exponents

Simplify the expression.

138. $\dfrac{k^{-7}m^5}{k^3m^6}$	139. $\left(\dfrac{b^5}{9y^4}\right)^{-4}$	140. $\left(\dfrac{2k^4}{9n^3}\right)^5$
141. $7.14^6 \cdot 7.14^{-6} \cdot 3.5$	142. $(3g^3h^4)^2(2g^4h^9)^3$	

Simplifying Radical Expressions

Simplify the radical expression.

143. $\sqrt{128}$	144. $\sqrt{20h^6k^4}$	145. $\sqrt{14q} \cdot 2\sqrt{4q}$	146. $\sqrt{\dfrac{80w^3}{9}}$
147. $\dfrac{3}{\sqrt{11}}$	148. $5\sqrt{2} + \sqrt{18}$	149. $\sqrt{6}(\sqrt{33} + 7)$	150. $\sqrt{\dfrac{63x^{15}y^9}{7xy^{11}}}$

Name_____ **Due: First Day of School**

Algebra II Honors Review (Answer Sheet)

Part 1 – Equations and Inequalities

1.	2.	3.
4.	5.	6.
7.	8.	9.
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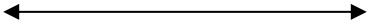
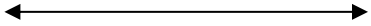
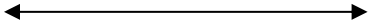
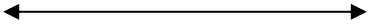
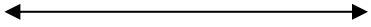
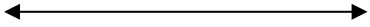
34. 	35. 	36. 
37. 	38. 	39. 
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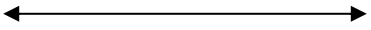
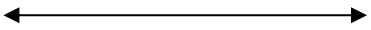
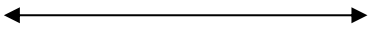
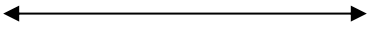
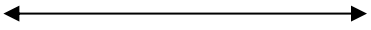
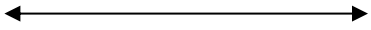
46. 	47. 	48. 
49. 	50. 	51. 
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PART 2 – Linear Equations and Functions

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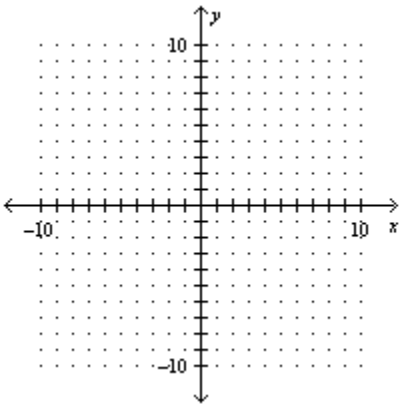

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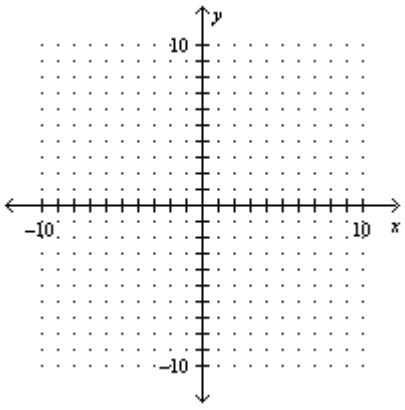

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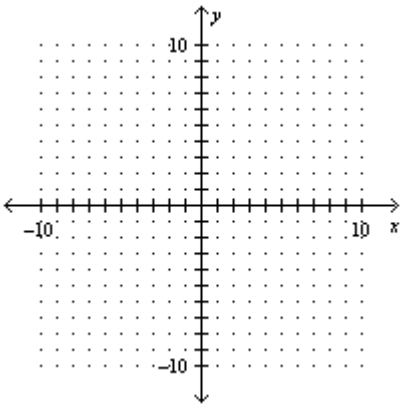

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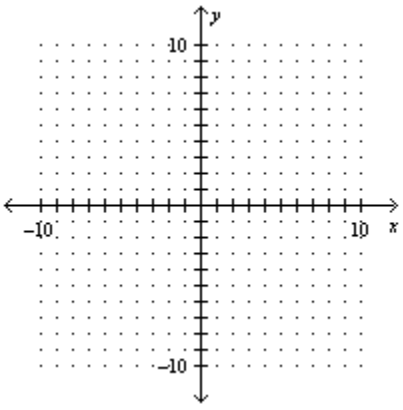

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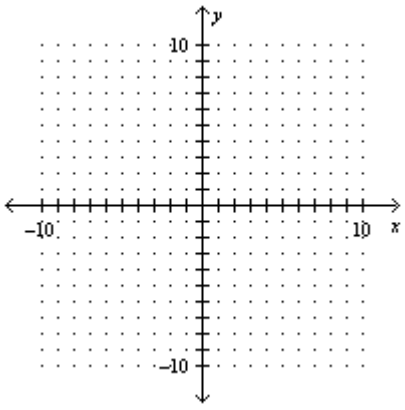

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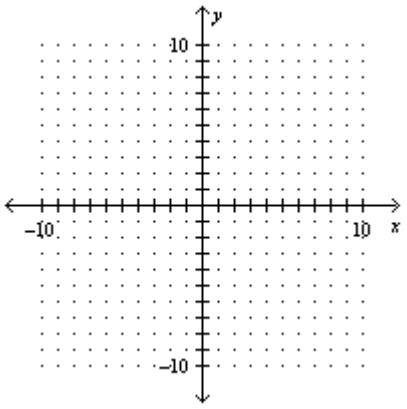

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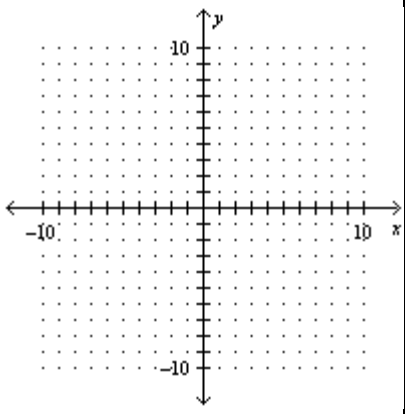

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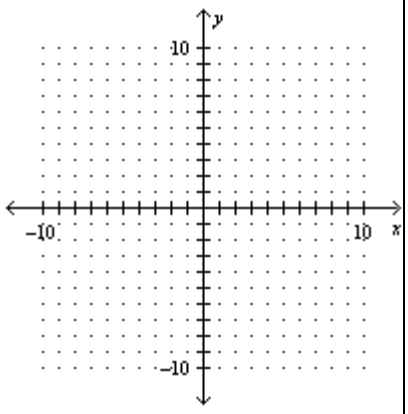

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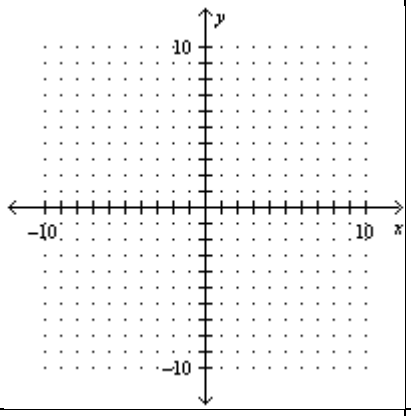

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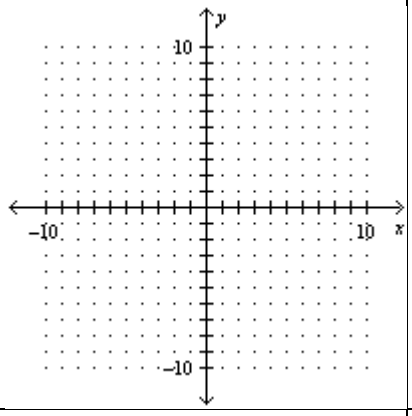

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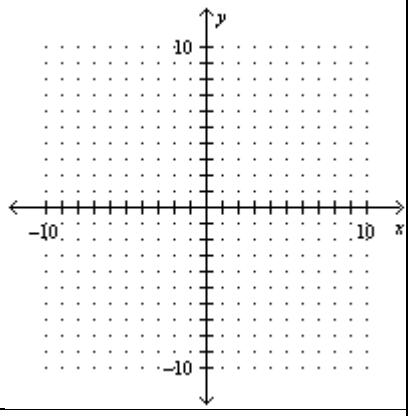

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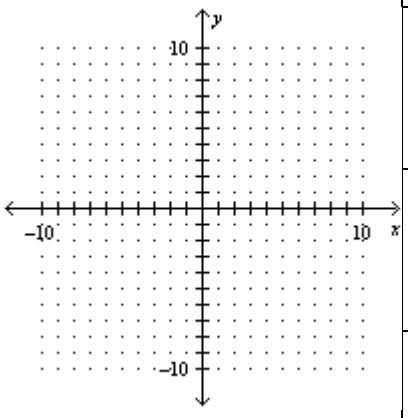

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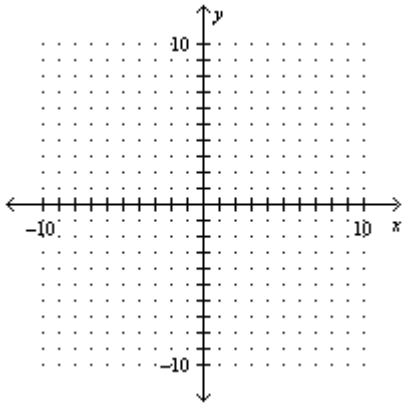
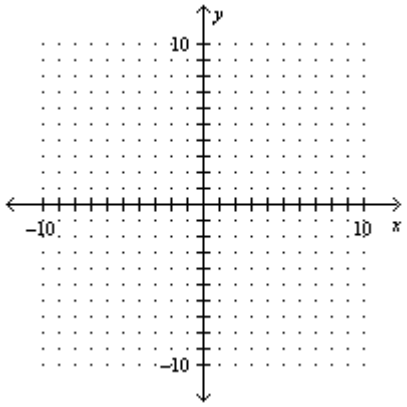
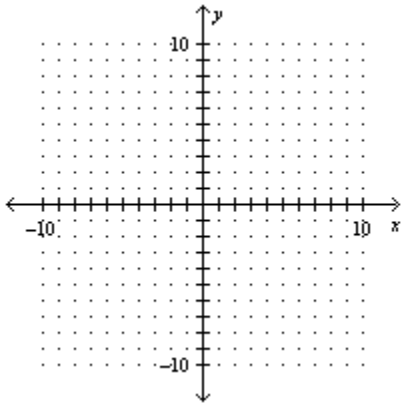
85. 	86. 	87. 

PART 3 – Linear Systems

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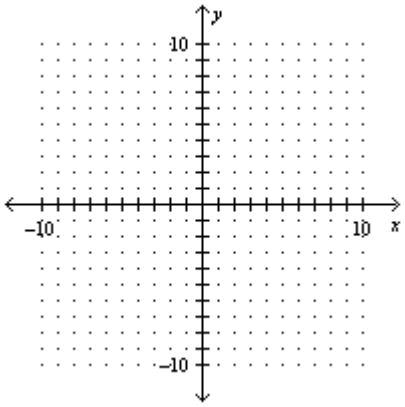

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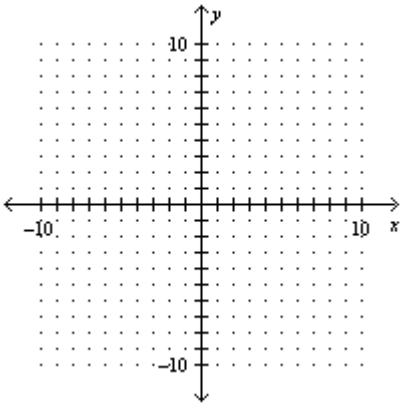

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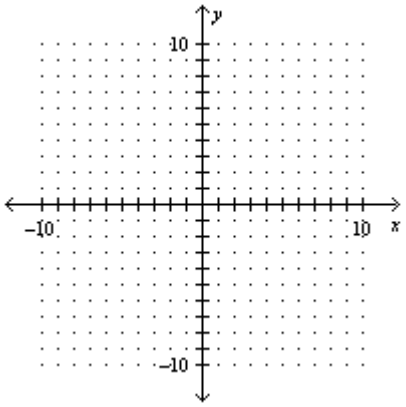

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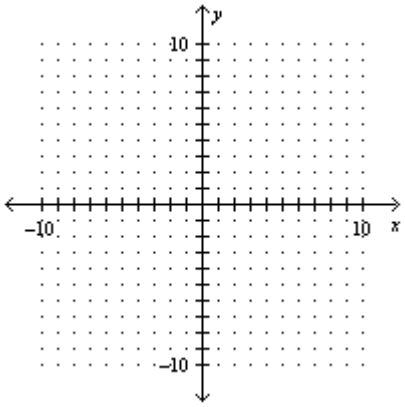

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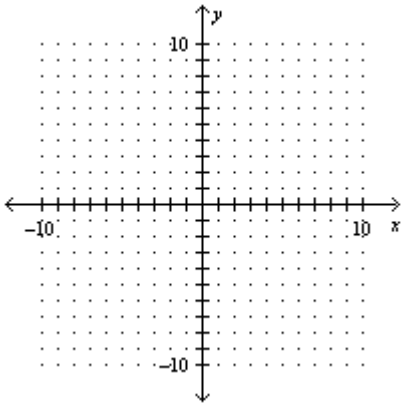

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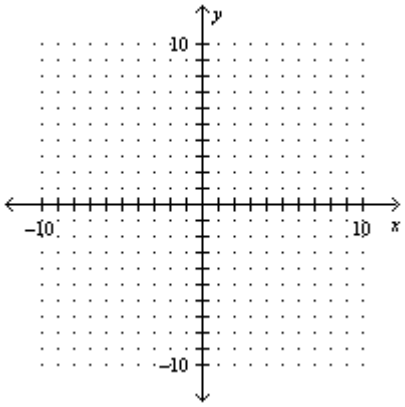

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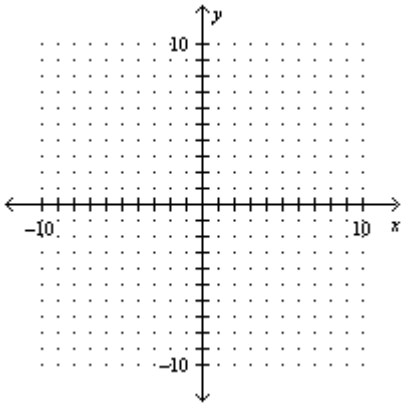

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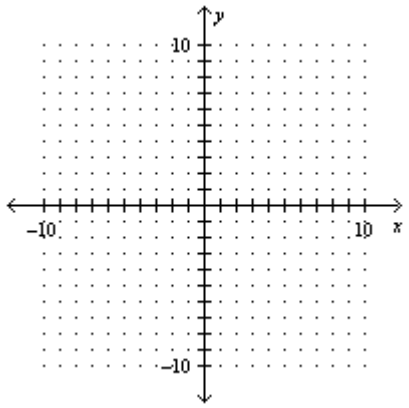
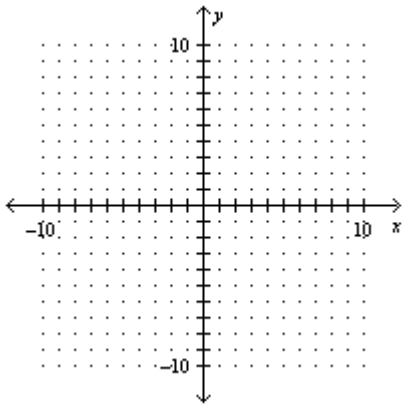
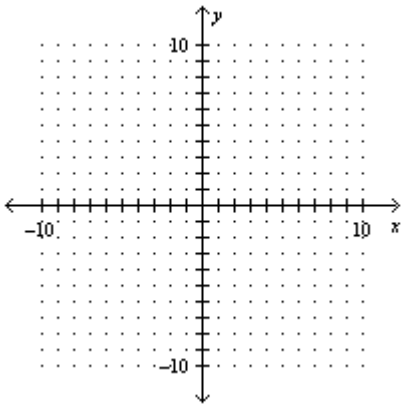
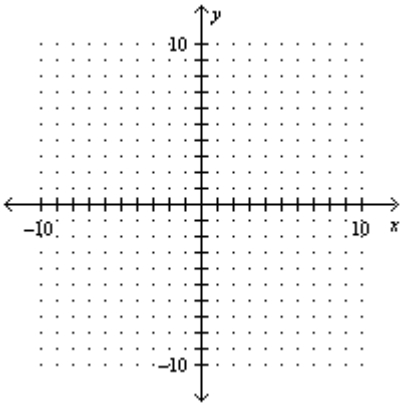
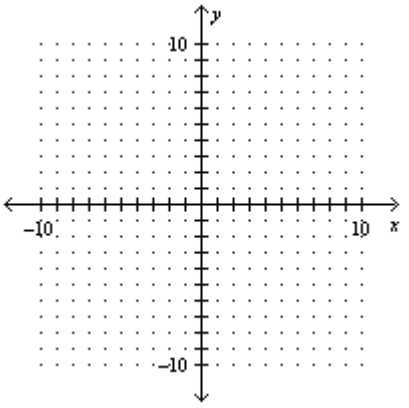
98.	99.	100.
101.	102.	103.

104.	105.
106.	107.

108. 	109. 	110. 
111. 	112. 	

Part 4 – Polynomials

113.	114.	115.
116.	117.	118.

119.	120.	
121.	122.	
123.	124.	125.
126.	127.	128.
129.	130.	131.

132.	133.	134.
135.	136.	137.

Part 5 – Exponents and Radicals

138.	139.	140.
141.	142.	

143.	144.	145.	146.
147.	148.	149.	150.