

Last Name: _____ Period: _____ Random Generator #: _____ ID: A

"If you tell the truth, you don't have to remember anything." - Mark Twain

Algebra Final Review B (2014)

Short Answer Show all thinking for maximum credit. Each question is worth 10 points.

1. Combine like terms: $-21a + 16a$.

2. Combine like terms: $q + 12q$.

Simplify the expression.

3. $9a - b - 2a - 10b$

4. $5(x + 10) + x$

5. $-6 - 7(c + 10)$

6. $-x(7x - 8)$

7. $5k^2(-6k^2 - 2k + 6)$

8. $(-8x) \cdot 3x^2$

9. $5(x + 10) + x$

10. $-6 - 7(c + 10)$

11. Lena buys 4 cans of soft drinks and 12 sandwiches for a picnic. Patrick buys 9 cans of soft drinks and 7 sandwiches for the same picnic. Let c be the cost of a soft drink. Let s be the cost of a sandwich. Write an expression that represents the total cost.

Simplify the product.

12. $(x - 4)(x + 3)$

13. $(x - 4)(x + 3)$

14. Simplify $(x - 2)(x - 2)$ using the Distributive Property.

15. Suppose $3s$ represents an even integer. What polynomial represents the product of $3s$, the *even* integer that comes just before $3s$, and the *even* integer that comes just after $3s$?

16. The base of a triangle is $(6h + 16)$ centimeters. The height of the triangle is $(3h - 8)$ centimeters. Find the area of the triangle.

Factor the expression.

17. $d^2 + 10d + 9$

18. $k^2 + kf - 2f^2$

19. $6g^3 + 8g^2 - 15g - 20$

20. $50k^3 - 40k^2 + 75k - 60$

21. $d^2 + 10d + 9$

22. $k^2 + kf - 2f^2$

23. $36y^2 - 84y - 147$

24. $k^2 - 16h^2$

Complete.

25. $z^2 + 9z - 90 = (z - 6)(z + \blacksquare)$

26. $z^2 + 9z - 90 = (z - 6)(z + \blacksquare)$

Factor by grouping.

27. $a^2 + ab - 56b^2$

28. $40p^2 - 13p - 36$

29. Graph $f(x) = -2x^2 - 2x - 1$. Label the axis of symmetry and vertex.
30. Suppose you have 54 feet of fencing to enclose a rectangular dog pen. The function $A = 27x - x^2$, where x = width, gives you the area of the dog pen in square feet. What width gives you the maximum area? What is the maximum area? Round to the nearest tenth as necessary.
31. A ball is thrown into the air with an upward velocity of 36 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 36t + 9$.
- In how many seconds does the ball reach its maximum height? Round to the nearest hundredth if necessary.
 - What is the ball's maximum height?
32. Write $9 \cdot 9 \cdot 9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$ using an exponent.
33. Simplify: 0.7^3 .
34. Each side of a cube is 3.1 cm long. Find the volume of the cube.

Simplify.

35. $5^2 \cdot (5 - 6^2)$
36. Identify the initial amount a and the growth factor b in the exponential function.
 $A(x) = 680 \cdot 4.3^x$

37. Suppose the population of a town is 2,700 and is growing 4% each year.
a. Write an equation to model the population growth.
b. Predict the population after 12 years.
38. You deposit \$500 in an account that earns 5% compounded annually (once per year). What is the balance in your account after 5 years? Round your answer to the nearest cent.
39. You deposit \$400 in an account that earns 6% compounded annually (once per year). What is the balance in your account after 5 years? Round your answer to the nearest cent.
40. Find the balance on a deposit of \$1,150 that earns 9% interest compounded annually for 2 years.

Find the balance in the account.

41. \$2,400 principal earning 2%, compounded annually, after 7 years
42. Suppose a laboratory has a 26 g sample of polonium-210. The half-life of polonium-210 is about 138 days.
a. How many half-lives of polonium-210 occur in 276 days?
b. How much polonium is in the sample 276 days later?
43. A boat costs \$15,500 and decreases in value by 10% per year. How much will the boat be worth after 5 years?

Write the expression using a single exponent.

44. $2^2 \cdot 2^8$

$$45. 7^5 \cdot 7^6$$

$$46. j^7 \cdot j^1$$

$$47. 6^a \cdot 6^v$$

$$48. 2^2 \cdot 2^8$$

$$49. 7^5 \cdot 7^6$$

$$50. j^7 \cdot j^1$$

$$51. 6^a \cdot 6^v$$

$$52. \frac{2^8}{2^7}$$

$$53. \frac{144^{14}}{144^2}$$

54. $\frac{x^{13}}{x^2}$

Write <, >, or = to complete the statement.

55. $8^3 \cdot 8^9$ ☐ 8^{12}

56. $8^3 \cdot 8^9$ ☐ 8^{12}

Simplify the expression.

57. 14^{-4}

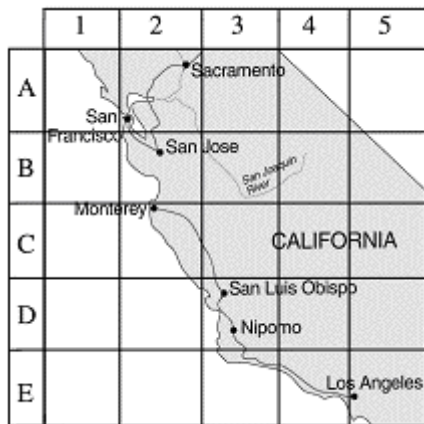
58. 14^{-4}

Write the number in standard form.

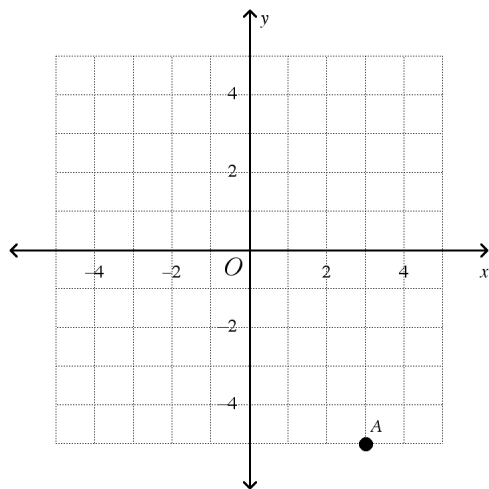
59. A cell has an approximate diameter of 3.656×10^{-5} millimeters.

60. A scientist uses a spherical particle in an experiment. The diameter of Particle A is 3.09×10^{-5} centimeters.
- Write the diameter of Particle A in standard form.
 - What is the radius of Particle A? Express your answer in standard form.

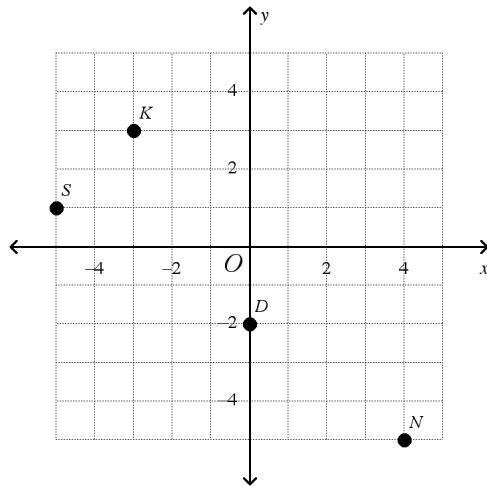
61. Name the section of the map in which San Francisco is located.



62. Name the coordinates of point A in the graph.



63. Name the point with the coordinates $(-3, 3)$.



64. What are the coordinates of the point 4 to the left and 5 above the point $(1, 0)$?

65. Simplify $\sqrt{36}$.

Simplify the square root.

66. $\sqrt{16}$

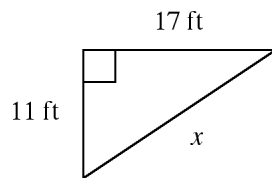
67. $-\sqrt{25}$

68. Find the length of the side of a square with an area of 36.

69. Suzanne wants to put a fence around her square garden. If the garden covers an area of 100 ft^2 , how many feet of fencing does she need?

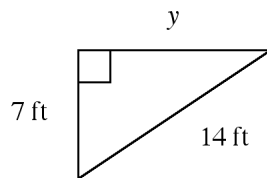
In the given right triangle, find the missing length to the nearest tenth.

70.



Not drawn to scale

71.

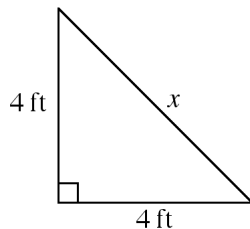


Not drawn to scale

The lengths of two sides of a right triangle are given. Find the length of the third side. Round to the nearest tenth if necessary.

72. leg: 20 m; hypotenuse: 25 m

73. Find the length of the hypotenuse. Round to the nearest tenth if necessary.

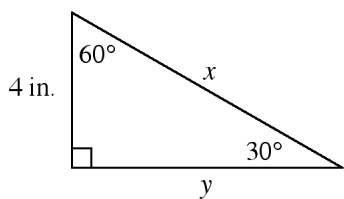


74. The legs of an isosceles right triangle are 11 cm long. Find the length of the hypotenuse. Round to the nearest tenth if necessary.

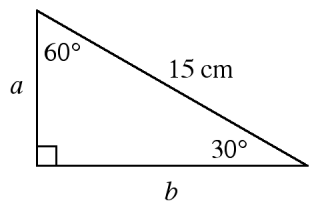
75. Ingrid is making a quilt using squares that measure 5 in. on a side. What is the length of a diagonal of one of the quilt squares? Round to the nearest tenth.

Find the missing lengths in the triangle. Round to the nearest tenth if necessary.

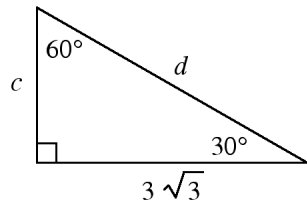
76.



77.



78.



Solve the equation.

79. $6x + 29 = 5$

80. $\frac{y - 5}{3} = 1$

81. $-9p - 17 = 10$

82. $\frac{w}{4} - 4 = 3$

83. $\frac{d}{3} + 10 = 7$

84. $-4n + 7 + 2n = 1$

85. $a - 22 = 11$

$$86. -22 = p - 25$$

$$87. w + 28 = 23$$

$$88. \frac{y}{-20} = -3$$

$$89. \frac{p}{-3.4} = -1.3$$

$$90. 12k = 108$$

$$91. 5h - 9 = -16 + 6h$$

$$92. 2(x + 4) = 30$$

$$93. 78 = -2(m + 3) + m$$

$$94. 5h - 9 = -16 + 6h$$

$$95. -2(m - 30) = -6m$$

Write and solve an equation.

96. The sum of two even integers is 194. What are they? Use the variable n for the value of the smaller integer.
97. You withdrew \$100 from the ATM machine. The new balance is \$372. What was the original balance b of your account?
98. Alexa scored 87 on her history test. The test had a multiple-choice section and a short-answer section. Alexa got 74 points on the multiple-choice section. How many points p did she receive on the short-answer section?
99. This year, 14,265 people applied to a particular college. The number of applicants increased by 868 from last year. How many people p applied last year?
100. Mark wants to buy a skateboard that costs \$65. He plans to save \$5 per week. How many weeks w will it take him to save \$65?
101. The sum of three consecutive integers is 21. What are they?

Solve the equation.

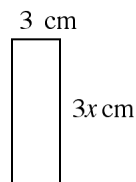
102. $37 - 18 + 8w = 67$
103. $5x - 5 = 3x - 9$
104. $8d - 4d - 6d - 8 = 2d$

105. $5x - 5 = 3x - 9$

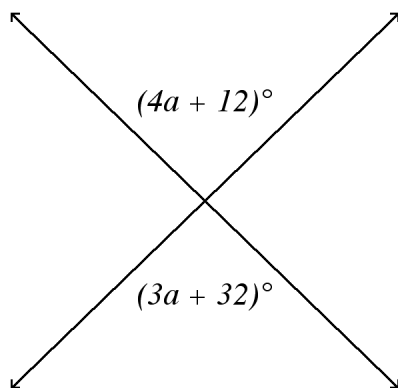
106. $8d - 4d - 6d - 8 = 2d$

107. John and 2 friends are going out for pizza for lunch. They split one pizza and 3 large drinks. The pizza cost \$14.00. After using a \$7.00 gift certificate, they spend a total of \$12.10. Write an equation to model this situation, and find the cost of one large drink.

108. The perimeter of the rectangle is 24 cm. Find the value of x .



109. **a.** Find the value of a .
b. Find the value of the marked angles.



110. List the terms that correctly complete the table.

Time (seconds)	0	1	2	3	4	5	6	7	8	9
Distance (feet)	■	30	40	50	■	70	80	90	100	■

Write an expression to describe a rule for the sequence. Then find the 100th term in the sequence.

111. 3, 7, 11, 15, 19, 23, ...

112. The cost of a school banquet is \$90 for the room rental and \$14 per person attending. Write an expression to model the total cost of the banquet for p people. What is the cost for 70 people?

Write an equation in point-slope form for the line through the given point with the given slope.

113. $(10, -9); m = -2$

114. $(10, -9); m = -2$

Is the relationship shown by the data linear? If so, model the data with an equation.

- 115.

x	y
-9	-2
-5	-7
-1	-12
3	-17

116. The table shows the height of a plant as it grows.

a. Model the data with an equation.

b. Based on your model, predict the height of the plant at 12 months.

Time (months)	Plant Height (cm)
3	9
5	15
7	21
9	27

117. A line passes through $(2, -1)$ and $(8, 4)$.

a. Write an equation for the line in point-slope form.

b. Rewrite the equation in standard form using integers.

Solve the inequality.

118. $q - 12 \geq -13$

119. $c + 6 < -20$

120. $\frac{d}{13} \geq -3$

121. $12p < 96$

122. $q - 12 \geq -13$

123. $c + 6 < -20$

124. $-7p - 16 > 82$

125. $\frac{w}{-15} - 13 \geq 8$

Write and solve an inequality.

126. The result of 6 subtracted from a number n is at least 2. What numbers are solutions?

127. An airline requires carry-on luggage to weigh at most 40 pounds. Your suitcase currently weighs 10 pounds. How many pounds p are available for you to fill your suitcase with other items?

128. The speed limit of a highway is 55 miles per hour. A car is traveling at least 65 miles per hour. How many miles per hour m over the speed limit is the car traveling?

129. You and your friends are making favors for a charity party. You make a profit of half a dollar per favor. How many favors f must you sell to make a profit of more than \$340?

130. Levi earns \$6.25 per hour working after school. He needs at least \$143.75 for a stereo system. How many hours h does he need to work to reach his goal?

131. Zoe makes \$7.75 an hour working at Warner's Autobody. She plans to buy a hand-held computer. The least expensive hand-held computer that she can find costs \$255.75. How many hours h will Zoe have to work to earn enough money to buy the hand-held computer?

132. The result of 6 subtracted from a number n is at least 2. What numbers are solutions?
133. An airline requires carry-on luggage to weigh at most 40 pounds. Your suitcase currently weighs 10 pounds. How many pounds p are available for you to fill your suitcase with other items?
134. The speed limit of a highway is 55 miles per hour. A car is traveling at least 65 miles per hour. How many miles per hour m over the speed limit is the car traveling?
135. The daily cost of renting a car is \$21 plus \$.53 per mile. Jane's budget allows her to spend a maximum of \$96.00 for a 1-day rental. How many miles m may Jane drive the rental car in one day without exceeding her budget of \$96.00?
136. You are planning a skating party at a rink that charges a basic fee of \$38.00, and \$6.50 per person for catered parties. You don't want to spend more than \$174.50. How many friends can you invite?
137. A road has a speed limit of 30 mi/h. Write an inequality that describes the legal speeds r for motor vehicles.

Solve the inequality. Graph the solutions.

138. $a+4 \geq 8$
139. What is the solution of the following system of equations?
 $y = -4x + 7$
 $y = -x + 4$

140. Suppose that y varies inversely with x . Write an equation for the inverse variation.
 $y = 6$ when $x = 8$

Simplify the expression.

141. $-\frac{1}{8} - \frac{2}{7}$

142. $-6.5(-4.9)$

143. $(-2)^5$

144. -5^4

145. $\frac{1}{4} + \frac{5}{6} + \frac{3}{8}$

146. $\frac{2}{3} + \frac{1}{11}$

147. $-\frac{17}{9} - \frac{14}{8}$

148. $5 \times (8 + 7) + 7$

149. $[2 \cdot (10 + 5)] - 5$

150. $\frac{1}{2}(-12m + 38)$

151. $-12 \div (-2)$

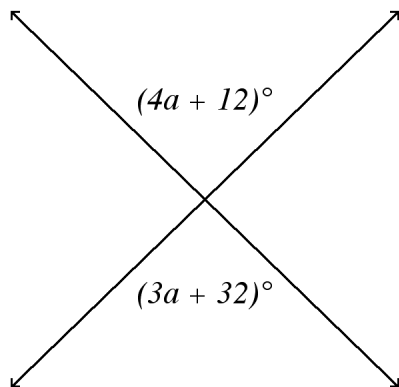
152. Simplify $(x - 2)(x - 2)$ using the Distributive Property.

153. Suppose $3s$ represents an even integer. What polynomial represents the product of $3s$, the *even* integer that comes just before $3s$, and the *even* integer that comes just after $3s$?

154. The base of a triangle is $(6h + 16)$ centimeters. The height of the triangle is $(3h - 8)$ centimeters. Find the area of the triangle.

155. Simplify $7(499)$ using the Distributive Property.

156. **a.** Find the value of a .
b. Find the value of the marked angles.



not drawn to scale

157. The 9 officers of the Student Council are going on a trip to an amusement park. Each student must pay an entrance fee plus \$5 for meals. The total cost of the trip is \$225. Solve the equation $9(e + 5) = 225$ to find the cost e of the entrance fee for each student.

158. Combine like terms: $q + 12q$.

Factor the polynomial.

159. $24w^{12} + 64w^8$

Solve the equation by factoring.

160. $z^2 - 6z - 27 = 0$

161. $3z^2 + 3z - 6 = 0$

162. $c^2 - 4c = 0$

163. Graph the function $f(x) = 4^x$.

Write an equation of a line with the given slope and y-intercept.

164. $m = 1, b = 4$

165. $m = \frac{1}{4}, b = -\frac{3}{4}$

166. A line passes through $(2, -1)$ and $(8, 4)$.

a. Write an equation for the line in point-slope form.

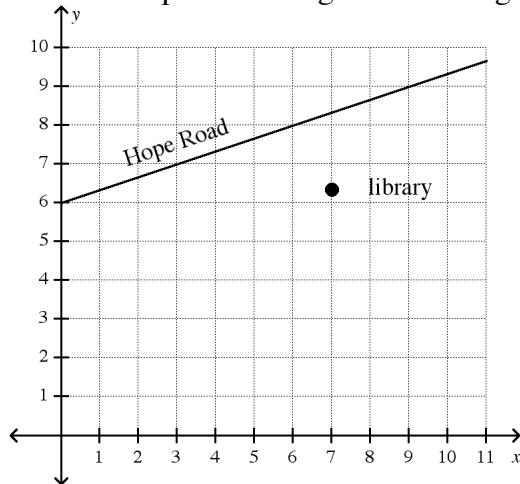
b. Rewrite the equation in standard form using integers.

Find equations of lines that are parallel to the lines with the equation.

167. $y = \frac{1}{6}x + 8$
 $-2x + 12y = -11$

168. $y = 5x + 6$
 $-18x + 3y = -54$

169. The map shows Hope Road and the construction site for the new library. Find the equation of a “street” that passes through the building site and is parallel to Hope Road.



Write an equation for the line that is parallel to the given line and that passes through the given point.

170. $y = \frac{3}{4}x - 9$; $(-8, -18)$

171. Find the length of the hypotenuse of a right triangle with legs of 20 cm and 21 cm.

172. Find the perimeter of a right triangle with legs of 20 cm and 21 cm.

Find the midpoint of each segment with the given endpoints.

173. $C(1, -5)$ and $D(-5, 1)$

Graph the inequality on a coordinate plane.

174. $y < x + 3$

175. $x \geq -2$

176. Graph the inequality: $x \leq -2$.

177. What is the solution of the following system of equations?

$$y = -4x + 7$$

$$y = -x + 4$$

Find the x - and y -intercept of the line.

178. $-3x + 9y = 18$

179. The grocery store sells kumquats for \$4.25 a pound and Asian pears for \$2.25 a pound. Write an equation in standard form for the weights of kumquats k and Asian pears p that a customer could buy with \$18.

180. Find the solution of $y = 6x + 1$ for $x = 5$.

Graph the equation.

181. $y = -3$

182. $x = -4$

Solve the system of equations by graphing.

183. $y = \frac{1}{2}x + 3$
 $y = -2x - 7$

184. $-\frac{1}{3}x + y = -1$
 $y = 4 + \frac{1}{3}x$

Solve the system using elimination.

185. $3x + y = 11$
 $4x - y = 17$

Solve the system of equations using substitution.

186. $y = 2x + 3$
 $y = 3x + 1$

187. $y = 2x - 10$
 $y = 4x - 8$

188. $y = 4x + 6$
 $y = 2x$

Graph the inequality.

189. $4x + 6y \geq 10$

190. $y < 4x - 2$

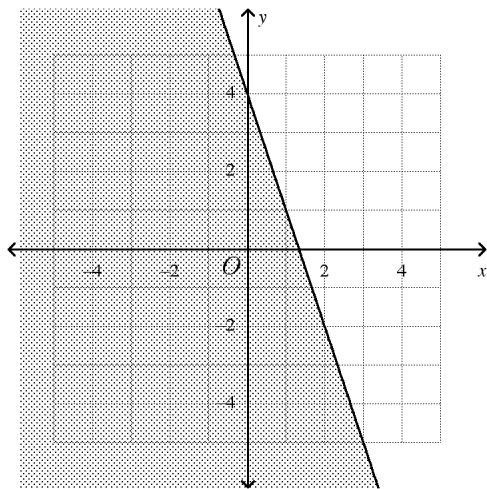
191. $y > -5x + 3$

192. Write the following inequality in slope-intercept form.
 $5x - 5y \geq 70$

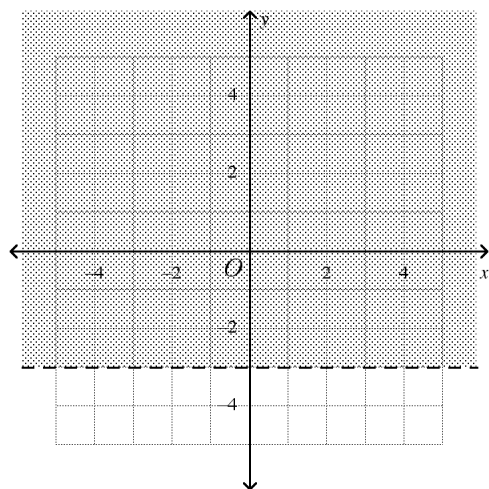
193. You have \$47 to spend at the music store. Each cassette tape costs \$5 and each CD costs \$10. Write and graph a linear inequality that represents this situation. Let x represent the number of tapes and y the number of CDs.

Write the linear inequality shown in the graph.

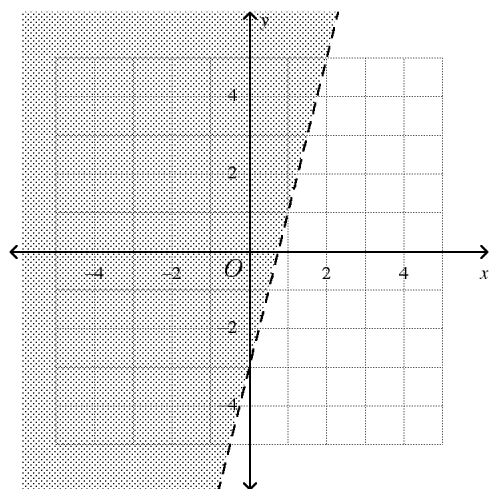
194.



195.



196.



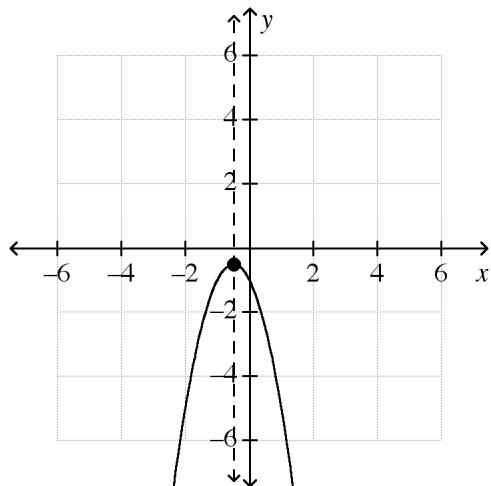
Algebra Final Review B (2014)

Answer Section

SHORT ANSWER

1. $-5a$
2. $13q$
3. $7a - 11b$
4. $6x + 50$
5. $-76 - 7c$
6. $-7x^2 + 8x$
7. $-30k^4 - 10k^3 + 30k^2$
8. $-24x^3$
9. $6x + 50$
10. $-76 - 7c$
11. $4c + 12s + 9c + 7s$
12. $x^2 - x - 12$
13. $x^2 - x - 12$
14. $x^2 - 4x + 4$
15. $27s^3 - 12s$
16. $(9h^2 - 64) \text{ cm}^2$
17. $(d + 9)(d + 1)$
18. $(k + 2f)(k - f)$
19. $(2g^2 - 5)(3g + 4)$
20. $5(2k^2 + 3)(5k - 4)$
21. $(d + 9)(d + 1)$
22. $(k + 2f)(k - f)$
23. $3(2y - 7)(6y + 7)$
24. $(k + 4h)(k - 4h)$
25. 15
26. 15
27. $(a + 8b)(a - 7b)$
28. $(8p - 9)(5p + 4)$

29.

Axis of symmetry: $x = -0.5$ Vertex: $(-0.5, -0.5)$ 30. width = 13.5 ft; area = 182.3 ft²

31. 1.13 s; 29.25 ft

32. 9^7

33. 0.343

34. 29.791 cm³

35. -775

36. 680, 4.3

37. $y = 2,700 \cdot 1.04^x$; about 4,323 people

38. \$638.14

39. \$535.29

40. \$1,366.32

41. \$2,756.85

42. 2; 6.5 g

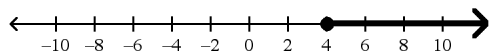
43. \$9,152.6

44. 2^{10} 45. 7^{11} 46. j^8 47. 6^{a+v} 48. 2^{10} 49. 7^{11} 50. j^8 51. 6^{a+v} 52. 2^1

- 53. 144^{12}
- 54. x^{11}
- 55. $=$
- 56. $=$
- 57. $\frac{1}{14^4}$
- 58. $\frac{1}{14^4}$
- 59. 0.00003656
- 60. 0.0000309; 0.00001545 cm
- 61. A-2
- 62. $(3, -5)$
- 63. K
- 64. $(-3, 5)$
- 65. 6
- 66. 4
- 67. -5
- 68. 6
- 69. 40 ft
- 70. 20.2 ft
- 71. 12.1 ft
- 72. 15 m
- 73. 5.7 ft
- 74. 15.6 cm
- 75. 7.1 in.
- 76. $x = 8$ in., $y = 6.9$ in.
- 77. $a = 7.5$ cm, $b = 13$ cm
- 78. $c = 3$ in., $d = 6$ in.
- 79. -4
- 80. 8
- 81. -3
- 82. 28
- 83. -9
- 84. 3
- 85. 33
- 86. 3
- 87. -5
- 88. 60
- 89. 4.42
- 90. 9
- 91. 7

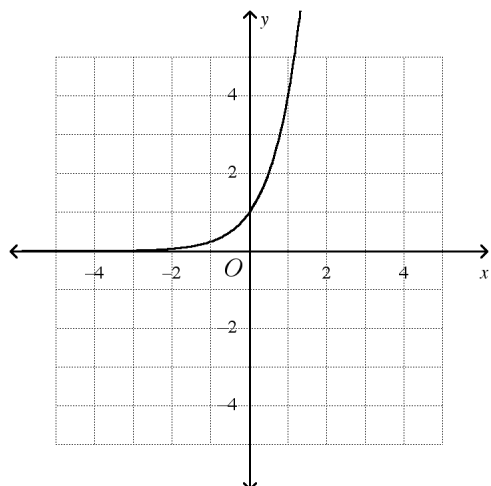
92. 11
93. -84
94. 7
95. -15
96. $n + (n + 2) = 194$; 96, 98
97. $b - 100 = 372$; \$472
98. $74 + p = 87$; 13 points
99. $868 + p = 14,265$; 13,397 people
100. $5w = 65$; 13 weeks
101. 6, 7, 8
102. 6
103. -2
104. -2
105. -2
106. -2
107. $3d + \$14.00 - \$7.00 = \$12.10$; \$1.70
108. 3
109. 20; 92°
110. 20, 60, 110
111. $n + 4$; 403
112. $90 + 14p$; \$1,070
113. $y + 9 = -2(x - 10)$
114. $y + 9 = -2(x - 10)$
115. The relationship is linear; $y + 2 = -\frac{5}{4}(x + 9)$.
116. $y - 9 = 3(x - 3)$; 36 cm
117. $y + 1 = \frac{5}{6}(x - 2)$; $-5x + 6y = -16$
118. $q \geq -1$
119. $c < -26$
120. $d \geq -39$
121. $p < 8$
122. $q \geq -1$
123. $c < -26$
124. $p < -14$
125. $w \leq -315$
126. $n - 6 \geq 2$; $n \geq 8$
127. $10 + p \leq 40$; $p \leq 30$
128. $55 + m \geq 65$; $m \geq 10$
129. $0.5f > 340$; $f > 680$; 680 favors
130. $6.25h \geq 143.75$; $h \geq 23$; 23 hours

131. $7.75h \geq 255.75$; $h \geq 33$; 33 hours
 132. $n - 6 \geq 2$; $n \geq 8$
 133. $10 + p \leq 40$; $p \leq 30$
 134. $55 + m \geq 65$; $m \geq 10$
 135. $0.50m + 21 \leq 96.00$; 150 or fewer miles
 136. $38.00 + 6.50m \leq 174.50$; 21 or fewer friends
 137. $r \leq 30$
 138. $a \geq 4$



139. $(1, 3)$
 140. $y = \frac{48}{x}$
 141. $-\frac{23}{56}$
 142. 31.85
 143. -32
 144. -625
 145. $1\frac{11}{24}$
 146. $\frac{25}{33}$
 147. $-3\frac{23}{36}$
 148. 82
 149. 25
 150. $-6m + 19$
 151. 6
 152. $x^2 - 4x + 4$
 153. $27s^3 - 12s$
 154. $(9h^2 - 64) \text{ cm}^2$
 155. 3493
 156. 20; 92°
 157. \$20
 158. $13q$
 159. $8w^8(3w^4 + 8)$
 160. $z = -3$ or $z = 9$
 161. $z = 1$ or $z = -2$
 162. $c = 0$ or $c = 4$

163.



164. $y = x + 4$

165. $y = \frac{1}{4}x - \frac{3}{4}$

166. $y + 1 = \frac{5}{6}(x - 2); -5x + 6y = -16$

167. Yes, since the slope are the same and the y-intercepts are different.

168. No, since the slopes are different.

169. $y = \frac{1}{3}x + 4$

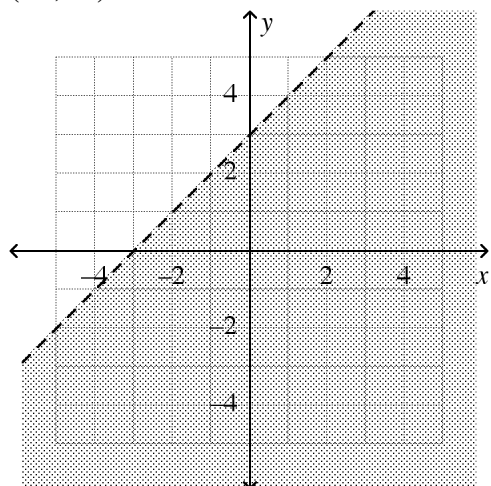
170. $y = \frac{3}{4}x - 12$

171. 29 cm

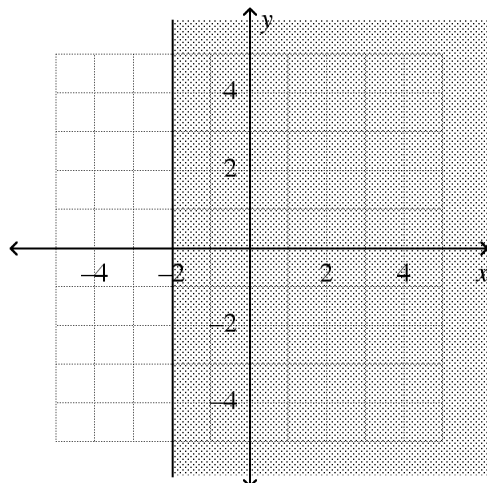
172. 70 cm

173. $(-2, -2)$

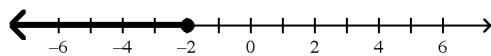
174.



175.



176.

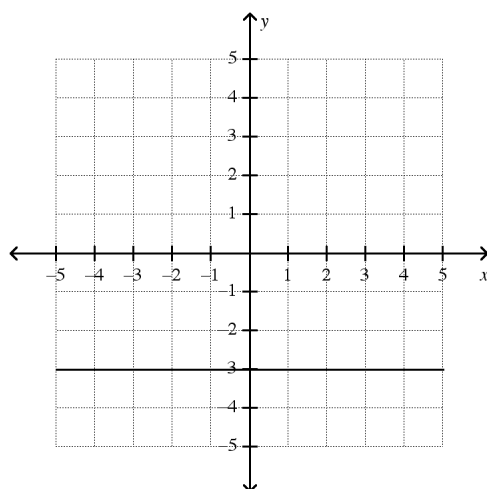


177. (1, 3)

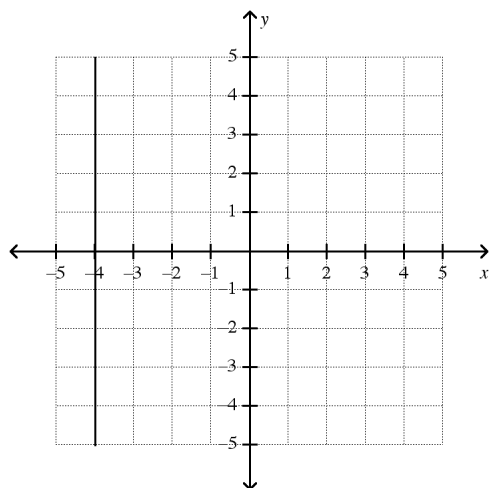
178. x -intercept is -6 ; y -intercept is 2 .179. $4.25k + 2.25p = 18$

180. (5, 31)

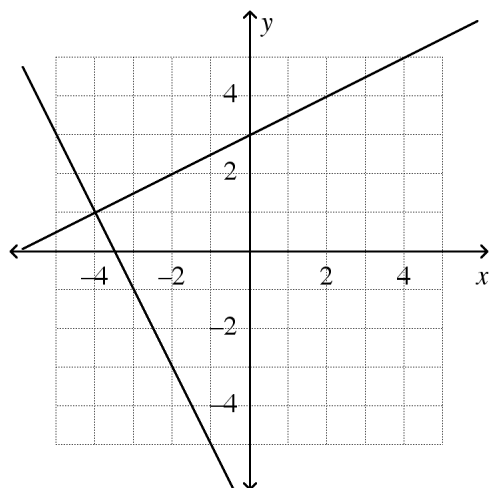
181.



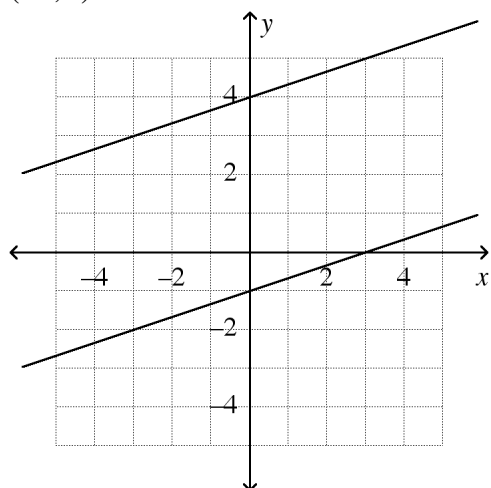
182.



183.

 $(-4, 1)$

184.

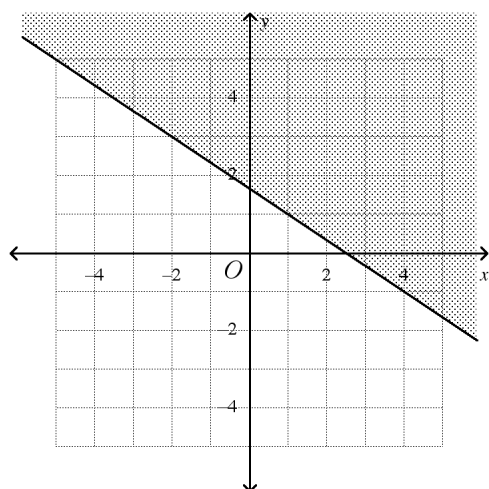


no solution

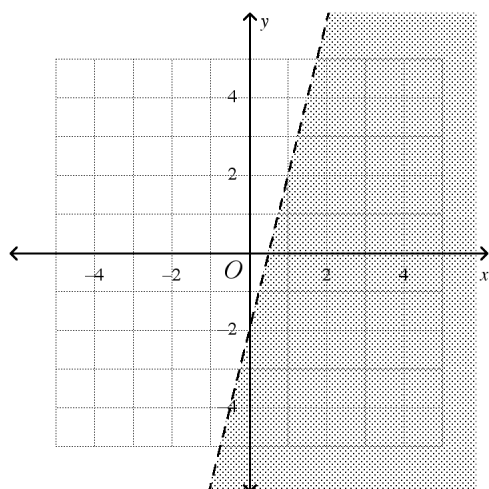
185. $(4, -1)$ 186. $(2, 7)$ 187. $(-1, -12)$

188. $(-3, -6)$

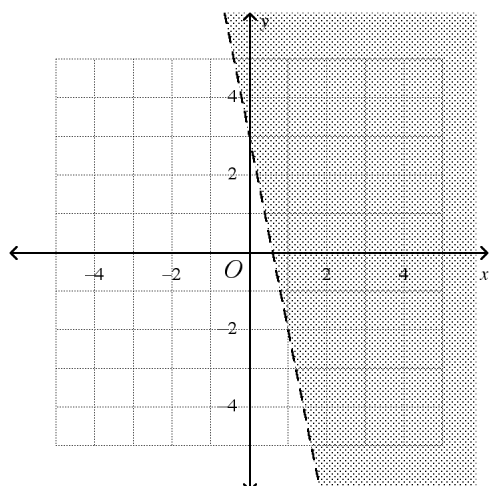
189.



190.

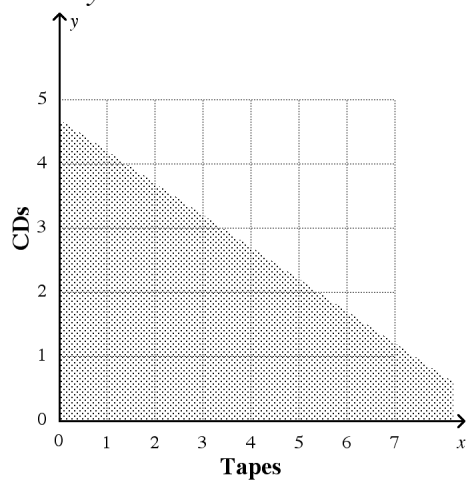


191.



192. $y \leq x - 14$

193. $5x + 10y \leq 47$



194. $y \leq -3x + 4$

195. $y > -3$

196. $y > 4x - 3$