

1) Evaluate the expression  $6 - (a - b)^2$ , when  $a = 13$  and  $b = 3$

2) Simplify using the distributive law and combining like terms.  $-3(2t - 5) - 5(4t - 4) + 4t$

3) Solve:  $-9x + 3(-2x - 7) = -33 - 3x$

4) Translate the situation into mathematical language. You need not actually solve the problem.

*A piece of wire 13 m long is to be cut into two pieces, one of them  $\frac{2}{3}$  as long as the other. How should the wire be cut?*

5) In a local election, 48,900 people voted. This was an increase of 6% over the last election. How many people voted in the last election?

6) One angle of a triangle is 5 times as great as a second angle. The third angle measures  $44^\circ$  less than twice the second angle. Find the measures of the angles.

7) Solve  $V = \frac{1}{3}Bh$ , for B

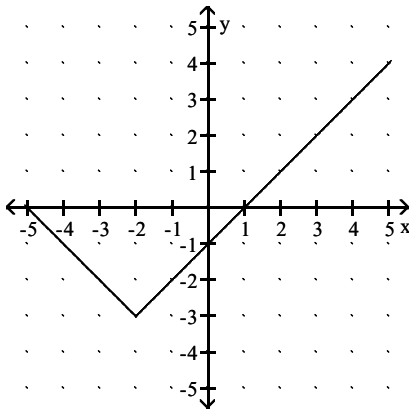
8) Solve  $F = \frac{9}{5}C + 32$ , for C

9) Simplify.  $14 + (-9) - 5 - (-19) + (-8)$

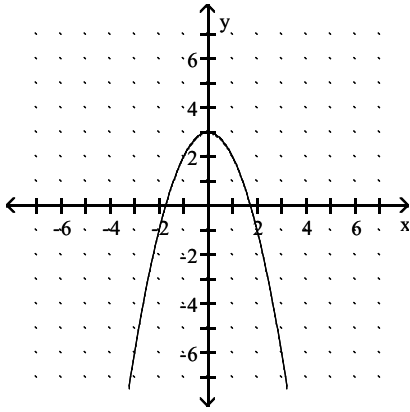
10) Simplify using only positive exponents.  $(3x^{-6}y^{-8})(4xy^{-3})$

11) Simplify using only positive exponents.  $\frac{24a^{-2}b^3}{6a^{-6}b^5}$

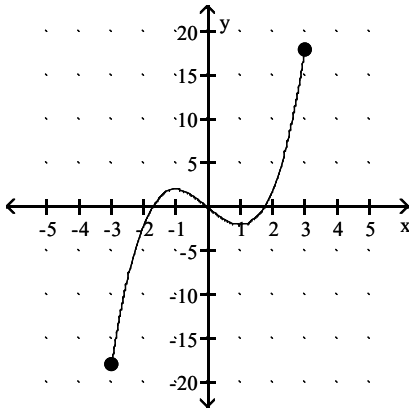
12) From the graph below, find  $f(3)$



13) Given the graph of the function, where is  $f(x) = 2$



14) Find the domain.

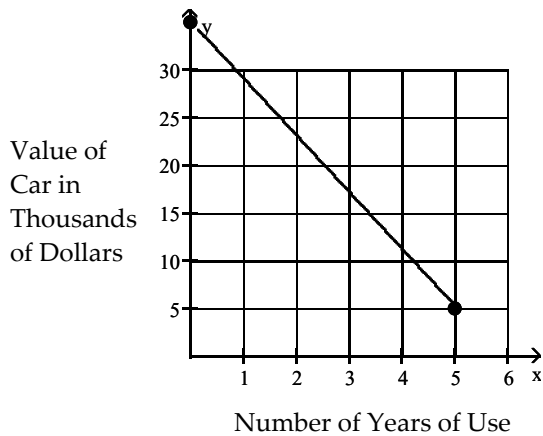


15) Find  $f(-3)$  when  $f(x) = x^2 + 4x + 6$ .

16) Find the domain of the function,  $f(x) = \frac{4}{x+5}$

17) Graph  $f(x) = \frac{1}{2}x + 3$

18) Using the graph below, find the rate of change in the value of the car with respect to time.



19) The value, in dollars, of a copy machine is given by the function  $f(x) = -410x + 5300$ , where  $x$  is the number of years that have passed since the machine was purchased. Interpret the slope of the graph of  $f$  as a rate of change.

20) Find the slope of the line  $2x - 5y = 21$

21) Graph  $y = 3$

22) Graph  $x = -2$

23) Find the  $y$ - and  $x$ -intercepts for the equation. Then graph the equation.  $-6x - 12y = 24$

24) Find the equation of the line through  $\left(0, \frac{3}{7}\right)$  and perpendicular to  $2x + 8y = 3$

25) Find an equation of the line having the specified slope and containing the indicated point. Write your answer as a function,  $f(x)$

$$m = 5; (-8, 0)$$

26) In 1985, John invested \$48,000 in the stock market. By 1990 his investment had grown to \$49,500. If the market continued to grow at the same rate, how much was in his account in 1992? *Give your answer to the nearest dollar.*

27) Let  $f(x) = -4x + 9$  and  $g(x) = 8x^2 + 7$ . Find  $(f-g)(3)$

28)  $f(x) = 2x - 9$ ,  $g(x) = 7x - 5$ . Find  $(f - g)(x)$ .

29)  $f(x) = 8 - 9x$ ,  $g(x) = -6x + 9$ . Find  $(f + g)(x)$ .

30) Given  $f(x) = 7x + 3$ ,  $g(x) = 4x + 7$ , Find  $(f \cdot g)(x)$ .

31) Find  $P(-2)$  when  $P(x) = -4x^2 - 4x + 2$

32) Simplify:  $(5x^3 + 3x^2) - (8x^2 - 4x - 1) - (3x^3 + x - 7)$

33) Total profit is defined as total revenue minus total cost.  $R(x)$  and  $C(x)$  are the revenue and cost from the sale of  $x$  televisions. If  $R(x) = 250x - 0.3x^2$  and  $C(x) = 6000 + 0.7x^2$ , find the profit from the sale of 80 televisions.  
*Hint:  $P(x) = R(x) - C(x)$*

34) Multiply:  $(4x - 4)(x - 3)$

35) Simplify:  $(8m + 5)^2$

- 36) Let  $f(x) = 7x - 2$  and  $g(x) = 7x + 2$ . Find  $(f \cdot g)(x)$
- 37) Factor:  $14y^2 + 63y - 35$
- 38) Factor:  $36x^2 - 96x + 64$
- 39) Solve for  $x$ :  $9x^2 - 4 = 0$
- 40) Solve for  $x$ :  $5x^2 - 29x - 6 = 0$
- 41) Solve for  $x$ :  $8x^2 - 2x = 0$
- 42) Let  $g(x) = x^2 + 4x$ . For what value(s) of  $x$  is  $g(x) = 21$ .
- 43) The length of a rectangular frame is 8 cm more than the width. The area inside the frame is 105 square cm. Find the width of the frame.
- 44) A rock falls from a tower that is 400 feet high. As it is falling, its height is given by the formula  $h = 400 - 16t^2$ . How many seconds will it take for the rock to hit the ground ( $h=0$ )? Round to the nearest tenth of a second.
- 45) Simplify. Assume that variables can represent any value.:  $\sqrt{16x^2 + 40x + 25}$
- 46) For  $f(x) = \sqrt[3]{2x - 1}$ , find  $f(-13)$ .
- 47) Find the domain of the radical function,  $f(x) = \sqrt{x - 6}$
- 48) Re-write with positive exponents:  $\frac{4x}{7\sqrt{y}}$
- 49) Simplify:  $\frac{y^{3/4}}{y^{1/4}}$
- 50) Simplify:  $12\sqrt{x^8}$
- 51) Simplify:  $5\sqrt[4]{\sqrt{x}}$
- 52) Multiply and Simplify:  $\sqrt{15}\sqrt{48}$
- 53) Rational the denominator:  $3\sqrt{\frac{5}{4}}$

54) Solve:  $5x^2 = 35$

55) Let  $f(x) = (x + 10)^2$ . Find  $x$  so that  $f(x) = 26$ .

56) Let  $f(x) = x^2 - 10x + 25$ . Find  $x$  so that  $f(x) = 49$ .

57) Find the  $x$ -intercepts:  $f(x) = x^2 + 8x - 5$

58) Let  $f(x) = 6x^2 + 8x - 15$ . For what values of  $x$  is  $f(x) = 0$ . *Round to the nearest thousandth.*

59) Write the equation for the function having a graph that meets all of the specified conditions.

*Has the same general shape as the graph of  $g(x) = 4x^2$  and has a maximum value at  $(2, 6)$ .*

60) Find the vertex:  $f(x) = -4x^2 + 32x - 67$

61) Find the line of symmetry:  $f(x) = 4x^2 + 16x + 13$

62) Find the  $x$ - and  $y$ -intercepts. If no  $x$ -intercepts exist, state so.  $f(x) = 5x^2 + 12x + 3$

63) A projectile is thrown upward so that its distance, in feet, above the ground after  $t$  seconds is  $H(t) = -15t^2 + 420t$ . What is its maximum height?

64) Bob owns a watch repair shop. He has found that the cost of operating his shop is given by  $C(x) = 3x^2 - 186x + 74$ , where  $C$  is the cost in dollars, and  $x$  is the number of watches repaired. How many watches must he repair to have the lowest cost?

65) Given  $f(x) = 6x + 7$  and  $g(x) = 3x - 1$ , find  $(f \circ g)(x)$ .

66) Given  $f(x) = x^2 - 3$  and  $g(x) = \sqrt{x - 10}$ , find  $(f \circ g)(x)$ .

67) Find  $(f \circ g)(4)$  if  $f(x) = 8x - 1$  and  $g(x) = 6x^2 + 6x - 6$

68) Determine whether the function is one-to-one. If so, find a formula for the inverse.

$$g(x) = \frac{4x - 2}{3}$$

69) Determine whether the function is one-to-one. If so, find a formula for the inverse.

$$h(x) = x^3 - 8$$

70) Graph  $y = 2^x$

71) Graph  $y = \left(\frac{1}{5}\right)^x$

72) Simplify:  $\log_6 \frac{1}{36}$

73) Simplify:  $10^{\log 5}$

74) Express as a sum, difference, and product of logarithms, without using exponents.

$$\log_b \frac{m^5 p^9}{n^4 b^8}$$

75) Express as a single logarithm.  $7 \log m - 6 \log n$

76) Approximate to the nearest ten-thousandths:  $\log_7 20$

77) Graph:  $f(x) = \ln(x)$

78) Graph:  $f(x) = e^x$

79) Solve:  $5^{(x-3)} = 28$

80) Solve:  $17 = 4e^{2x}$

81) Solve:  $\log_{25} x = \frac{1}{2}$

82) Solve:  $\log_4 (5x - 9) = 3$

83) Suppose that \$5000 is invested at an interest rate of 5.7% per year, compounded continuously. What is the balance after 7 years?

84) How long will it take for the population of a certain country to double if its annual growth rate is 4.5%? (Round to the nearest year.)

85) Write a system of equations that yields the solution. DO NOT SOLVE.

*Two angles are supplementary. One angle is  $9^\circ$  more than three times the other angle. Find the measures of the angles. (Let  $x$  and  $y$  represent the angles.)*

86) Solve.

$$\begin{aligned}3x + y &= 13 \\2x + 9y &= -8\end{aligned}$$

87) Solve.

$$\begin{aligned}-7x + 8y &= -16 \\5x + 4y &= -8\end{aligned}$$

88) Solve.

$$\begin{aligned}5x - 4 &= y \\y - 5x &= 4\end{aligned}$$

89) Solve.

$$\begin{aligned}4x + 2y &= -8 \\8x + 4y &= -16\end{aligned}$$

90) Ron and Kathy are ticket sellers for their class play. Ron sells student tickets for \$2.00 each, and Kathy sells adult tickets for \$4.50 each. If their total revenue for 364 tickets is \$1175.50, then how many tickets did Ron sell?

91) Walt made an extra \$9000 last year from a part-time job. He invested part of the money at 10% and the rest at 9%. He made a total of \$870 in interest. How much was invested at 9%?

92) A child's bank contains \$1.92 in pennies and nickels. If the number of pennies is 46 less than 2 times the number of nickels, then how many pennies are in the bank?

93) Solve the system.

$$\begin{aligned}x + y + z &= 3 \\x - y + 4z &= -10 \\4x + y + z &= 15\end{aligned}$$

94) Solve the system.

$$\begin{aligned}6x - y - 9z &= -33 \\-4x + 7z &= 26 \\7y + z &= 27\end{aligned}$$

95) The sum of a student's three scores is 219. The first is 12 more than the second, and the sum of the first two is 24 more than twice the third. Find the student's first score.

96) Find the total-profit function for the total-cost and total-revenue functions.

$$C(x) = 35x + 265,000$$

$$R(x) = 85x$$

97) Find the equilibrium point for the pair of demand and supply functions.

$$D(p) = 7400 - 37p$$

$$S(p) = -1750 + 85p$$

98) The MetroCity paint company is planning to produce a new line of paint. The paint will be produced by the gallon. For the first year, the fixed costs for setting up production are \$2500. The variable costs for producing each gallon are \$10. The revenue for each gallon is \$40. Find the number of gallons of paint that are sold at the break-even point.

99) Solve and graph the inequality. Write the solution set using interval notation.

$$-\frac{4}{5}x \leq -\frac{9}{10}$$

100) Solve and write your answer in interval notation.

$$4x + 7(3x - 3) \leq 9 - 5x$$

101) Given the function  $f(x) = 7x - 5$ , find all values of  $x$  where  $f(x) > -47$ .

102) Find the domain of the function

$$f(x) = \sqrt{8 - x}$$

103) A salesperson has two job offers. Company A offers a weekly salary of \$400 plus commission of 10% of sales. Company B offers a weekly salary of \$800 plus commission of 5% of sales. What is the amount of sales above which Company A's offer is the better of the two?

104) Solve the inequality and graph the solution set.

$$9x - 6 < 3x \text{ or } -2x \leq -6$$

105) Solve the inequality and graph the solution set.

$$7 \leq 3t - 2 \leq 22$$

106) Solve the inequality and graph the solution set.

$$-15 \leq 4x - 7 \text{ and } 9x - 8 < 10$$



107) Graph.  $2x + 3y \geq -6$

108) Graph the system of linear inequalities.

$$\begin{aligned}2x + y &\leq 4 \\ y - 1 &< 0\end{aligned}$$

109) Graph the system of inequalities. Find the coordinates of the vertices.

$$\begin{aligned}3y - x &\leq 9, \\ y + 2x &\leq 10, \\ y &\geq 0\end{aligned}$$

110) Find the maximum and minimum values of the objective function.

$$\begin{aligned}F &= 4y - 7x, \text{ subject to} \\ y &\leq 3x - 1 \\ y &\geq -3x + 11 \\ x &\leq 6\end{aligned}$$

111) Joe has to take a test which consists of short-answer questions worth 10 points each and essay questions worth 30 points each. He must do at least 9 short-answer questions, but won't have time to do more than 7. He has to answer at least 3 essay questions but can't spend time to do more than 7. If no more than 19 questions can be done, what is his maximum score?

112) Write a negation for the statement. *Everyone is asleep.*

113) Let  $p$  represents the statement "It's Monday." and  $q$  represents the statement "It's raining today."

Translate the following compound statement into words:  $\sim p \wedge \sim q$

114) Let  $p$  represents the statement : " $x < 2$ " and  $q$  represents the statement: " $y > 1$ "

Translate the following compound statement into words:  $p \vee \sim q$

115) Let  $p$  represent the statement, "Jim plays football", and let  $q$  represent the statement "Michael plays basketball". Convert the compound statement into symbols.

*Jim does not play football or Michael plays basketball.*

116) Construct a truth table for the statement.  $\sim p \wedge \sim q$

A) p	q	$(\sim p \wedge \sim q)$
T	T	F
T	F	F
F	T	F
F	F	F

B) p	q	$(\sim p \wedge \sim q)$
T	T	F
T	F	T
F	T	T
F	F	T

C) p	q	$(\sim p \wedge \sim q)$
T	T	T
T	F	F
F	T	F
F	F	T

D) p	q	$(\sim p \wedge \sim q)$
T	T	F
T	F	F
F	T	F
F	F	T

117) Construct a truth table for the statement.  $(s \wedge q) \vee (\sim s \wedge \sim q)$

118) Use De Morgan's laws to write the negation of the statement. *It is Saturday and it is not raining.*

119) Let  $p =$  "I eat too much." and  $q =$  "I'll exercise."

Write the compound statement in symbols. *If I exercise, then I won't eat too much.*

120) Construct a truth table for the statement.:  $\sim p \wedge \sim q$

121) Construct a truth table for the statement.:  $\sim p \rightarrow (\sim p \wedge q)$

122) Write the inverse of the statement:  $q \rightarrow \sim p$

123) Write the converse of the statement: *If I were young, I would be happy.*

124) Write the contrapositive of the statement: *If you like me, then I like you.*

125) Use a truth table to determine whether the argument is valid.

$p \rightarrow q$
$\sim p$
<hr/>
$\sim q$

Answer Key

Testname: FINAL EXAM REVIEW (MATH 11000, SPRING 2017)

1) -94

2)  $-22t + 35$

3) 1

4) Let  $x$  be the length of the longer piece of wire;  $x + \frac{2}{3}x = 13$  or  $1\frac{2}{3}x = 13$

5) 46,132 people

6)  $140^\circ, 28^\circ, 12^\circ$

7)  $B = \frac{3V}{h}$

8)  $C = \frac{5}{9}(F - 32)$

9) 11

10)  $\frac{12}{x^5y^{11}}$

11)  $\frac{4a^4}{b^2}$

12) 2

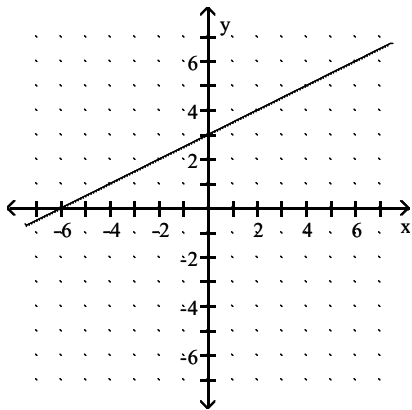
13)  $x = 1$  and  $x = -1$

14)  $\{x \mid -3 \leq x \leq 3\}$

15) 3

16)  $\{x \mid x \text{ is a real number and } x \neq -5\}$

17)



18) -\$6 thousand per year

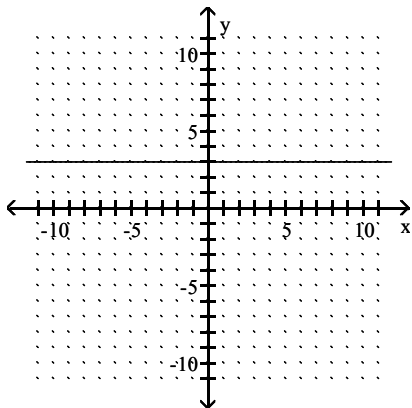
19) The copy machine decreases in value by \$410 each year.

20)  $\frac{2}{5}$

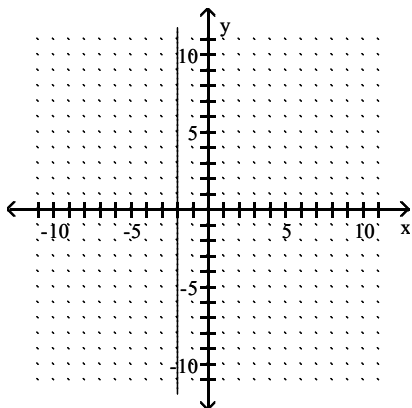
Answer Key

Testname: FINAL EXAM REVIEW (MATH 11000, SPRING 2017)

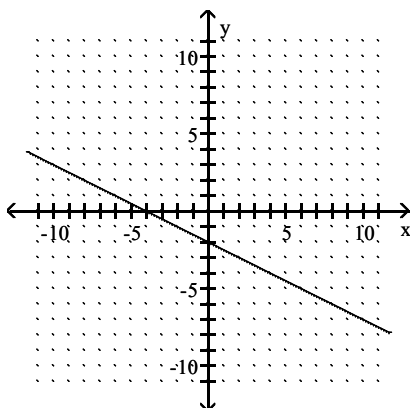
21)



22)



23)  $(0, -2); (-4, 0)$



24)  $y = 4x + \frac{3}{7}$

25)  $f(x) = 5x + 40$

26) \$50,100

27) -82

28)  $-5x - 4$

29)  $-15x + 17$

30)  $28x^2 + 61x + 21$

31) -6

32)  $2x^3 - 5x^2 + 3x + 8$

33) \$7600

## Answer Key

Testname: FINAL EXAM REVIEW (MATH 11000, SPRING 2017)

34)  $4x^2 - 16x + 12$

35)  $64m^2 + 80m + 25$

36)  $49x^2 - 4$

37)  $7(2y - 1)(y + 5)$

38)  $4(3x - 4)^2$

39)  $\frac{2}{3}, -\frac{2}{3}$

40)  $-\frac{1}{5}, 6$

41)  $\frac{1}{4}, 0$

42)  $\{3, -7\}$

43) 7 cm

44) 5 sec

45)  $|4x + 5|$

46) -3

47)  $[6, \infty)$

48)  $\frac{4x}{y^{1/7}}$

49)  $y^{1/2}$

50)  $\sqrt[3]{x^2}$

51)  $\frac{20}{\sqrt{x}}$

52)  $12\sqrt{5}$

53)  $\frac{\sqrt[3]{80}}{4}$

54)  $\pm\sqrt{7}$

55)  $-10 + \sqrt{26}, -10 - \sqrt{26}$

56) -2, 12

57)  $(-4 + \sqrt{21}, 0), (-4 - \sqrt{21}, 0)$

58) 1.049, -2.383

59)  $f(x) = -4(x - 2)^2 + 6$

60) (4, -3)

61)  $x = -2$

62)  $\left(\frac{-6 \pm \sqrt{21}}{5}, 0\right), (0, 3)$

63) 2940 ft

64) 31 watches

65)  $(f \circ g)(x) = 18x + 1$

66)  $(f \circ g)(x) = x - 13$

67) 911

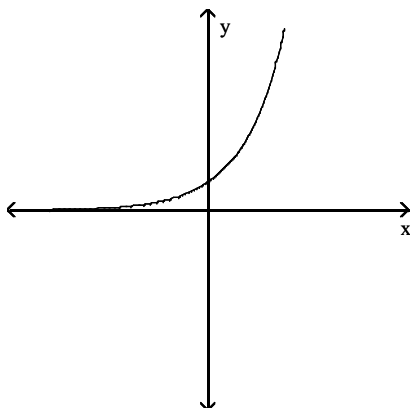
68)  $g^{-1}(x) = \frac{3x + 2}{4}$

69)  $h^{-1}(x) = \sqrt[3]{x + 8}$

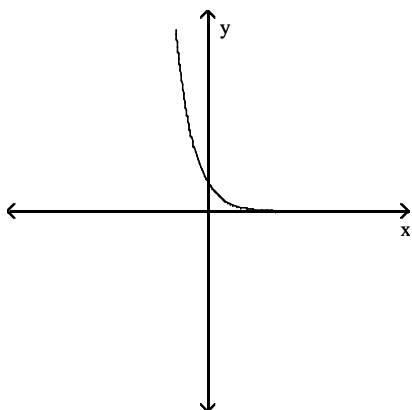
Answer Key

Testname: FINAL EXAM REVIEW (MATH 11000, SPRING 2017)

70)



71)



72) -2

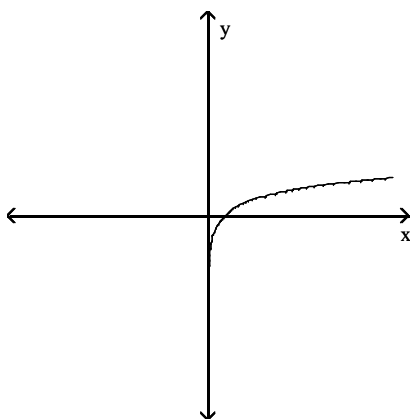
73) 5

74)  $5\log_b m + 9\log_b p - 4\log_b n - 8$

75)  $\log\left(\frac{m^7}{n^6}\right)$

76) 1.5395

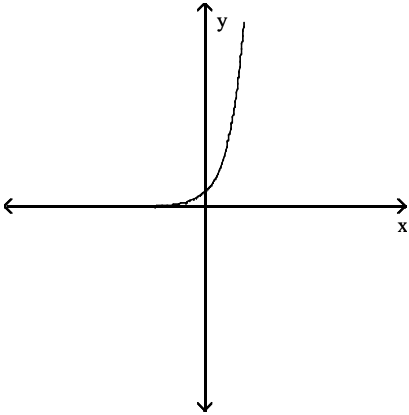
77)



Answer Key

Testname: FINAL EXAM REVIEW (MATH 11000, SPRING 2017)

78)



79) 5.070

80) 0.723

81) 5

82)  $\frac{73}{5}$

83) \$7451.67

84) 15 years

85)  $x + y = 180$ ,  $x = 3y + 9$

86) (5, -2)

87) (0, -2)

88) No solution

89) Infinitely many solutions

90) 185 tickets

91) \$3000

92) 22

93) (4, 2, -3)

94) (4, 3, 6)

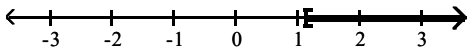
95) 83

96)  $P(x) = 50x - 265,000$

97) (\$75, 4625)

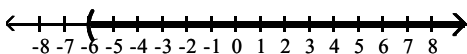
98) 84 gallons

99)  $\left[\frac{9}{8}, \infty\right)$



100)  $(-\infty, 1]$

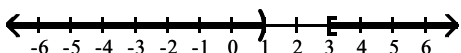
101)  $(-6, \infty)$



102)  $\{x \mid x \leq 8\}$

103) \$8000

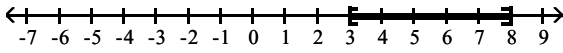
104)



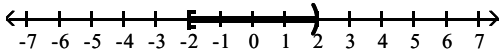
Answer Key

Testname: FINAL EXAM REVIEW (MATH 11000, SPRING 2017)

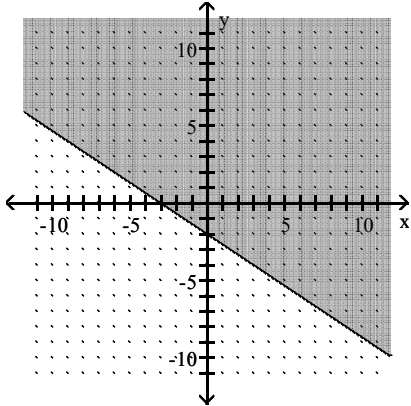
105)



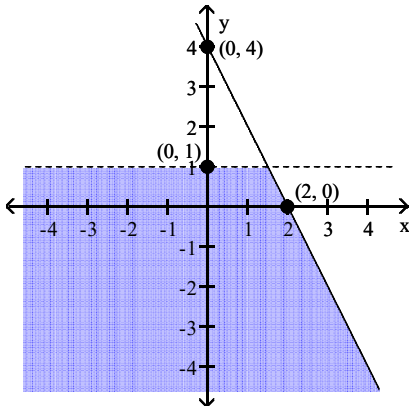
106)



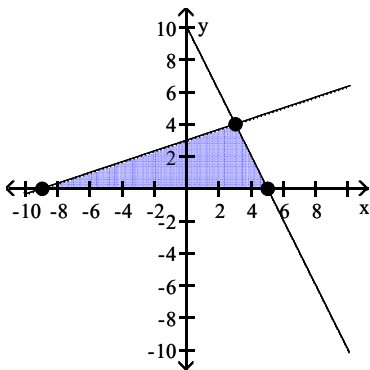
107)



108)



109)



$(-9, 0), (3, 4), (5, 0)$

110) Maximum: 26; minimum: -70

111) 330

112) Not everyone is asleep.



Answer Key

Testname: FINAL EXAM REVIEW (MATH 11000, SPRING 2017)

113) It's not Monday and it's not raining today.

114)  $x$  is less than 2 or  $y$  is not greater than 1.

115)  $\sim p \vee q$

116) D

117)  $s \quad q \quad (s \wedge q) \vee (\sim s \wedge \sim q)$

T	T	T
T	F	F
F	T	F
F	F	T

118) It is not Saturday or it is raining.

119)  $q \rightarrow \sim p$

120)  $p \quad q \quad (\sim p \wedge \sim q)$

T	T	F
T	F	F
F	T	F
F	F	T

121)  $p \quad q \quad \sim p \rightarrow (\sim p \wedge q)$

T	T	T
T	F	T
F	T	T
F	F	F

122)  $\sim q \rightarrow p$

123) If I were happy, I would be young.

124) If I don't like you , then you don't like me.

125) Invalid