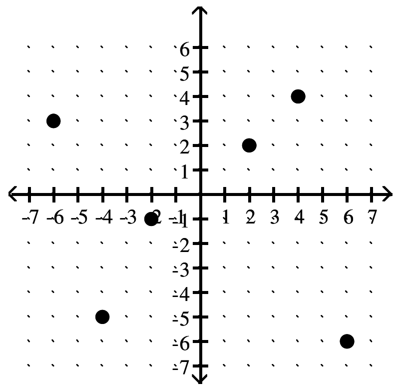
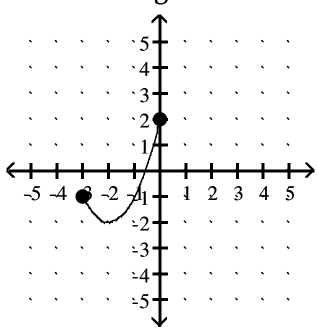
1) **Find the domain and range for the function.** 1) _______



A) D: {−6, −4, 4, 6}; R: {−6, −5, 3, 4}
B) D: {−6, −4, −2, 0, 2, 4, 6}; R: {−6, −5, −1, 2, 3, 4}
C) D: {−6, −4, −2, 2, 4, 6}; R: {−6, −5, −1, 2, 3, 4}
D) D: {−6, −5, −1, 2, 3, 4}; R: {−6, −4, −2, 2, 4, 6}

2) **Find the domain and range for the function.** 2) _______



A) D: [−2, 2]; R: [−3, 0]
B) D: (−∞, 2]; R: [0, 3]
C) D: [−3, 0]; R: [−2, 2]
D) D: [0, 3]; R: (−∞, 2]

3) Given $f(x) = (x + 6)^2$, find f(1). 3) _______

A) 14 B) 49 C) −49 D) 25

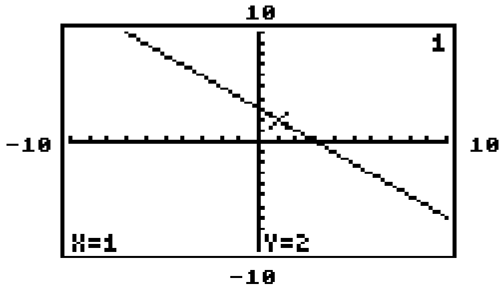
4) Given $f(x) = 2x^2 - 3x - 3$, find f(−4). 4) _______

A) 1 B) 26 C) 41 D) 44

5) Given $f(x) = 4x^2 - 4x - 1$, find $f\left(\frac{1}{4}\right)$ 5) _______

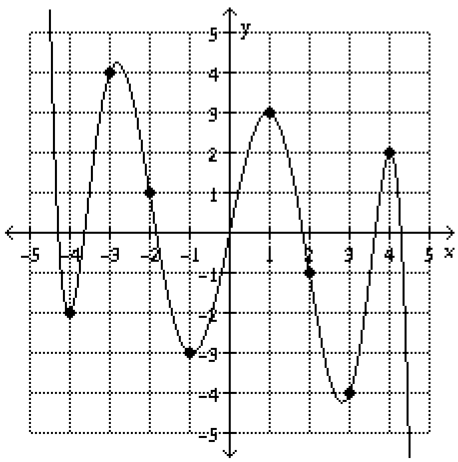
A) $-\frac{7}{4}$ B) $\frac{7}{4}$ C) $\frac{1}{16}$ D) $-\frac{1}{16}$

6) If y = f(x), find f(1). 6) _______



A) -2 B) 0 C) 2 D) 1

7) If y = f(x), find f(-3). 7) _______



A) -1 B) 1 C) -4 D) 4

8) Employees of a publishing company received an increase in salary of 6% plus a bonus of $500. Let S(x) = 1.06x + 500 represent the new salary in terms of the previous salary x. Find and interpret S(14,000). 8) _______

A) $22,900; If an employee's old salary was $22,900, then his/her new salary was $14,000 after the increase and bonus.

B) $15,340; If an employee's old salary was $14,000, then his/her new salary was $15,340 after the increase and bonus.

C) $12,736; If an employee's old salary was $12,736, then his/her new salary was $14,000 after the increase and bonus.

D) $14,500; If an employee's old salary was $14,000, then his/her new salary was $14,500 after the increase and bonus.

9) The function $E(x) = 0.0049x^3 - 0.0032x^2 + 0.188x + 1.87$ gives the approximate total earnings of a company, in millions of dollars, where $x = 0$ corresponds to 2006, $x = 1$ corresponds to 2007, and so on. This model is valid for the years from 2006 to 2010. Determine the earnings for 2007. Round to two decimal places if necessary. 9) _______

A) \$2.06 million B) \$1.87 million C) \$2.07 million D) \$2.27 million

10) The number of mosquitoes $M(x)$, in millions, in a certain area depends on the June rainfall x, in inches: $M(x) = 16x - x^2$. What rainfall produces the maximum number of mosquitoes? 10) ______

A) 8 in. B) 256 in. C) 16 in. D) 0 in.

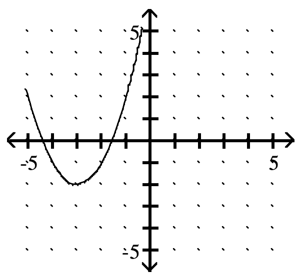
11) **Determine a viewing window that will provide a complete graph of the function.** 11) ______

$$y = 3x^3 - 26x^2 + 18x - 47$$

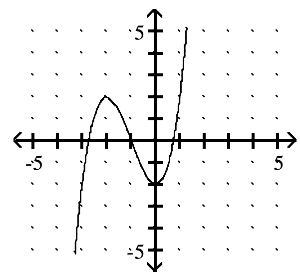
A) [−5, 5] by [−500, 100]
B) [−8, 10] by [−100, 300]
C) [−10, 10] by [−150, 150]
D) [−3, 10] by [−400, 100]

12) **Graph.** $y = x^4 + 3x^2 - 2$ 12) ______

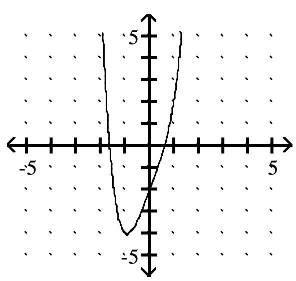
A)



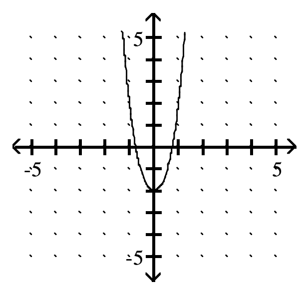
B)



C)

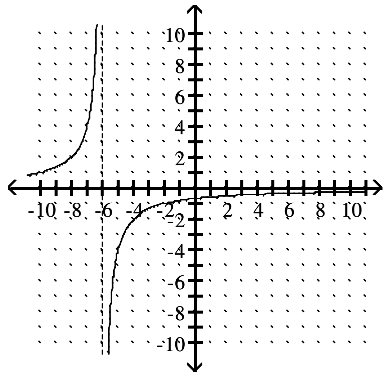


D)



13) **Graph.** $y = \frac{-4}{x - 6}$ 13) ______

A)



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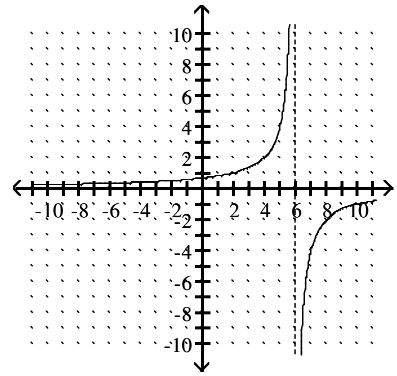
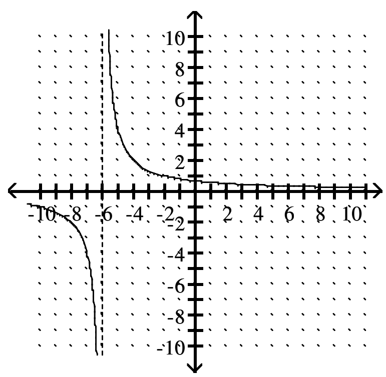
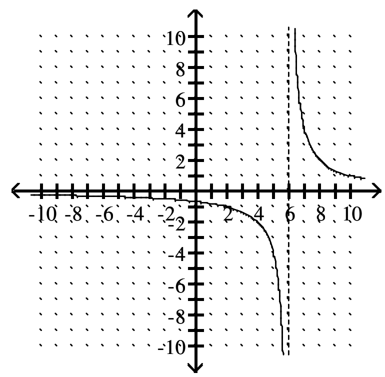


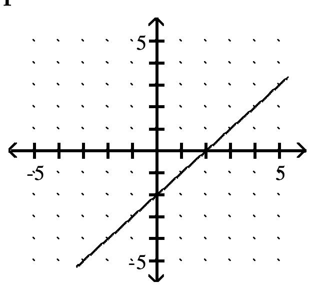
C)



D)

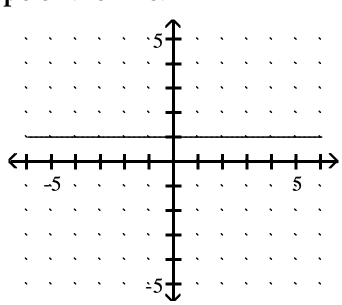


14) **Find the slope of the line.** 14) ______



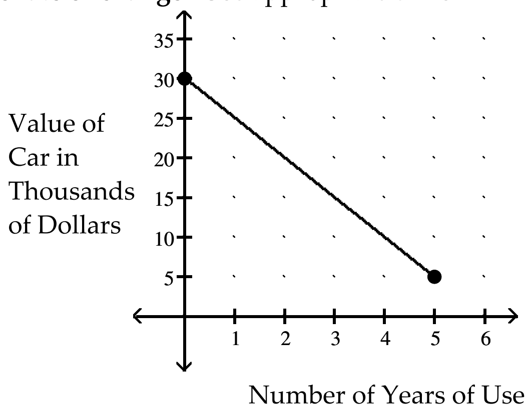
A) -1 B) 2 C) -2 D) 1

15) **Find the slope of the line.** 15) ______



A) 0 B) 7 C) -7 D) undefined

16) **Find the rate of change**. Use appropriate units. 16) ______

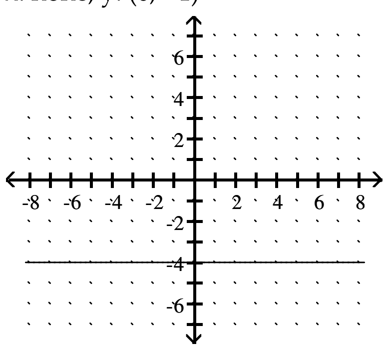


A) \$5000 per year
B) −\$6000 per year
C) −\$5000 per year
D) \$6000 per year

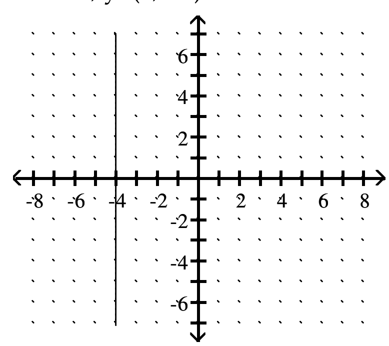
17) **Find the x– and y–intercepts of the graph of the given equation, if they exist. Then graph the equation.** 17) ______

$x = -4$

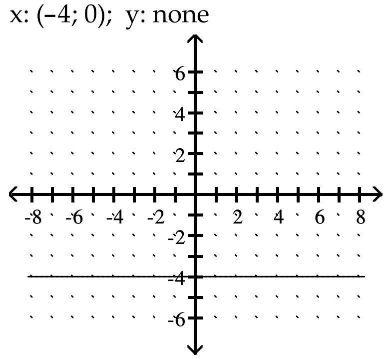
A) x: none; y: (0, −4)



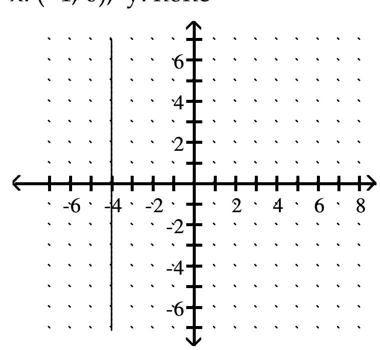
B) x: none; y: (0, −4)



C) x: (−4; 0); y: none



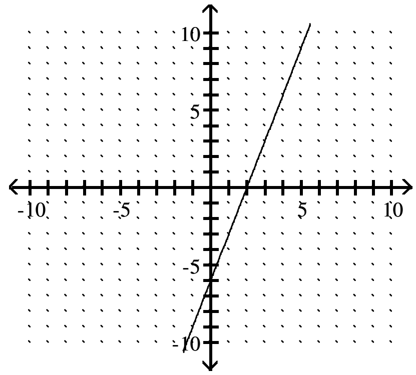
D) x: (−4, 0); y: none



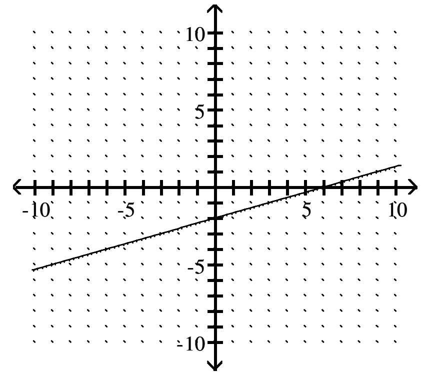
18) **Find the x– and y–intercepts of the graph of the given equation, if they exist. Then graph the equation.** 18) ______

$3x - 9y = 18$

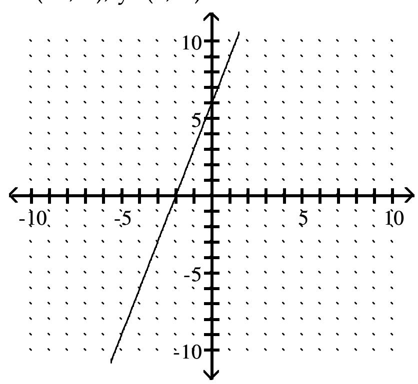
A) x: (2, 0); y: (0,–6)



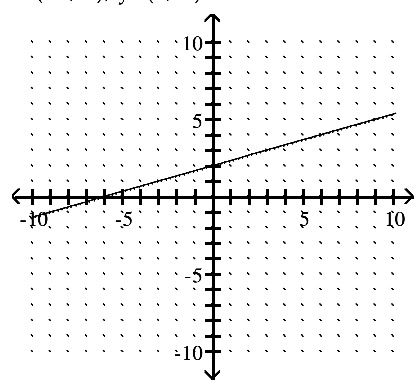
B) x: (6, 0); y: (0, –2)



C) x: (–2, 0); y: (0, 6)



D) x: (–6, 0); y: (0, 2)



19) The cost of tuition at a community college is given by $C(x) = 456 + 63x$, where x is the number of credit hours. Interpret the slope of this function as a rate of change. 19) ______

A) The tuition at the community college increases by $456 for each additional 63 credit hours.

B) The number of credit hours increases by 63 for each increase of $456 in tuition.

C) The tuition at the community college increases by $63 for each additional credit hour.

D) The tuition at the community college increases by $456 for each additional credit hour.

20) The cost of a rental car for the weekend is given by the function $C(x) = 149 + 0.26x$, where x is the number of miles driven. Find and interpret the C–intercept of the graph of this function. 20) ______

A) 149; There is a flat rate of $149 to rent a car in addition to the charge for each mile driven.

B) 149; The cost of the rental car increases by $149 for each mile driven.

C) 0.26; There is a flat rate of $0.26 to rent a car in addition to the charge for each mile driven.

D) 0.26; The cost of the rental car increases by $0.26 for each mile driven.

21) A boat is moving away from shore in such a way that at time t hours its distance from shore, in kilometers, is given by the linear function $d(t) = 3.5t + 6.1$. What is the rate of change of the distance from shore? 21) ______

A) 6.1 m/s B) 3.5 m/s C) 6.1 km/hr D) 3.5 km/hr

22) The population of a small town can be modeled by $P = -35t + 13{,}000$, where t is the number of years since 2010. Interpret the slope of the graph of this function as a rate of change. 22) ______

A) The population of the town is decreasing by 13,000 people per year.
B) The population of the town is increasing by 35 people per year.
C) The population of the town is increasing by 13,000 people per year.
D) The population of the town is decreasing by 35 people per year.

23) In a certain town the annual consumption, b, of beef (in pounds per person) can be estimated by $b = 36 - 0.5t$, where t is the number of years since 2010. Find and interpret the b–intercept of the graph of this function. 23) ______

A) 72; If this trend continues, the annual consumption of beef in this town will be zero pounds per person in the year 2082.
B) 72; The annual consumption of beef in this town was 72 pounds per person in 2010.
C) 36; If this trend continues, the annual consumption of beef in this town will be zero pounds per person in the year 2046.
D) 36; The annual consumption of beef in this town was 36 pounds per person in 2010.

24) **Solve.** $\frac{2}{5}x - \frac{1}{3}x = 3$ 24) ______

A) −90 B) 45 C) 90 D) −45

25) **Find the zero of f(x).** $f(x) = \frac{1}{3}x + \frac{1}{6}$ 25) ______

A) $-\frac{1}{2}$ B) $\frac{1}{2}$ C) $-\frac{1}{6}$ D) $\frac{1}{6}$

26) **Find the zero of f(x).** $f(x) = 6x + 12$ 26) ______

A) 2 B) 12 C) −12 D) −2

27) **Find the zero of f(x).** $f(x) = \frac{1}{2}x$ 27) ______

A) −2 B) 0 C) 2 D) does not exist

28) **Find the zero of f(x).** $f(x) = -2x$ 28) ______

A) −2 B) 0 C) 2 D) does not exist

29) **Solve.** $S = 2\pi rh + 2\pi r^2$ for h — 29) ______

A) $h = \frac{S}{2\pi r} - 1$ B) $h = 2\pi(S - r)$ C) $h = \frac{S - 2\pi r^2}{2\pi r}$ D) $h = S - r$

30) **Solve.** $A = \frac{1}{2}h(b_1 + b_2)$ for b_1 — 30) ______

A) $b_1 = \frac{A - hb_2}{2h}$ B) $b_1 = \frac{hb_2 - 2A}{h}$

C) $b_1 = \frac{2A - hb_2}{h}$ D) $b_1 = \frac{2Ab_2 - h}{h}$

31) **Solve.** $A = P(1 + nr)$ for r — 31) ______

A) $r = \frac{Pn}{A - P}$ B) $r = \frac{A}{n}$ C) $r = \frac{P - A}{Pn}$ D) $r = \frac{A - P}{Pn}$

32) **Solve for y.** $x - 6y = 8$ — 32) ______

A) $y = \frac{1}{6}x - 8$ B) $y = 6x - 8$ C) $y = x - \frac{4}{3}$ D) $y = \frac{1}{6}x - \frac{4}{3}$

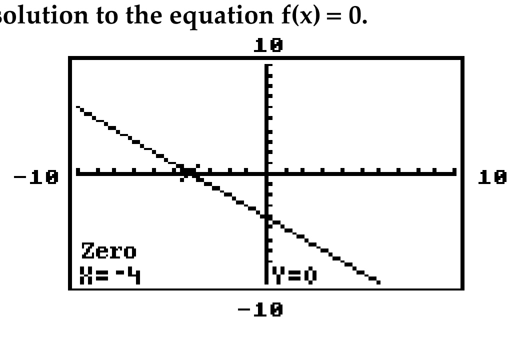
33) **Solve for y.** $3x - 10y = -6$ — 33) ______

A) $y = -\frac{3}{10}x + \frac{3}{5}$ B) $y = \frac{3}{10}x + \frac{3}{5}$ C) $y = 3x + 11$ D) $y = \frac{10}{3}x - 2$

34) **The graph of a certain function y = f(x) and the zero of that function is given. Using this graph, find** — 34) ______

a) the x–intercept of the graph of y = f(x) and

b) the solution to the equation f(x) = 0.



A) a. (0, −4)
b. x = 0

B) a. (−4, 0)
b. x = −4

C) a. (−4, 0)
b. x = 0

D) a. (0, −4)
b. x = −4

35) The mathematical model C = 900x + 80,000 represents the cost in dollars a company has in manufacturing x items during a month. How many items were produced if costs reached $800,000? 35) ______

A) 800 items B) 711 items C) 978 items D) 799,100 items

36) Mark has $75 to spend on salmon at $5.00 per pound and/or chicken at $3.00 per pound. If he buys s pounds of salmon and c pounds of chicken, the equation 5s + 3c = 75 must be satisfied. How much salmon did Mark buy if he bought 5 pounds of chicken? 36) ______

A) 17 lb B) 12 lb C) 16 lb D) 19 lb

37) When going more than 38 miles per hour, the gas mileage of a certain car fits the model y = 43.81 - 0.395x where x is the speed of the car in miles per hour and y is the miles per gallon of gasoline. Based on this model, at what speed will the car average 15 miles per gallon? (Round to nearest whole number.) 37) ______

A) 149 mph B) 98 mph C) 73 mph D) 48 mph

38) An average score of 90 for 5 exams is needed for a final grade of A. John's first 4 exam grades are 79, 89, 97, and 95. Determine the grade needed on the fifth exam to get an A in the course. 38) ______

A) 95 B) 90 C) 100 D) 85

39) The future value of a simple interest investment is given by S = P(1 + rt), where P is the principal invested at a simple interest rate r for t years. What principal P must be invested for t = 3 months at the simple interest rate r = 12% so that the future value grows to $2300. 39) ______

A) $66.99 B) $2053.57 C) $2254.90 D) $2233.01

40) **Find the linear function that is the best fit for the given data. Round decimal values to the nearest hundredth, if necessary.** 40) ______

x	1	3	5	7	9
y	143	116	100	98	90

A) y = 6.8x - 150.7 B) y = -6.8x + 150.7
C) y = 6.2x - 140.4 D) y = -6.2x + 140.4

41) Managers rate employees according to job performance and attitude. The results for several randomly selected employees are given below. Find the linear function to model this data. 41) ______

Performance	59	63	65	69	58	77	76	69	70	64
Attitude	72	67	78	82	75	87	92	83	87	78

A) y = -47.3 + 2.02x B) y = 92.3 - 0.669x
C) y = 11.7 + 1.02x D) y = 2.81 + 1.35x

42) The paired data below consist of the test scores of 6 randomly selected students and the number of hours they studied for the test. Find a linear function that predicts a student's score as a function of the number of hours he or she studied. 42) ______

Hours	5	10	4	6	10	9
Score	64	86	69	86	59	87

A) $y = -67.3 + 1.07x$
B) $y = 67.3 + 1.07x$
C) $y = 33.7 + 2.14x$
D) $y = 33.7 - 2.14x$

43) The paired data below consist of the test scores of 6 randomly selected students and the number of hours they studied for the test. The linear model for this data is $y = 67.3 + 1.07x$, where x is number of hours studied and y is score on the test. Use this model to predict the score on the test of a student who studies 13 hours. 43) ______

Hours	5	10	4	6	10	9
Score	64	86	69	86	59	87

A) 81.2
B) 76.2
C) 86.8
D) 86.2

44) The paired data below consist of the temperatures on randomly chosen days and the amount a certain kind of plant grew (in millimeters). The linear model for this data is $y = 14.6 + 0.211x$, where x is temperature and y is growth in millimeters. Use this model to predict the growth of a plant if the temperature is 55. 44) ______

Temp	62	76	50	51	71	46	51	44	79
Growth	36	39	50	13	33	33	17	6	16

A) 27.09 mm
B) 25.05 mm
C) 26.65 mm
D) 26.21 mm

45) **Solve.** $-5(3a - 15) < -20a + 40$ 45) ______

A) $a < -20$
B) $a > -20$
C) $a > -7$
D) $a < -7$

46) **Solve. Express the solution in interval notation.** $-6x + 1 \geq -7x + 7.$ 46) ______

A) $(-6, \infty)$
B) $(-\infty, -6)$
C) $(-\infty, 6]$
D) $[6, \infty)$

47) **Solve.** $-20 < -4x \leq -4$ 47) ______

A) $1 \leq x \leq 5$
B) $1 \leq x < 5$
C) $-5 < x \leq -1$
D) $1 < x < 5$

48) **Solve.** $-13 < 3y + 5 \leq -1$ 48) ______

A) $-6 < y \leq -2$
B) $-6 < y < -2$
C) $-6 \leq y < -2$
D) $-6 \leq y \leq -2$

49) **Solve.** $-9 \leq -2c + 1 < -5$ 49) ______

A) $-5 < c \leq -3$
B) $3 < c \leq 5$
C) $-5 \leq c < -3$
D) $3 \leq c < 5$

50) **Solve.** $-4 < \frac{5 - 2x}{7} \le 9$ 50) ______

A) $29 \le x < \frac{33}{2}$
B) $29 < x < \frac{33}{2}$
C) $-29 \le x < \frac{33}{2}$
D) $-29 \le x \le \frac{33}{2}$

51) **Solve.** $-19 \le \frac{-2 - 4x}{2} \le -11$ 51) ______

A) $5 < x \le 9$
B) $5 \le x \le 9$
C) $5 \le x < 9$
D) $5 < x < 9$

52) Jim has gotten scores of 67 and 89 on his first two tests. What score must he get on his third test tc keep an average of 80 or greater? 52) ______

A) At least 84
B) At least 78.7
C) At least 78
D) At least 83

53) Jon has 953 points in his math class. He must have 68% of the 1500 points possible by the end of the term to receive credit for the class. What is the minimum number of additional points he must earn by the end of the term to receive credit for the class? 53) ______

A) 648 points
B) 67 points
C) 1020 points
D) 547 points

54) Correct Computers, Inc. finds that the cost to make x laptop computers is $C = 1841x + 130{,}478$, while the revenue produced from them is $R = 2244x$ (C and R are in dollars). What is the smallest whole number of computers, x, that must be sold for the company to show a profit? 54) ______

A) 533,002,630 computers
B) 52,582,634 computers
C) 324 computers
D) 32 computers

55) DG's Plumbing and Heating charges \$50 plus \$70 per hour for emergency service. Bill remembers being billed just over \$450 for an emergency call. How long to the nearest hour was the plumber at Bill's house? 55) ______

A) 6 hours
B) 16 hours
C) 7 hours
D) 12 hours

56) Using the formula to find Fahrenheit (F) in terms of Celsius (C), $F = \left(\frac{9}{5}\right)C + 32$, find the range (to the nearest tenth) of the Fahrenheit temperature when the range of the Celsius temperature is between 2°C and 10°C, inclusive. 56) ______

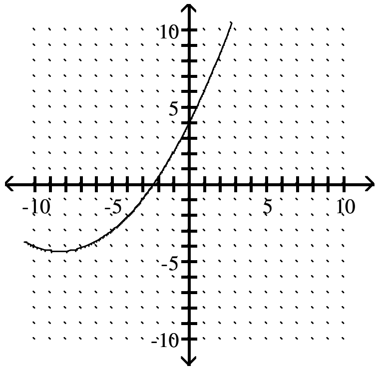
A) Between 3.6°F and 18°F, inclusive
B) Between 33.1°F and 32.8°F, inclusive
C) Between 35.6°F and 50°F, inclusive
D) Between 19.6°F and 34°F, inclusive

57) Assume that the mathematical model $C(x) = 18x + 120$ represents the cost C, in hundreds of dollars, for a certain manufacturer to produce x items. How many items x can be manufactured while keeping costs between between \$660,000 and \$984,000? 57) ______

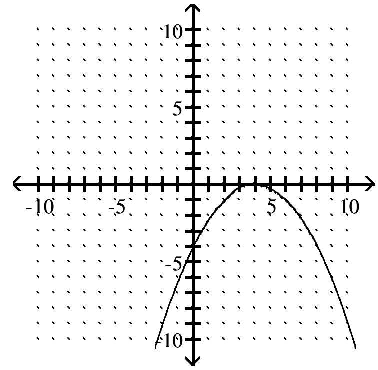
A) $380 < x < 570$
B) $570 < x < 760$
C) $540 < x < 720$
D) $360 < x < 540$

58) **Graph the quadratic equation on [–10, 10] by [–10, 10]. Does this window give a complete graph?** $f(x) = 4x^2 + 2x - 4$ 58) ______

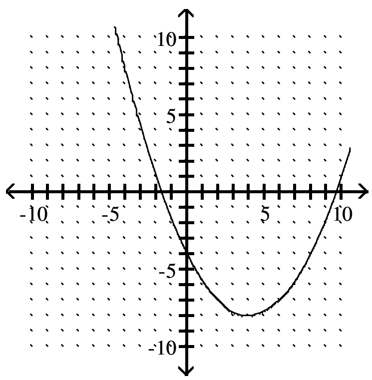
A) No



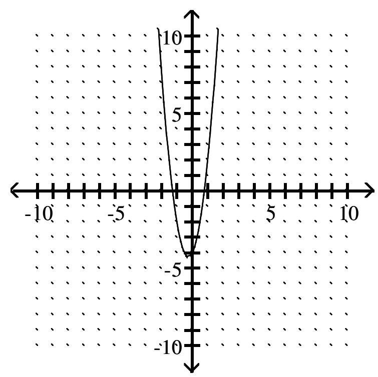
B) Yes



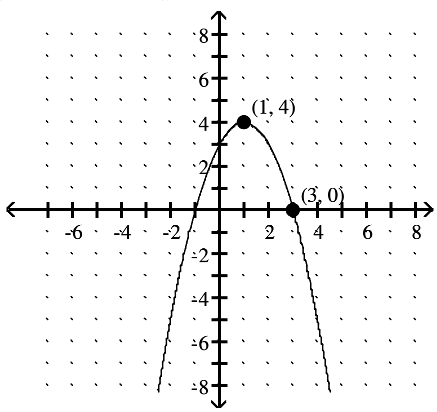
C) Yes



D) Yes



59) Write the equation of the quadratic function whose graph is shown. 59) ______



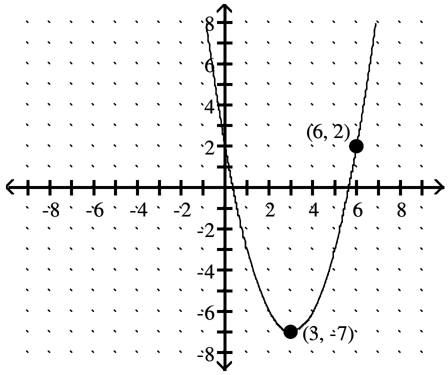
A) $y = (x - 1)^2 + 4$

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

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

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

60) Write the equation of the quadratic function whose graph is shown. 60) ______



A) $y = -(x - 3)^2 - 7$
B) $y = (x - 3)^2 - 7$
C) $y = (x + 3)^2 - 7$
D) $y = -(x - 3)^2 + 7$

61) **Give the coordinates of the vertex.** $y = (x - 9)^2 + 4$ 61) ______

A) (−9, 4) B) (−9, −4) C) (9, 4) D) (9, −4)

62) **Give the coordinates of the vertexx.** $y = (x + 13)^2$ 62) ______

A) (0, 13) B) (−13, 0) C) (13, 0) D) (0, −13)

63) **Give the coordinates of the vertex.** $y = 3x^2 + 18x + 26$ 63) ______

A) (−1, −3) B) (−3, −1) C) (3, 1) D) (1, 3)

64) **Give the coordinates of the vertex.** $y = x^2 - 4$ 64) ______

A) (0, 4) B) (4, 0) C) (0, −4) D) (−4, 0)

65) **Determine the x–intercepts of the graph of** $y = x^2 - x - 6$ 65) ______

A) (−1, 0), (−6, 0) B) (−2, 0), (3, 0) C) (−3, 0), (−2, 0) D) (−3, 0), (2, 0)

66) **Determine the x–intercepts of the graph of** $y = -x^2 + 2x + 35$ 66) ______

A) (−7, 0), (5, 0) B) (−35, 0), (−2, 0) C) (−5, 0), (7, 0) D) (5, 0), (7, 0)

67) **Determine the x–intercepts of the graph of** $f(x) = 4x^2 - 20x + 21$ 67) ______

A) (6, 0), (14, 0)
B) (1.5, 0), (3.5, 0)
C) (−3.5, 0), (−1.5,0)
D) (−29, 0), (21, 0)

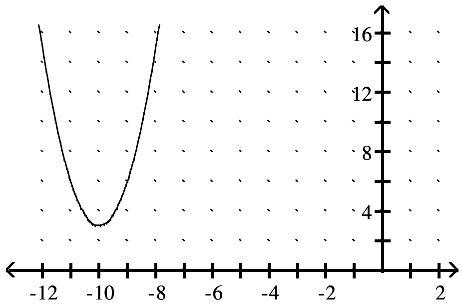
68) **Determine the x–intercepts of the graph of** $g(x) = -2x^2 - 3x + 5$ 68) ______

A) (−2.5, 0), (1, 0) B) (−1, 0), (2.5, 0) C) (−3, 0), (5, 0) D) (−5, 0), (2, 0)

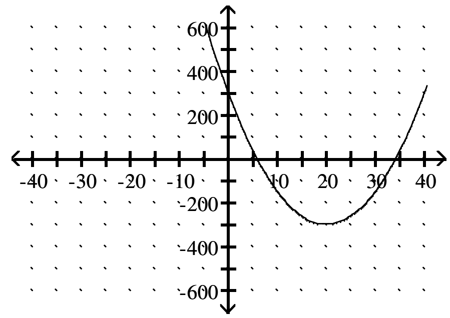
69) **Sketch the complete graph of the function.** 69) ______

$y = 3x^2 - 60x + 303$

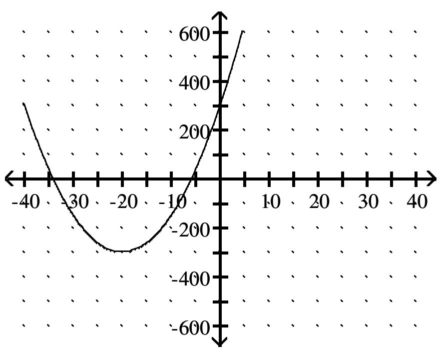
A)



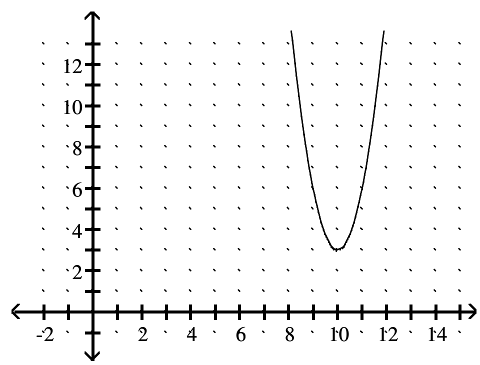
B)



C)



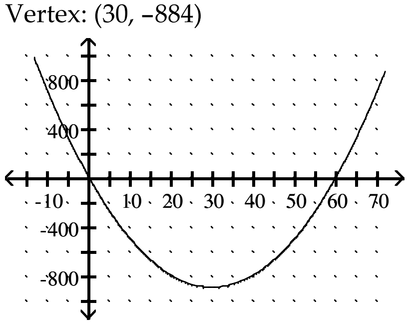
D)



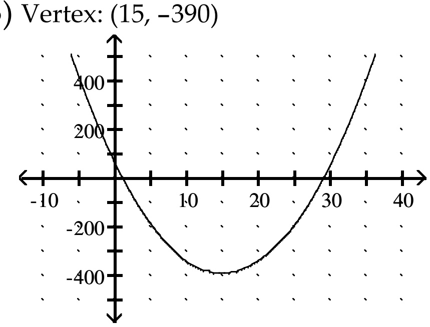
70) **Give the coordinates of the vertex and graph the equation in a window that includes the vertex.** 70) ______

$y = 2x^2 - 60x + 16$

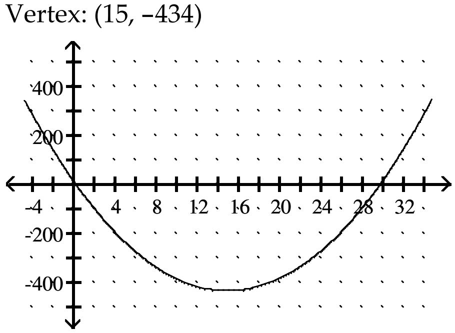
A) Vertex: (30, −884)



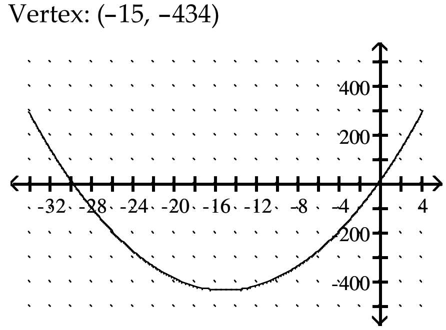
B) Vertex: (15, −390)



C) Vertex: (15, −434)



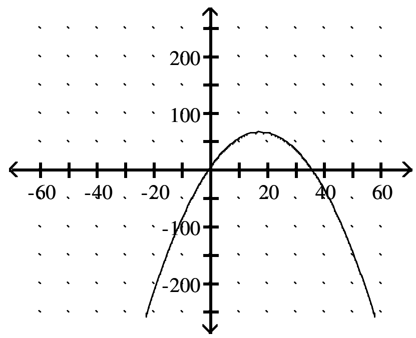
D) Vertex: (−15, −434)



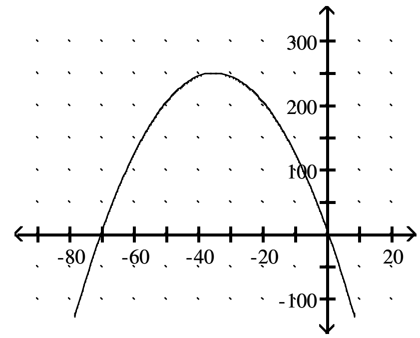
71) **Give the coordinates of the vertex and graph the equation in a window that includes the vertex.** 71) ______

$y = -\,0.2x^2 - 14x + 6$

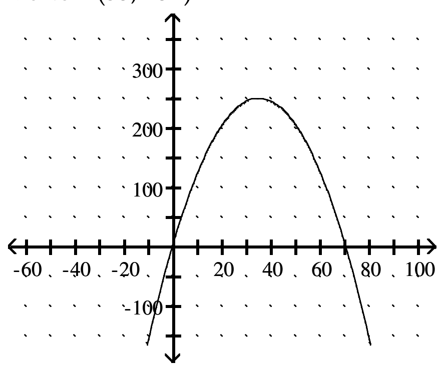
A) Vertex: (17.5, 67.25)



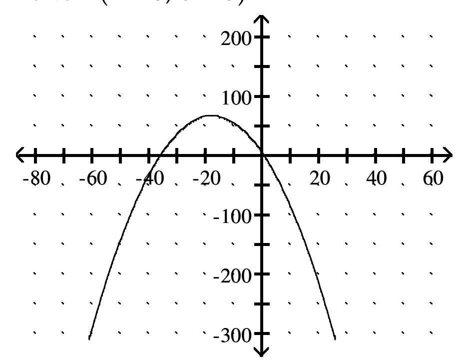
B) Vertex: (−35, 251)



C) Vertex: (35, 251)



D) Vertex: (−17.5, 67.25)



72) At Allied Electronics, production has begun on the X–15 Computer Chip. The total revenue function is given by $R(x) = 58x - 0.3x^2$ and the total cost function is given by $C(x) = 11x + 12$, where x represents the number of boxes of computer chips produced. The total profit function, $P(x)$, is such that $P(x) = R(x) - C(x)$. Find $P(x)$. 72) ______

A) $P(x) = -0.3x^2 + 36x + 12$
B) $P(x) = 0.3x^2 + 47x - 24$
C) $P(x) = 0.3x^2 + 36x - 36$
D) $P(x) = -0.3x^2 + 47x - 12$

73) John owns a hot dog stand. He has found that his profit is given by the equation $P = -x^2 + 68x + 79$, where x is the number of hot dogs sold. How many hot dogs must he sell to earn the most profit? 73) ______

A) 45 hot dogs
B) 22 hot dogs
C) 34 hot dogs
D) 35 hot dogs

74) John owns a hot dog stand. His profit, in dollars, is given by the equation $P(x) = P = -x^2 + 14x + 54$, where x is the number of hot dogs sold. What is the most he can earn? 74) ______

A) \$117
B) \$103
C) \$49
D) \$75

75) Given the following revenue and cost functions, find the x–value that makes revenue a maximum. 75) ______

$R(x) = 68x - 2x^2;\ C(x) = 21x + 97$

A) 17 B) 16 C) 18 D) 34

76) Given the following revenue and cost functions, find the x–value that makes profit a maximum. (Recall that profit equals revenue minus cost.) 76) ______

$R(x) = 58x - 2x^2;\ C(x) = 21x + 109$

A) 9.25 B) 18.5 C) 10.25 D) 14.5

77) The profit for a product is given by $p = 2000 + x^2 - 105x$, where x is the number of units produced and sold. Graphically find the x–intercepts of this function to find how many units will give break–even (that is return a profit of zero). 77) ______

A) 80 units B) 25 or 80 units

C) They will never break even. D) 25 units

78) If a ball is thrown upward at 64 feet per second from the top of a building that is 180 feet high, the height of the ball can be modeled by $S = 180 + 64t - 16t^2$ feet, where t is the number of seconds after the ball is thrown. After how many seconds does the ball reach its maximum height? 78) ______

A) 2 sec B) 5.6 sec C) 1 sec D) 4 sec

79) If a ball is thrown upward at 64 feet per second from the top of a building that is 180 feet high, the height of the ball can be modeled by $S = 180 + 64t - 16t^2$ feet, where t is the number of seconds after the ball is thrown. What is the ball's maximum height? 79) ______

A) 372 ft B) 180 ft C) 228 ft D) 244 ft

80) Your company uses the quadratic model $y = -4.5x^2 + 150x$ to represent the average number of new customers who will be signed on (x) weeks after the release of your new service. How many new customers can you expect to gain in week 18? 80) ______

A) 621 customers B) –108 customers

C) 1242 customers D) 2619 customers

81) The polynomial function $I(t) = -0.1t^2 + 1.7t$ represents the yearly income (or loss) from a real estate investment, where t is time in years. After how many years does income begin to decline? 81) ______

A) 8.5 yr B) 7.5 yr C) 17 yr D) 11.33 yr

82) **Solve.** $20x^2 + 33x + 10 = 0$ 82) ______

A) $x = \frac{5}{4}, x = \frac{2}{5}$ B) $x = \frac{5}{4}, x = -2$

C) $x = -\frac{5}{4}, x = -\frac{2}{5}$ D) $x = -5, x = -\frac{2}{5}$

83) **Solve.** $x^2 - 9 = 0$ 83) ______

A) ±4 B) 4.5 C) 3 D) ±3

84) **Solve.** $y^2 - 12 = 0$ 84) ______

A) $\pm 2\sqrt{3}$ B) $\sqrt{12}$ C) 6 D) 144

85) **Solve.** $-7k^2 - 5 = -33$ 85) ______

A) 2 B) −16.5 C) ±4 D) ±2

86) **Solve.** $6y^2 + 19y + 15 = 0$ 86) ______

A) $-\frac{5}{3}, -\frac{3}{2}$ B) $\frac{5}{3}, -\frac{3}{2}$ C) $-\frac{5}{6}, -\frac{1}{5}$ D) $\frac{5}{3}, \frac{3}{2}$

87) **Solve.** $z^2 + 12z + 14 = 0$ 87) ______

A) $-12 + \sqrt{14}$ B) $6 + \sqrt{22}$ C) $6 \pm \sqrt{14}$ D) $-6 \pm \sqrt{22}$

88) **Solve.** $p^2 - p - 4 = 0$ 88) ______

A) $\frac{1 \pm i\sqrt{15}}{2}$ B) $\frac{1 \pm \sqrt{17}}{2}$ C) $1 \pm \sqrt{17}$ D) $\frac{-1 \pm \sqrt{17}}{2}$

89) **Solve.** $6n^2 = -12n - 1$ 89) ______

A) $\frac{-6 \pm \sqrt{42}}{6}$ B) $\frac{-12 \pm \sqrt{30}}{6}$ C) $\frac{-6 \pm \sqrt{30}}{12}$ D) $\frac{-6 \pm \sqrt{30}}{6}$

90) **Approximate solutions to the equation. round your answers to three decimal places.** 90) ______

$x^2 + 7x = -5$

A) 6.193, 0.807 B) −4.307, −4.307 C) −0.807, −6.193 D) 0.653, −7.653

91) **Solve.** $x^2 + 196 = 0$ 91) ______

A) ±14 B) 14i C) −98i D) ±14i

92) **Solve.** $(7x - 1)^2 + 5 = 0$ 92) ______

A) $\frac{1 \pm \sqrt{5}}{7}$ B) $\frac{1}{7} \pm \frac{5}{7} i$ C) $\frac{1}{7} \pm \frac{\sqrt{5}}{7} i$ D) $7 \pm 7i\sqrt{5}$

93) **Solve.** $x^2 - 4x + 13 = 0$ 93) ______

A) $-2 \pm 3i$ B) $2 \pm 3i$ C) 5, −1 D) $4 \pm 6i$

94) **Solve.** $x^2 + x + 9 = 0$ 94) ______

A) $\frac{1 \pm \sqrt{35}}{2}$ B) $\frac{1}{2} \pm \frac{\sqrt{35}}{2} i$ C) $\frac{-1 \pm \sqrt{35}}{2}$ D) $\frac{-1}{2} \pm \frac{\sqrt{35}}{2} i$

95) **Solve.** $x^2 - \frac{1}{3}x = -\frac{7}{6}$ 95) ______

A) $0, -\frac{7}{2}i$ B) $\frac{-1}{6} \pm \frac{\sqrt{41}}{6} i$ C) $\frac{1}{6} \pm \frac{\sqrt{41}}{6} i$ D) $\frac{1}{3}i, 0$

96) A grasshopper is perched on a reed 5 inches above the ground. It hops off the reed and lands on the ground about 7.9 inches away. During its hop, its height is given by the equation $h = -0.3x^2 + 1.75x + 5$, where x is the distance in inches from the base of the reed, and h is in inches. How far was the grasshopper from the base of the reed when it was 3.75 inches above the ground? Round to the nearest tenth. 96) ______

A) 0.6 in. B) 0.8 in. C) 6.5 in. D) 7.9 in.

97) If an object is propelled upward from a height of 64 feet at an initial velocity of 64 feet per second, then its height after t seconds is given by the equation $h = -16t^2 + 64t + 64$, where h is in feet. After how many seconds will the object reach a height of 128 feet? 97) ______

A) 1 sec B) 8 sec C) 2 sec D) 4 sec

98) The function defined by $D(t) = 13t^2 - 73t$ gives the distance in feet that a car going approximately 50 mph will skid in t seconds. Find the time it would take for the car to skid 380 ft. Round to the nearest tenth. 98) ______

A) 10.3 sec B) 9.9 sec C) 8.9 sec D) 10.1 sec

99) Assume that the elevation E, in feet, of a sag in a proposed route is given by $E(x) = 0.000039x^2 - 0.25x + 1100$, where x represents the horizontal distance in feet along the proposed route and $0 \le x \le 5000$. For what x–values is the elevation 1000 feet? Round your answer to the nearest foot. 99) ______

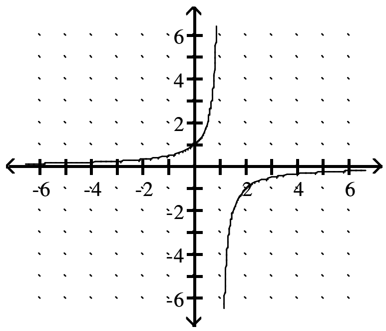
A) x = 439 ft or x = 5992 ft B) x = 429 ft or x = 5992 ft
C) x = 439 ft or x = 5982 ft D) x = 429 ft or x = 5982 ft

100) If an amount of money, called the principal, P, is deposited into an account that earns interest at a rate r, compounded annually, then in two years that investment will grow to an amount A, given by the formula $A = P(1 + r)^2$. If a principal amount of \$4500 grows to \$5445.00 in two years, what is the interest rate? 100) _____

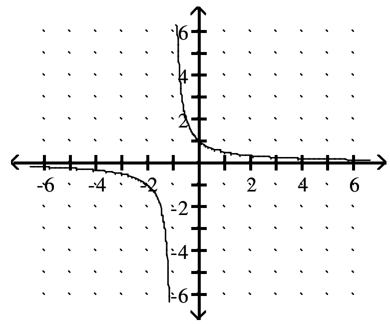
A) 11% B) 10% C) 12% D) 8%

101) **Graph.** $f(x) = \dfrac{1}{x+1}$ 101) _____

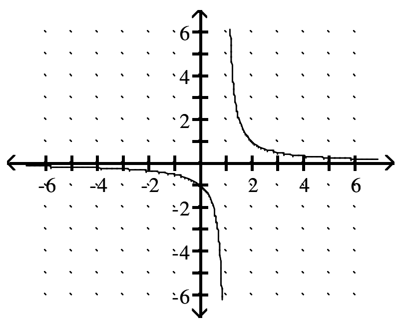
A)



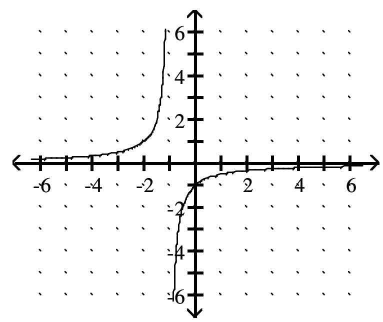
B)



C)

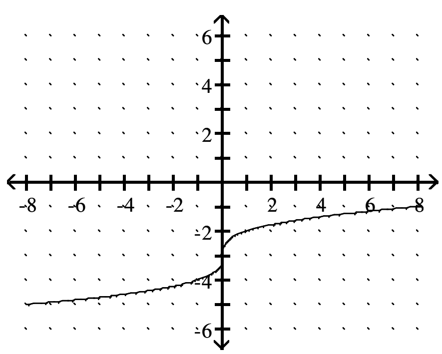


D)

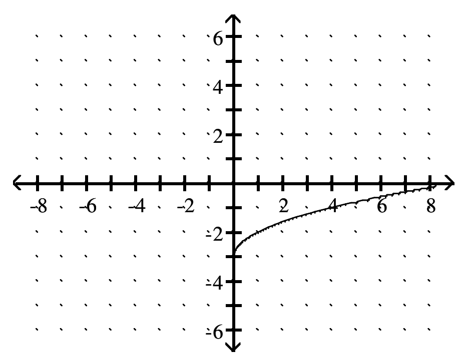


102) **Graph.** $y = \sqrt{x} - 3$ 102) _____

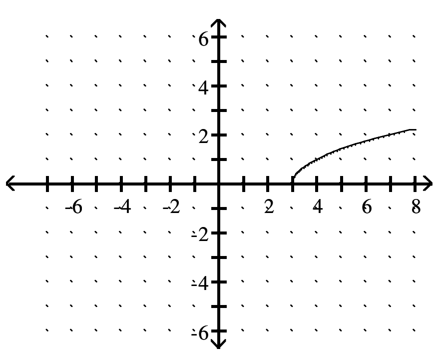
A)



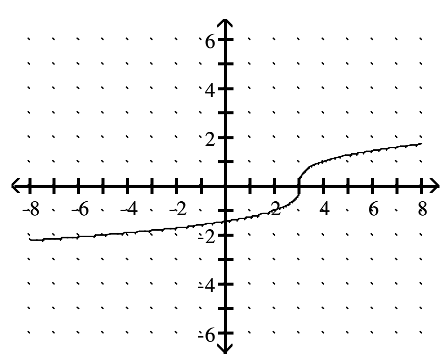
B)



C)

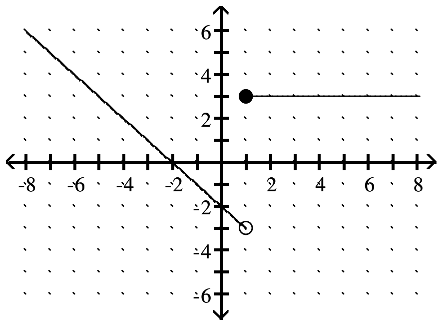


D)

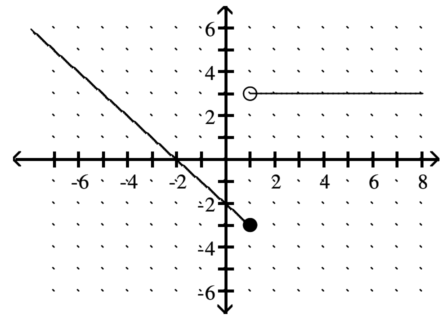


103) **Graph** $f(x) = \begin{cases} 3, & \text{if } x \geq 1 \\ -2 - x, & \text{if } x < 1 \end{cases}$ 103) _____

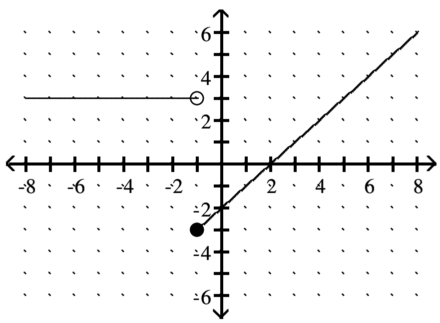
A)



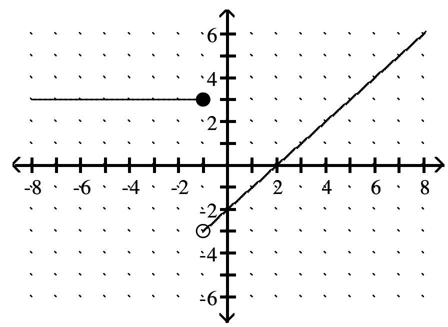
B)



C)

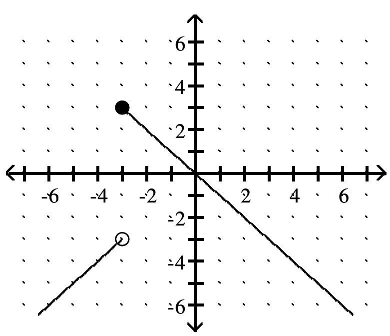


D)

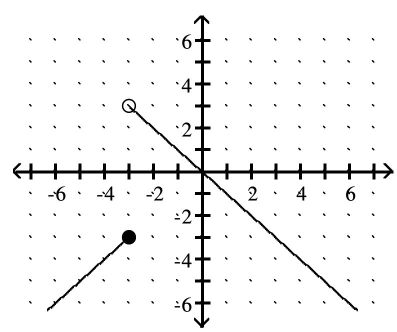


104) Graph $f(x) = \begin{cases} x, & \text{if } x \leq -3 \\ -x, & \text{if } x > -3 \end{cases}$ 104) _____

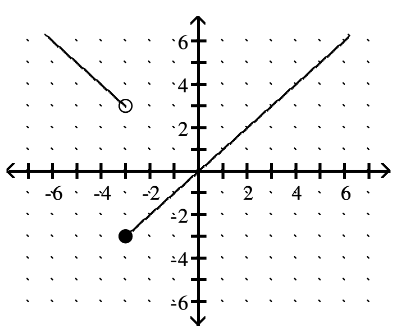
A)



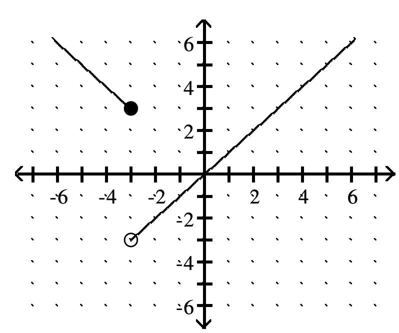
B)



C)



D)



105) **Evaluate** $f(-2)$ for 105) _____

$$f(x) = \begin{cases} 5x, \text{ if } x \le -1 \\ x - 7, \text{ if } x > -1 \end{cases}$$

A) -9 B) -5 C) -10 D) 10

106) **Evaluate** $f(5)$ for 106) _____

$$f(x) = \begin{cases} 4x + 4 & \text{if } x \le 0 \\ 4 - 4x & \text{if } 0 < x < 4 \\ x & \text{if } x \ge 4 \end{cases}$$

A) 4 B) 5 C) 24 D) -16

107) **Evaluate** $f(-3)$ for 107) _____

$$f(x) = \begin{cases} x^2 - 4x - 4, & \text{if } x \le -3 \\ x, & \text{if } x > -3 \end{cases}$$

A) 1 B) 25 C) -3 D) 17

108) For $f(x) = -|x - 4|$, find $f(5)$. 108) _____

A) -1 B) 4 C) 5 D) 1

109) Suppose S varies directly as the cubed root of T, and that S = 12 when T = 64. Find T when S = 9. 109) _____

A) 12 B) 64 C) 27 D) 3

110) Suppose x varies inversely as y squared, and x = 6 when y = 8. Find x when y = 4. 110) _____

A) 96 B) 2 C) 24 D) 72

111) If money is invested for 2 years , with interest compounded annually, the future value of the investment varies directly as the square of (1 + r), where r is the annual interest rate. If the future value of the investment is $4759.04 when the interest rate is 4%, what rate gives a future value of $4577.76? 111) _____

A) 0.02% B) 4% C) 2% D) 20%

112) Suppose a car rental company charges $116 for the first day and $66 for each additional or partial day. Let S(x) represent the cost of renting a car for x days. Find the value of S(3.5). 112) _____

A) $231 B) $281 C) $347 D) $314

113) The charges for renting a moving van are \$60 for the first 40 miles and \$5 for each additional mile. Assume that a fraction of a mile is rounded up. 113) _____
a. Determine the cost of driving the van 82 miles.
b. Find a symbolic representation for a function f that computes the cost of driving the van x miles, where $0 < x \leq 100$. (Hint: express f as a piecewise–constant function.)

A) a. \$270; b. $f(x) = \begin{cases} 60 & \text{if } 0 < x \leq 40 \\ 60 + 5(x + 40) & \text{if } 40 < x \leq 100 \end{cases}$

B) a. \$670; b. $f(x) = \begin{cases} 60 & \text{if } 0 < x \leq 40 \\ 60 + 5(x + 40) & \text{if } 40 < x \leq 100 \end{cases}$

C) a. \$270; b. $f(x) = \begin{cases} 60 & \text{if } 0 < x \leq 40 \\ 60 + 5(x - 40) & \text{if } 40 < x \leq 100 \end{cases}$

D) a. \$5130; b. $f(x) = \begin{cases} 60 & \text{if } 0 < x \leq 40 \\ 60x + 5(x - 40) & \text{if } 40 < x \leq 100 \end{cases}$

114) In Country X, the average hourly wage in dollars from 1960 to 2010 can be modeled by 114) _____

$$f(x) = \begin{cases} 0.079(x - 1960) + 0.35 & \text{if } 1960 \leq x < 1985 \\ 0.188(x - 1985) + 3.03 & \text{if } 1985 \leq x \leq 2010 \end{cases}$$

Use f to estimate the average hourly wages in 1965, 1985, and 2005.

A) \$3.43, \$0.35, \$6.79 B) \$0.75, \$3.03, \$6.79 C) \$0.75, \$2.33, \$6.79

115) The number of people present at a stadium holding a big rock concert can be estimated with the following function: $y = 13252x^{0.72} + 0.45x + 102$, where y is the number of people present and x is the amount of time after 3:00 P.M. on the day of the concert. Predict the number of people present at 7:00PM. 115) _____

A) 53,901 people B) 38,270 people C) 36,060 people D) 36,059 people

116) The number of mice in an old barn after the cats are removed can be roughly estimated with the following function: $y = 2.325x^{0.79} + 0.25x + 1$, where y is the number of mice and x is the number of weeks since a cat lived in the barn. Predict the number of mice there will be in ten weeks if you get rid of the cat in the barn. 116) _____

A) 22 mice B) 18 mice C) 15 mice D) 17 mice

117) A study in a small town showed that the percent of residents who have college degrees can be modeled by the function $P = 33x^{0.33}$, where x is the number of years since 2010. Use numerical or graphical methods to find when the model predicts that the percent will be 66. 117) _____

A) 2019 B) 2020 C) 2018 D) 2017

118) The number G of gears a machine can make varies directly as the time T it operates. If it can make 1980 gears in 7 hours, how many gears can it make in 3 hours? 118) _____

A) 1990 gears B) 0.0106 gears C) 282.86 gears D) 848.57 gears

119) The intensity of a radio signal from the radio station varies inversely as the square of the distance from the station. Suppose the the intensity is 8000 units at a distance of 2 miles. What will the intensity be at a distance of 6 miles? Round your answer to the nearest unit. 119) _____

A) 853 units B) 872 units C) 915 units D) 889 units

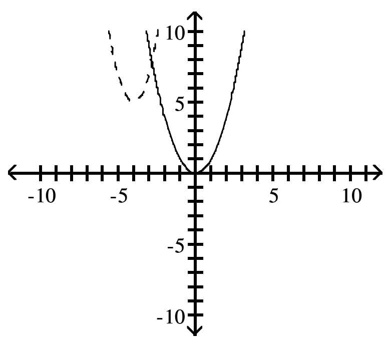
120) The weight that a horizontal beam can support varies inversely as the length of the beam. Suppose that a 5–m beam can support 350 kg. How many kilograms can a 10–m beam support? 120) _____

A) 0.1429 kg B) 0.0057 kg C) 7 kg D) 175 kg

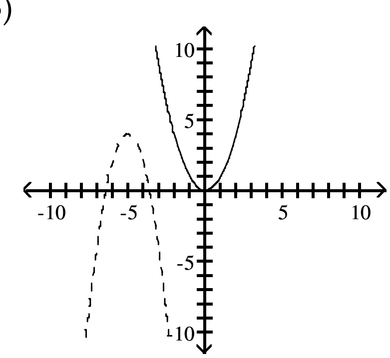
121) **Sketch the graph of the pair of functions. Use a dashed line for g(x).** 121) _____

$f(x) = x^2$, $g(x) = -2(x + 5)^2 + 4$

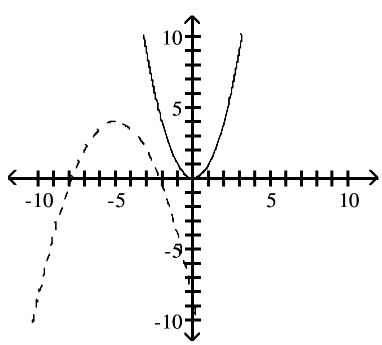
A)



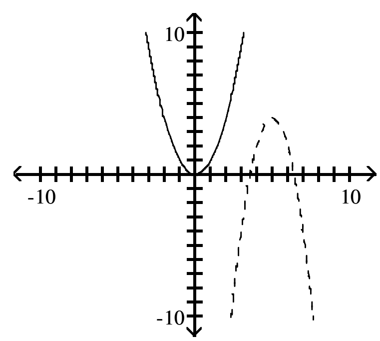
B)



C)



D)



122) The graph of $y = -5(x - 4)^2 + 8$ can be obtained from the graph of $y = x^2$ by : 122) _____

A) shifting horizontally 4 units to the right; vertically stretching by a factor of 5; reflecting across the x–axis, and shifting vertically 8 units in the upward direction.

B) shifting horizontally 4 units to the right; vertically stretching by a factor of 8; reflecting across the y–axis, and shifting vertically 5 units in thedownward direction.

C) shifting horizontally4 units to the left; vertically stretching by a factor of 5; reflecting across the x–axis, and shifting vertically 8 units in the upward direction.

D) shifting horizontally 4 units to the right; vertically stretching by a factor of 8; reflecting across the x–axis, and shifting vertically 5 units in the upward direction.

123) The graph of $y = -6(x + 2)^2 - 8$ can be obtained from the graph of $y = x^2$ by: 123) _____

A) shifting horizontally 2 units to the right; vertically stretching by a factor of 6; reflecting across the x–axis, and shifting vertically 8 units in the downward direction.

B) shifting horizontally 2 units to the right; vertically stretching by a factor of 6; reflecting across the x–axis, and shifting vertically 8 units in the upward direction.

C) shifting horizontally2 units to the left; vertically stretching by a factor of 8; reflecting across the x–axis, and shifting vertically 6 units in the downward direction.

D) shifting horizontally 2 units to the left; vertically stretching by a factor of 6; reflecting across the x–axis, and shifting vertically 8 units in the downward direction.

124) **Write the equation of the graph after the indicated transformation(s).** 124) _____

The graph of $y = x^2$ is shifted 8 units to the left and 10 units downward.

A) $y = (x - 8)^2 - 10$ B) $y = (x + 8)^2 - 10$

C) $y = (x + 10)^2 - 8$ D) $y = (x - 10)^2 + 8$

125) **Write the equation of the graph after the indicated transformation(s).** 125) _____

The graph of $y = x^2$ is shifted 3 units to the right. This graph is then vertically stretched by a factor of 5 and reflected across the x–axis. Finally, the graph is shifted 7 units upward.

A) $y = -5(x + 7)^2 + 3$ B) $y = -5(x + 3)^2 + 7$

C) $y = -5(x - 3)^2 + 7$ D) $y = -5(x - 3)^2 - 7$

126) **Write the equation of the graph after the indicated transformation(s).** 126) _____

The year y when sales were s million dollars for a particular electronics company can be modeled by the radical equation $y = 1.2\sqrt{s - 2} - 7$, where y = 1 represents 2010, and so on. Use the model to predict the sales for 2015 to the nearest tenth of a million.

A) \$121.4 million B) \$120.4 million C) \$119.4 million D) \$118.4 million

127) $f(x) = 4x - 6$, $g(x) = 2x - 9$ Find $(f - g)(x)$. 127) _____

A) $2x - 15$ B) $2x + 3$ C) $-2x - 3$ D) $6x - 15$

128) $f(x) = 9x - 1$, $g(x) = 6x - 5$ Find $(f \cdot g)(x)$. 128) _____

A) $15x^2 - 51x - 6$ B) $54x^2 + 5$ C) $54x^2 - 11x + 5$ D) $54x^2 - 51x + 5$

129) $f(x) = 8x^2 - 9x$, $g(x) = x^2 - 6x - 27$ Find $\left(\frac{f}{g}\right)(x)$. 129) _____

A) $\frac{8x}{x+1}$ B) $\frac{8-x}{27}$ C) $\frac{8x^2 - 9x}{x^2 - 6x - 27}$ D) $\frac{8x - 9}{-6}$

130) $f(x) = \frac{7x - 5}{5}$, $g(x) = \frac{1}{x}$ Find $(f - g)(x)$. 130) _____

A) $\frac{7x^2 - 5x - 1}{5x}$ B) $\frac{7x^2 - 5x - 5}{5x}$ C) $\frac{7x - 5}{5 - x}$ D) $\frac{7x^2 - 5x + 5}{5x}$

131) For $f(x) = 5x - 9$ and $g(x) = \sqrt{x + 7}$, what is the domain of $\left(\frac{f}{g}\right)(x)$? 131) _____

A) $[7, \infty)$ B) $[0, \infty)$ C) $(-7, 7)$ D) $(-7, \infty)$

132) For $f(x) = \sqrt{x - 4}$ and $g(x) = x - 7$, what is the domain of f/g ? 132) _____

A) $[4, 7) \cup (7, \infty)$ B) $(4, 7) \cup (7, \infty)$ C) $[4, \infty)$ D) $[0, 7) \cup (7, \infty)$

133) If $f(x) = x + 3$ and $g(x) = 2x^2 + 12x + 4$, evaluate $(f \cdot g)(-2)$. 133) _____

A) -60 B) 60 C) -12 D) -16

134) Given $f(x) = -5x + 6$ and $g(x) = 6x + 9$, find $(g \circ f)(x)$. 134) _____

A) $30x + 45$ B) $-30x - 27$ C) $-30x + 51$ D) $-30x + 45$

135) Given $f(x) = |15 - x|$ and $g(x) = 3x + 8$, find $(f \circ g)(x)$. 135) _____

A) $|23 - 3x|$ B) $|7 + 3x|$ C) $|7 - 3x|$ D) $3|15 - x| + 8$

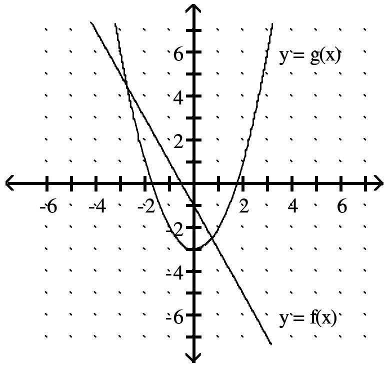
136) Find $(g \circ f)(-17)$ when $f(x) = \frac{x - 7}{4}$ and $g(x) = 2x + 3$. 136) _____

A) $-\frac{19}{2}$ B) 186 C) -9 D) -30

137) Find $(f \circ g)(-3)$ when $f(x) = 6x + 4$ and $g(x) = -5x^2 - 5x - 1$. 137) _____

A) -911 B) 178 C) 139 D) -182

138) **Evaluate** $(f \circ g)(-2)$. 138) _____



A) 0 B) -3 C) 3 D) 4

139) The monthly total cost of producing clock radios is given by $C(x) = 36{,}000 + 23x$, where x is the number of radios produced per month. Find the monthly average cost function. 139) _____

A) $\overline{C}(x) = \dfrac{36{,}000 + 23x}{x}$ B) $\overline{C}(x) = \dfrac{36{,}000 + 23}{x}$

C) $\overline{C}(x) = \dfrac{x}{36{,}000 + 23x}$ D) $\overline{C}(x) = x(36{,}000 + 23x)$

140) Let $C(x) = 100 + 30x$ be the cost to manufacture x items. Find the average cost per item to produce 80 items. 140) _____

A) \$347 B) \$480 C) \$31 D) \$49

141) At Allied Electronics, production has begun on the X–15 Computer Chip. The total revenue function is given by $R(x) = 56x - 0.3x^2$ and the total cost function is given by $C(x) = 3x + 14$, where x represents the number of boxes of computer chips produced. The total profit function, P(x), is such that $P(x) = R(x) - C(x)$. Find P(x). 141) _____

A) $P(x) = 0.3x^2 + 50x - 42$ B) $P(x) = -0.3x^2 + 53x - 14$

C) $P(x) = 0.3x^2 + 53x - 28$ D) $P(x) = -0.3x^2 + 50x + 14$

142) The cost of manufacturing clocks is given by $C(x) = 46 + 41x - x^2$. Also, it is known that in t hours the number of clocks that can be produced is given by $x = 10t$, where $1 \le t \le 12$. Express C as a function of t. 142) _____

A) $C(t) = 46 + 410t - 100t$ B) $C(t) = 46 + 410t - 100t^2$

C) $C(t) = 46 + 41t + t^2$ D) $C(t) = 46 + 41t - 10$

143) **Find the inverse of the function.** $f(x) = 5x - 3$ 143) _____

A) $f^{-1}(x) = \dfrac{x + 3}{5}$ B) $f^{-1}(x) = \dfrac{x - 3}{5}$

C) $f^{-1}(x) = \dfrac{x}{5} + 3$ D) Not a one–to–one function

144) **Find the inverse of the function.** $f(x) = -9 - 2x$ 144) _____

A) $f^{-1}(x) = -7 - x$

B) $f^{-1}(x) = \frac{9}{2} - \frac{x}{2}$

C) $f^{-1}(x) = -\frac{9}{2} + \frac{x}{2}$

D) $f^{-1}(x) = -\frac{9}{2} - \frac{x}{2}$

145) **Find the inverse of the function.** $f(x) = \frac{8}{x + 7}$ 145) _____

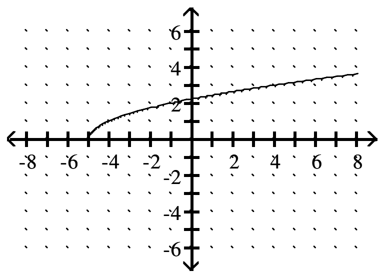
A) Not a one-to-one function

B) $f^{-1}(x) = \frac{7 + 8x}{x}$

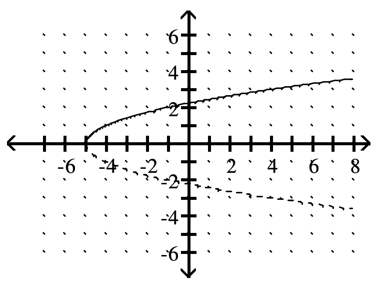
C) $f^{-1}(x) = \frac{x}{7 + 8x}$

D) $f^{-1}(x) = \frac{-7x + 8}{x}$

146) **The graph of the function y = f(x) is given. On the same axes, sketch the graph of $f^{-1}(x)$. Use a dashed line for the inverse function.** 146) _____



A)



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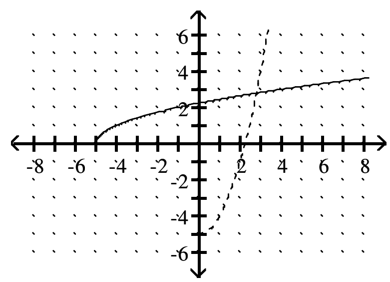
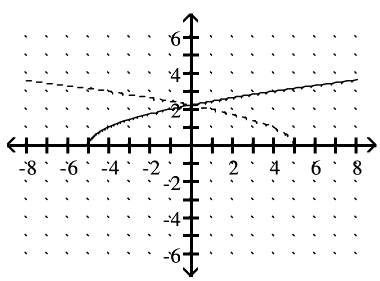
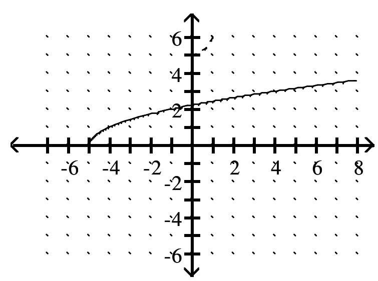


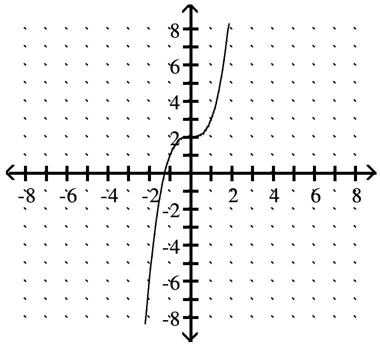
C)



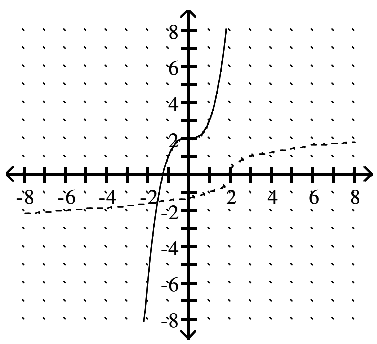
D)



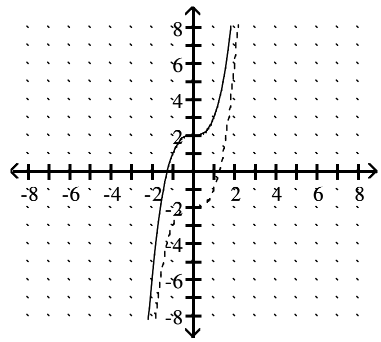
147) **The graph of the function y = f(x) is given. On the same axes, sketch the graph of $f^{-1}(x)$. Use a dashed line for the inverse function.** 147) _____



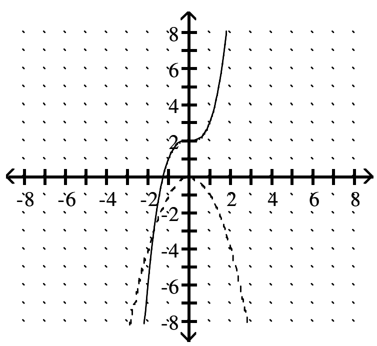
A)



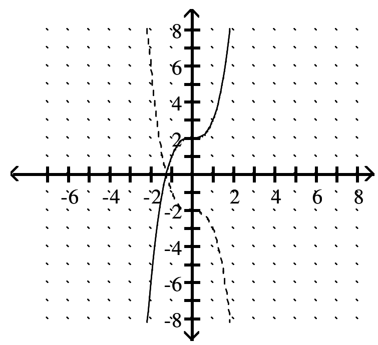
B)



C)



D)



148) Let $f(x) = \left(\frac{1}{5}\right)^x$. Find f(–3). 148) _____

A) –15 B) $-\frac{1}{125}$ C) $\frac{1}{125}$ D) 125

149) Let $f(x) = 3^{(1-x)}$. Find f(4). 149) _____

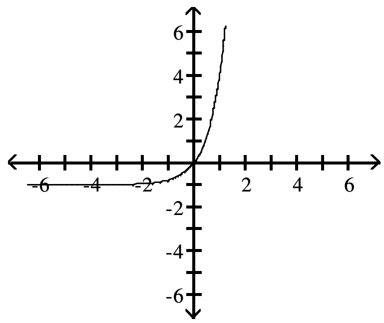
A) –9 B) 27 C) $\frac{1}{27}$ D) $\frac{1}{9}$

150) Let $f(x) = 2.8e^{-2.3x}$. Find f(0.8), rounded to four decimal places. 150) _____

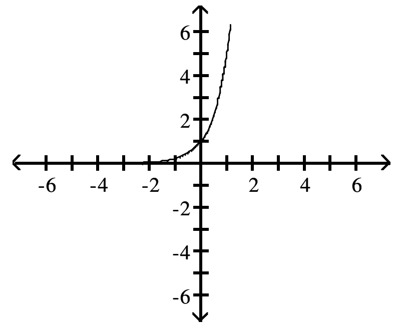
A) 17.6303 B) –0.4447 C) –17.6303 D) 0.4447

151) **Graph.** $f(x) = 5^{(x - 1)}$ 151) _____

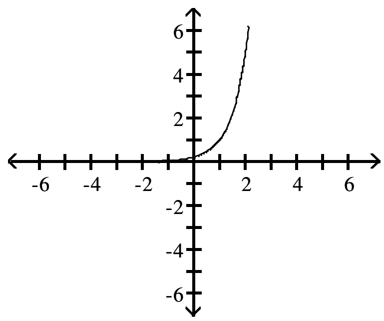
A)



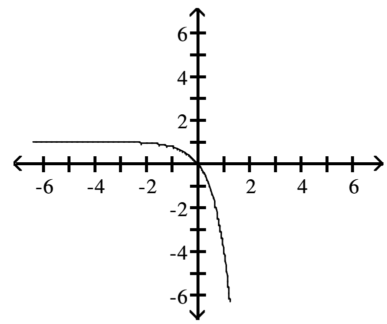
B)



C)

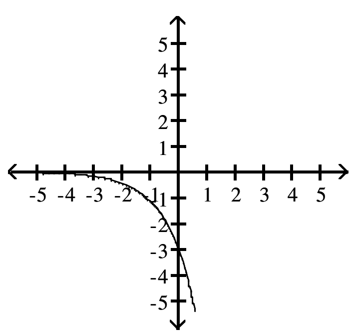


D)

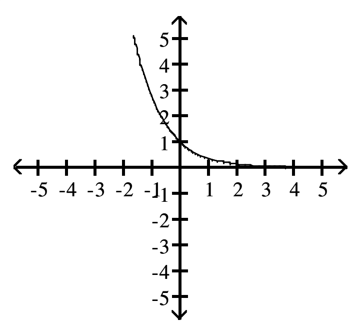


152) **Graph.** $f(x) = 3e^{-x}$ 152) _____

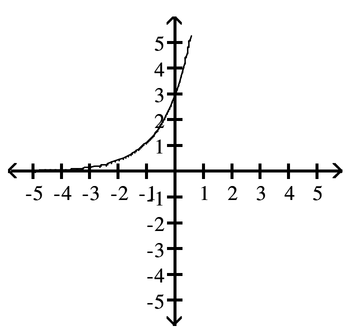
A)



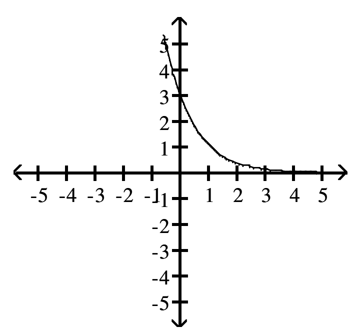
B)



C)



D)



153) In September 1998 the population of the country of West Goma in millions was modeled by $f(x) = 17.9e^{0.0011x}$. At the same time the population of East Goma in millions was modeled by $g(x) = 14.2e^{0.0185x}$. In both formulas x is the year, where $x = 0$ corresponds to September 1998. Assuming these trends continue, estimate the year when the population of West Goma will equal the population of East Goma. 153) _____

A) 2010 B) 2011 C) 1985 D) 13

154) In September 1998 the population of the country of West Goma in millions was modeled by $f(x) = 16.1e^{0.0019x}$. At the same time the population of East Goma in millions was modeled by $g(x) = 14.7e^{0.0123x}$. In both formulas x is the year, where $x = 0$ corresponds to September 1998. Assuming these trends continue, estimate what the population will be when the populations are equal. 154) _____

A) 1 million B) 14 million C) 15 million D) 16 million

155) The growth in the population of a certain rodent at a dump site fits the exponential function $A(t)= 708e^{0.024t}$, where t is the number of years since 1988. Estimate the population in the year 2000. 155) _____

A) 725 B) 967 C) 944 D) 472

156) A computer is purchased for $4500. Its value each year is about 77% of the value the preceding year. Its value, in dollars, after t years is given by the exponential function $V(t) = 4500(0.77)^t$. Find the value of the computer after 8 years. 156) _____

A) $428.18 B) $329.70 C) $27,720.00 D) $556.08

157) **Write the logarithmic equation in exponential form.** $\log_w Q = 7$ 157) _____

A) $Q^7 = w$ B) $w^7 = Q$ C) $7^w = Q$ D) $Q^w = 7$

158) **Write the logarithmic equation in exponential form.** $y = \log(11x)$ 158) _____

A) $y^{10} = 11x$ B) $11x^{y} = 10$ C) $10^{y} = 11x$ D) $10^{11x} = y$

159) **Write the logarithmic equation in exponential form.** $4y = \ln(-5x)$ 159) _____

A) $-5x^{4y} = e$ B) $e^{4y} = -5x$ C) $e^y = -\frac{5}{4}x$ D) $e^{-5x} = 4y$

160) **Write in logarithmic form.** $p = 18^t$ 160) _____

A) $\log_{18} p = t$ B) $\log_p 18 = t$ C) $\log_t 18 = p$ D) $\log_{18} t = p$

161) **Write in logarithmic form.** $8^{3x} = y$ 161) _____

A) $\log_8 y = 3x$ B) $\log_y 8 = 3x$ C) $\log_y 3x = 8$ D) $\log_8 3x = y$

162) **Evaluate. Round the answer to four decimal places.** $\log 3767$ 162) _____

A) 3.5760 B) 3.5771 C) 8.2340 D) 3.5748

163) **Evaluate. Round the answer to four decimal places.** $\ln 0.980$ 163) _____

A) 0.0202 B) −0.0202 C) 0.0088 D) −0.0088

164) **Evaluate. Round the answer to four decimal places.** $\log (-3)$ 164) _____

A) 1.0986 B) 0.4771 C) 0.3817 D) Does not exist

165) **Evaluate.** $\log_9 1$ 165) _____

A) 10 B) 0 C) 9 D) 1

166) **Evaluate.** $\log_9 \frac{1}{81}$ 166) _____

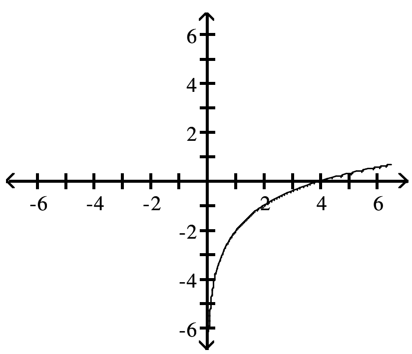
A) −2 B) 9 C) 2 D) −9

167) **Evaluate.** $\log_9 \frac{1}{729}$ 167) _____

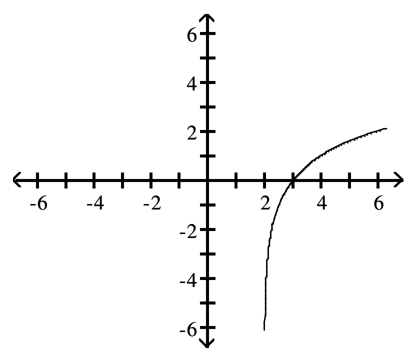
A) 3 B) −3 C) −81 D) 81

168) **Graph.** $f(x) = \log_2 (x - 2)$ 168) _____

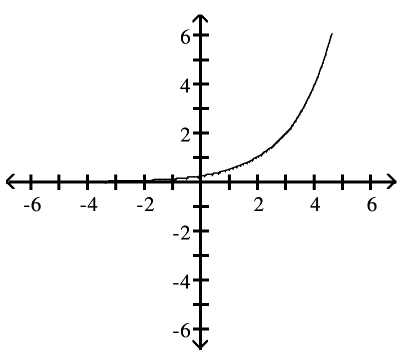
A)



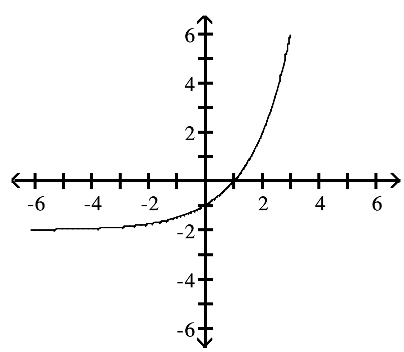
B)



C)



D)



169) **Find the inverse of the function.** $f(x) = 9^x + 3$ 169) _____

A) $f^{-1}(x) = \log_9(x - 3)$
B) $f^{-1}(x) = \log_9(x + 3)$
C) $f^{-1}(x) = \log_9(x + 9)$
D) $f^{-1}(x) = \log_9(x - 9)$

170) **Use the properties of logarithms to evaluate the expression.** $\log_a a^3$ 170) _____

A) $3\log_a a$
B) 3
C) 1
D) a^3

171) **Use the properties of logarithms to evaluate the expression.** $\ln e^6$ 171) _____

A) 1
B) 6 ln e
C) 6
D) e^6

172) The sales of a new product (in items per month) can be approximated by $S(x) = 275 + 100 \log(3t + 1)$, where t represents the number of months after the item first becomes available. Find the number of items sold per month 3 months after the item first becomes available. 172) _____

A) 375 items per month
B) 2275 items per month
C) 1275 items per month
D) 475 items per month

173) Coyotes are one of the few species of North American animals with an expanding range. The future population of coyotes in a region of Mississippi can be modeled by the equation $P = 56 + 18 \ln(11t + 1)$, where t is time in years. Use the equation to determine when the population will reach 160. Round to the nearest tenth when necessary. 173) _____

A) 29.6 years
B) 29.3 years
C) 54,498.5 years
D) 29.5 years

174) **Solve.** Round to three decimal places. $3^x = 23$ 174) _____

A) 2.037
B) 7.667
C) 2.854
D) 0.350

175) **Solve.** Round to three decimal places. $5^{(3x - 3)} = 20$ 175) _____

A) 1.620
B) 1.462
C) 2.333
D) -0.380

176) **Solve.** Round to three decimal places. $5^{(9 - 3x)} = 125$ 176) _____

A) 3
B) 25
C) 2
D) -2

177) **Evaluate.** Approximate to three decimal places. $\log_6 (95.63)$ 177) _____

A) 15.938
B) 2.545
C) 1.981
D) 0.393

178) **Solve. Give an exact solution.** $\log_3 x = -2$ 178) _____

A) $\frac{1}{8}$
B) 1
C) $\frac{1}{9}$
D) -6

179) **Solve.** $292 + 12 \log x = 160$ 179) _____

A) -10^{11} B) -110 C) 10^{-11} D) no solution

180) **Solve.** $\log(x + 18) = 2$ 180) _____

A) 100 B) 18 C) 2 D) 82

181) **Determine a window which gives a complete graph of the polynomial function.** 181) _____

$f(x) = 2x^4 + 2x^3 - 4x^2 - 3x - 6$

A) [−3, 3] by [−3, 4] B) [−3, 3] by [−10, 5]

C) [−5, 5] by [−2, 1] D) [−2, 2] by [−10, −5]

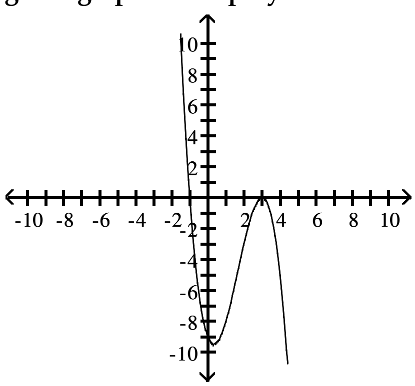
182) **Determine a window which gives a complete graph of the polynomial function.** 182) _____

$f(x) = 3x^3 - 26x^2 + 18x - 47$

A) [−10, 10] by [−150, 150] B) [−3, 10] by [−400, 100]

C) [−5, 5] by [−500, 100] D) [−8, 10] by [−100, 300]

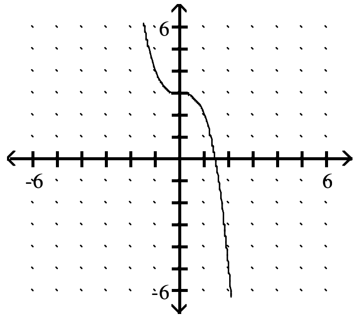
183) **Use the given graph of the polynomial function to estimate the x–intercepts.** 183) _____



A) (−9, 0), (−1, 0) B) (−9, 0), (3, 0)

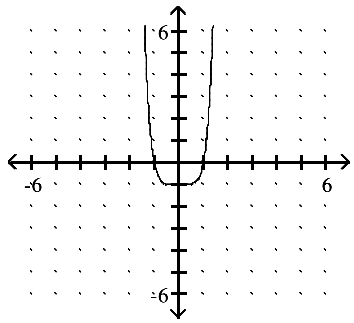
C) (−1, 0), (3, 0) D) (−9, 0), (−1, 0), (3, 0)

184) **Use the given graph of the polynomial function to state whether the leading coefficient is positive or negative and whether the polynomial function is cubic or quartic.** 184) _____



A) Negative; Quartic
B) Negative; Cubic
C) Positive; Quartic
D) Positive; Cubic

185) **Use the given graph of the polynomial function to state whether the leading coefficient is positive or negative and whether the polynomial function is cubic or quartic.** 185) _____



A) Positive; Quartic
B) Negative; Cubic
C) Positive; Cubic
D) Negative; Quartic

186) **State the degree and leading coefficient of the polynomial function.** 186) _____

$f(x) = 8(x + 3)(x^8 - 3)$

A) Degree: 8; leading coefficient: 1
B) Degree: 8; leading coefficient: 8
C) Degree: 9; leading coefficient: 8
D) Degree: 9; leading coefficient: –8

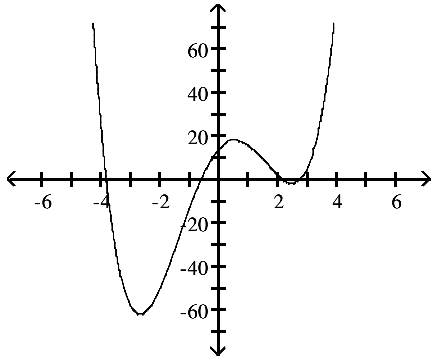
187) **State the degree and leading coefficient of the polynomial function.** 187) _____

$f(x) = 8(x + 2)^2(x - 2)^2$

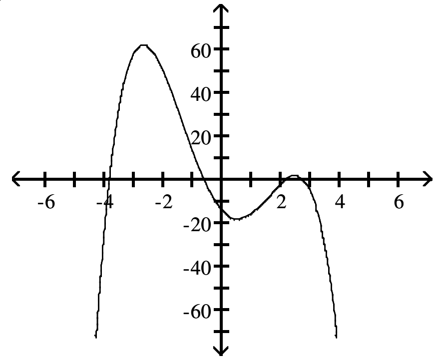
A) Degree: 2; leading coefficient: 8
B) Degree: 2; leading coefficient: 1
C) Degree: 4; leading coefficient: 8
D) Degree: 4; leading coefficient: 1

188) **Graph.** $y = -x^4 + 0.5x^3 + 13.5x^2 - 15x - 14$ 188) _____

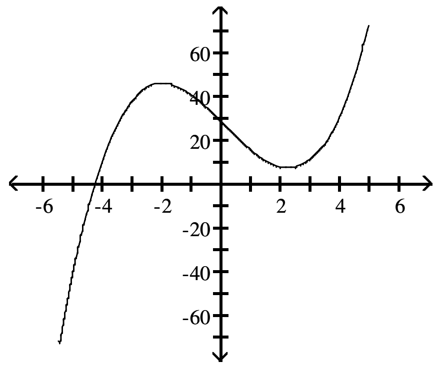
A)



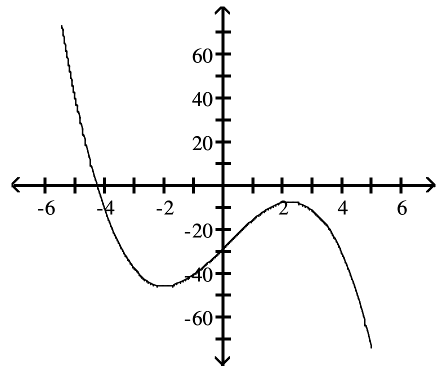
B)



C)



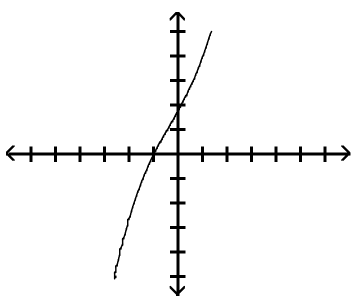
D)



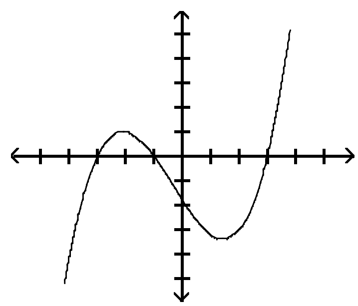
189) **Choose the graph that satisfies the given conditions.** 189) _____

Polynomial of degree 3 with three distinct x–intercepts and a positive leading coefficient

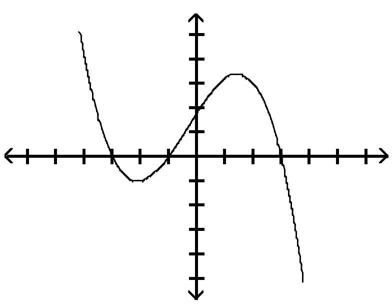
A)



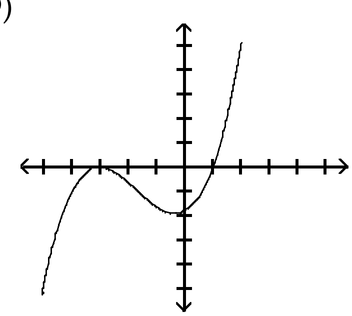
B)



C)



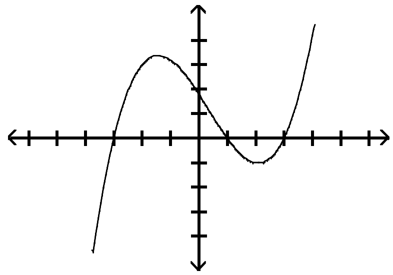
D)



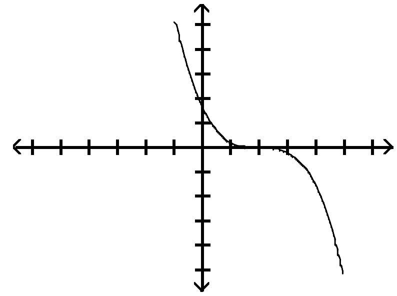
190) **Choose the graph that satisfies the given conditions.** 190) _____

Cubic polynomial with two distinct x–intercepts and a positive leading coefficient

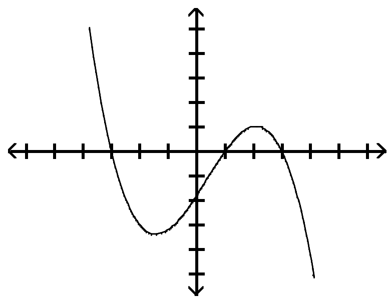
A)



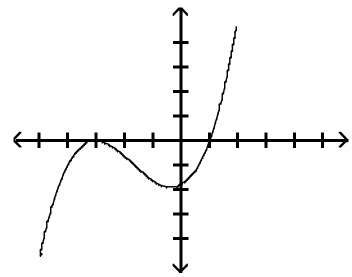
B)



C)



D)



191) **Use a graphing calculator to estimate the local maximum and local minimum values of the function to the nearest hundredth.** 191) _____

$y = 3x^3 - 4x^2 - 6x + 2$

A) Local max: (–0.48, 3.63); local min: (1.38, –6.01)

B) Local max: (–6.01, 1.38); local min: (3.63, –0.48)

C) Local max: (–0.48, 3.68); local min: (1.38, –6.15)

D) Local max: (–0.44, 3.61); local min: (1.45, –5.97)

192) The polynomial $R(x) = -0.035x^5 + 3.785x^4 + 200$ approximates the shark population in a particular area, where x is the number of years from 1985. Use a graphing calculator to describe the shark population from the years 1985 to 2010. 192) _____

A) The population increases.

B) The population remains stable.

C) The population decreases.

D) Not enough information.

193) Ariel, a marine biologist, models a population P of crabs, t days after being left to reproduce, with the function $P(t) = -0.00009t^3 + 0.024t^2 + 10.5t + 1800$. Assuming that this model continues to be accurate, when will this population become extinct? (Round to the nearest day.) 193) _____

A) 1512 days

B) 547 days

C) 707 days

D) 911 days

194) **Solve.** $(3x + 2)(x - 4)^2(x + 5) = 0$ 194) _____

A) $-2, 16, -5$ B) $-\frac{2}{3}, -4, 4, -5$ C) $\frac{2}{3}, -4, 5$ D) $-\frac{2}{3}, 4, -5$

195) **Solve.** $(2x + 7)^2(6 - x)^2 = 0$ 195) _____

A) $\frac{7}{2}, -6$ B) $-7, 6$ C) $-\frac{7}{2}, 6$ D) $-\frac{7}{2}, \frac{7}{2}, -6, 6$

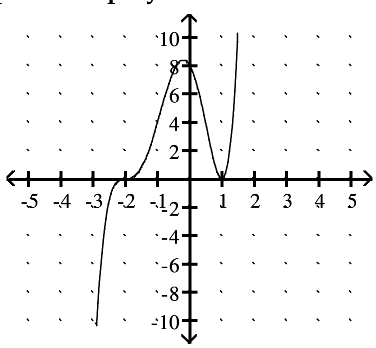
196) **Solve.** $x^3 - 8x^2 + 11x + 20 = 0$ 196) _____

A) 5, 6, –1 B) –5, –6, 1 C) 4, 5, –1 D) –4, –5, 0

197) **Solve.** $x^4 - 12x^2 + 36 = 0$ 197) _____

A) 6 B) $-\sqrt{6}, \sqrt{6}$ C) $\sqrt{6}$ D) –6, 6

198) **Use the graph of the polynomial function f(x) to solve f(x) = 0.** 198) _____



A) –2, 0, 1 B) –1, 2 C) –2, 1, 8 D) –2, 1

199) If the price for a product is given by $p = 1600 - x^2$, where x is the number of units sold, then the revenue is given by $R = px = 1600x - x^3$. How many units must be sold to give zero revenue? 199) _____

A) 0, 40 B) 1600 C) 0, 1600 D) 0

200) The Cool Company determines that the supply function for its basic air conditioning unit is $S(p) = 50 + 0.01p^3$ and that its demand function is $D(p) = 250 - 0.2p^2$, where p is the price. Determine the price for which the supply equals the demand. 200) _____

A) \$21.36 B) \$21.86 C) \$22.36 D) \$22.86

Answer Key
Testname: MATH 1015 FE REVIEW REV SP18

1) C	43) A	85) D	127) B	169) A
2) C	44) D	86) A	128) D	170) B
3) B	45) D	87) D	129) C	171) C
4) C	46) D	88) B	130) B	172) A
5) A	47) B	89) D	131) D	173) B
6) C	48) A	90) C	132) A	174) C
7) D	49) B	91) D	133) C	175) A
8) B	50) C	92) C	134) D	176) C
9) A	51) B	93) B	135) C	177) B
10) A	52) A	94) D	136) C	178) C
11) D	53) B	95) C	137) D	179) C
12) D	54) C	96) C	138) B	180) D
13) B	55) A	97) C	139) A	181) B
14) D	56) C	98) C	140) C	182) B
15) A	57) D	99) D	141) B	183) C
16) C	58) D	100) B	142) B	184) B
17) D	59) D	101) B	143) A	185) A
18) B	60) B	102) B	144) D	186) C
19) C	61) C	103) A	145) D	187) C
20) A	62) B	104) B	146) B	188) B
21) D	63) B	105) C	147) A	189) B
22) D	64) C	106) B	148) D	190) D
23) D	65) B	107) D	149) C	191) A
24) B	66) C	108) A	150) D	192) A
25) A	67) B	109) C	151) C	193) B
26) D	68) A	110) C	152) D	194) D
27) B	69) D	111) C	153) B	195) C
28) B	70) C	112) D	154) D	196) C
29) C	71) B	113) C	155) C	197) B
30) C	72) D	114) B	156) D	198) D
31) D	73) C	115) D	157) B	199) A
32) D	74) B	116) B	158) C	200) B
33) B	75) A	117) C	159) B	
34) B	76) A	118) D	160) A	
35) A	77) B	119) D	161) A	
36) B	78) A	120) D	162) A	
37) C	79) D	121) B	163) B	
38) B	80) C	122) A	164) D	
39) D	81) A	123) D	165) B	
40) D	82) C	124) B	166) A	
41) C	83) D	125) C	167) B	
42) B	84) A	126) C	168) B	