# *College Algebra in Context 5th edition Harshbarger Test Bank*

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**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Solve the equation.**

1) $24x - 2 = 6$

A) $\frac{1}{3}$

B) $-\frac{1}{3}$

C) $\frac{7}{24}$

D) $\frac{1}{6}$

Answer: A

2) $21s + 40 = -4s$

A) $\frac{40}{17}$

B) $\frac{5}{8}$

C) $-\frac{8}{5}$

D) $\frac{8}{5}$

Answer: C

3) $19t - 47 = 7t - 15$

A) $-\frac{19}{62}$

B) $\frac{8}{3}$

C) $-\frac{13}{22}$

D) $-\frac{8}{3}$

Answer: B

4) $(y - 7) - (y + 2) = 4y$

A) $-\frac{9}{5}$

B) $-\frac{9}{7}$

C) $-\frac{9}{4}$

D) $-\frac{1}{2}$

Answer: C



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5) $13(7c - 4) = 5c - 8$

A) $\frac{11}{48}$

B) $\frac{22}{43}$

C) $-\frac{22}{43}$

D) $\frac{60}{43}$

Answer: B

6) $4(y + 4) = 5(y - 6)$

A) −46

B) −14

C) 14

D) 46

Answer: D

7) $3(2z - 3) = 5(z + 4)$

A) 14

B) 11

C) −11

D) 29

Answer: D

8) $-3x + 4(-2x - 7) = -31 - 8x$

A) −1

B) $\frac{59}{19}$

C) 1

D) $\frac{59}{3}$

Answer: C

9) $9x - (4x - 1) = 2$

A) $-\frac{1}{13}$

B) $\frac{1}{13}$

C) $\frac{1}{5}$

D) $-\frac{1}{5}$

Answer: C



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10) $6(3x - 1) = 24$

A) $\frac{5}{3}$

B) 1

C) $\frac{23}{18}$

D) $\frac{25}{18}$

Answer: A

11) $\frac{r + 6}{5} = \frac{r + 8}{7}$

A) –2
B) –1
C) 2
D) 1

Answer: B

12) $\frac{6x + 7}{7} + \frac{3}{7} = -\frac{4x}{7}$

A) $-\frac{2}{5}$

B) – 1
C) – 5
D) $\frac{2}{5}$

Answer: B

13) $\frac{1}{5}(r + 6) = \frac{1}{7}(r + 8)$

A) –2
B) –1
C) 1
D) 2

Answer: B

14) $\frac{2}{5}x - \frac{1}{3}x = 5$

A) –150
B) 75
C) –75
D) 150

Answer: B



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15) $-\frac{1}{2}(x-6)-\frac{1}{3}(x-3)=x+1$

A) $\frac{6}{11}$

B) $\frac{18}{11}$

C) $-\frac{30}{11}$

D) $-\frac{18}{11}$

Answer: B

16) $\frac{1}{2}y-(y-\frac{1}{2})=\frac{1}{32}(y+5)$

A) $\frac{11}{15}$

B) $-\frac{21}{17}$

C) $-\frac{11}{47}$

D) $\frac{11}{17}$

Answer: D

17) $\frac{1}{3}(9x-15)=\frac{1}{2}(10x-6)$

A) $\frac{1}{15}$

B) –15

C) 1

D) –1

Answer: D

18) $-11.2q=-116.4-1.5q$

A) 12

B) 10.5

C) 10.4

D) –126

Answer: A

19) $-7.6q+1.4=-41.3-1.5q$

A) 5.6

B) 7

C) –49

D) 5.8

Answer: B



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20) $-4.6 = y + 8$

A) 12.6

B) 3.4

C) −12.6

D) −3.4

Answer: C

**Find the zero of f(x).**

21) $f(x) = \frac{1}{5}x + \frac{1}{10}$

A) $-\frac{1}{2}$

B) $\frac{1}{10}$

C) $-\frac{1}{10}$

D) $\frac{1}{2}$

Answer: A

22) $f(x) = 6x + 12$

A) 2

B) −2

C) −12

D) 12

Answer: B

23) $f(x) = \frac{1}{6}x$

A) 6

B) −6

C) does not exist

D) 0

Answer: D

24) $f(x) = 9x$

A) 9

B) 0

C) does not exist

D) −9

Answer: B



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**You are given a table showing input and output values for a given function $y_1 = f(x)$. Use the table to answer the question.**

25) What is the y–intercept of the graph of y = f(x)?

| X | Y1 |
|---|---|
| 0.000 | 5.00 |
| 1.00 | 9.00 |
| -2.00 | -3.00 |
| 2.00 | 13.00 |

X=0

A) 0
B) –3
C) 5
D) 1

Answer: C

26) What is the x–intercept of the graph of y = f(x)?

| X | Y1 |
|---|---|
| 2.000 | -2.00 |
| 6.00 | 0.00 |
| -2.00 | -4.00 |
| 4.00 | -1.00 |

X=2

A) 0
B) –1
C) –2
D) 6

Answer: D

27) What is the y–intercept of the graph of y = f(x)?

| X | Y1 |
|---|---|
| 0.000 | 7.00 |
| 1.00 | 10.00 |
| 2.00 | 13.00 |
| 3.00 | 16.00 |
| 4.00 | 19.00 |
| 5.00 | 22.00 |

X=0

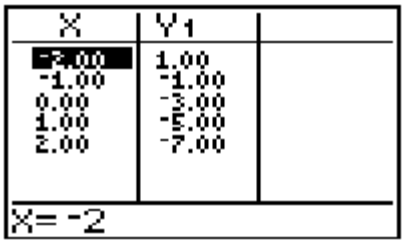
A) 10
B) 7
C) 0
D) 1

Answer: B



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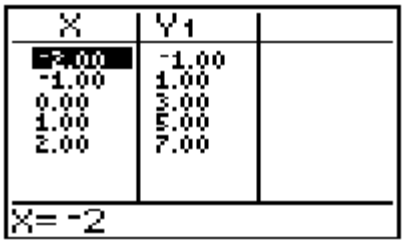
28) What is the y–intercept of the graph of y = f(x)?




A) 1
B) 0
C) –3
D) 3

Answer: C

29) What is the y–intercept of the graph of y = f(x)?




A) 0
B) 3
C) –3
D) –1

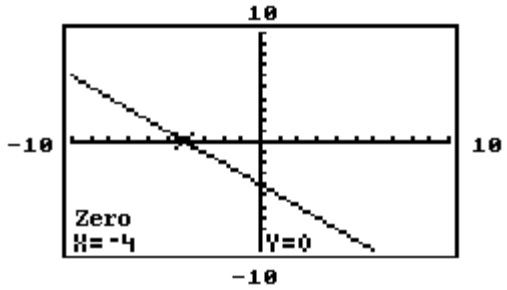
Answer: B



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**The graph of a certain function y = f(x) and the zero of that function is given. Using this graph, find a) the x–intercept of the graph of y = f(x) and b) the solution to the equation f(x) = 0.**

30)




A) a. 0
b. x = –4

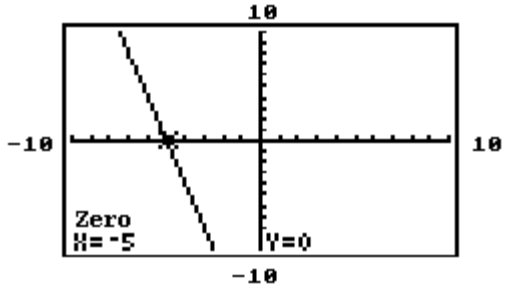
B) a. –5
b. x = –5

C) a. –4
b. x = –4

D) a. –4
b. x = 0

Answer: C

31)




A) a. 0
b. x = –5

B) a. –5
b. x = 0

C) a. –5
b. x = –5

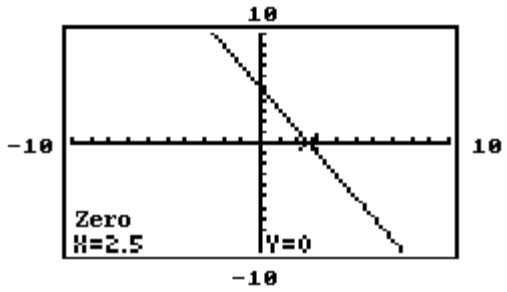
D) a. –6
b. x = –6

Answer: C



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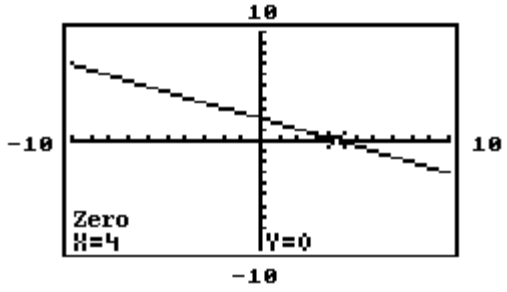
32)




A) a. 0
b. x = 2.5
B) a. –2.5
b. x = –2.5
C) a. 2.5
b. x = 2.5
D) a. 2.5
b. x = 0

Answer: C

33)



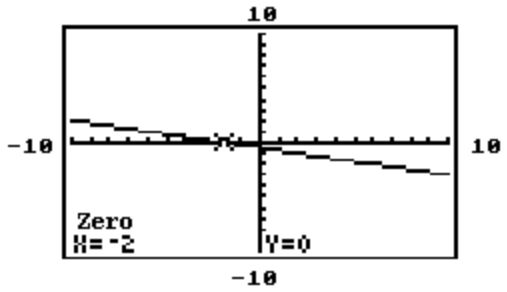

A) a. 5
b. x = 5
B) a. 4
b. x = 4
C) a. 4
b. x = 0
D) a. 0
b. x = 4

Answer: B



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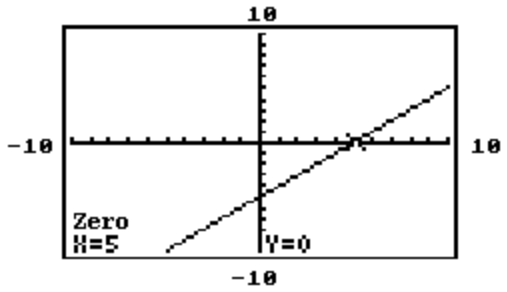
34)




A) a. 0
b. x = –2
B) a. –2
b. x = –2
C) a. –2
b. x = 0
D) a. –1
b. x = –1

Answer: B

35)



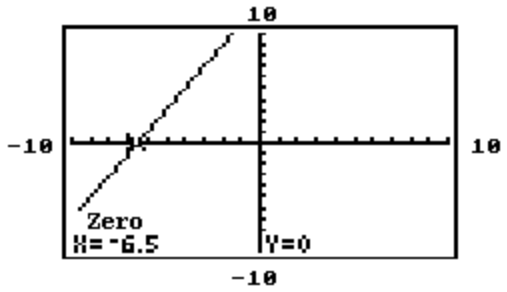

A) a. 0
b. x = 5
B) a. 5
b. x = 5
C) a. 5
b. x = 0
D) a. –5
b. x = –5

Answer: B



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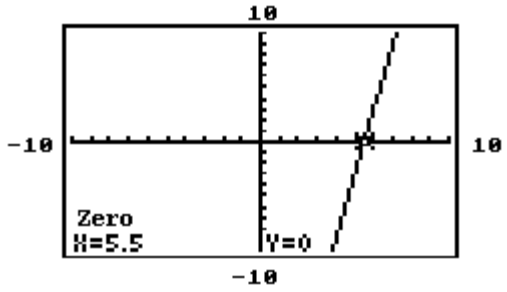
36)




A) a. 6.5
b. x = 6.5
B) a. –6.5
b. x = 0
C) a. –6.5
b. x = –6.5
D) a. 0
b. x = –6.5

Answer: C

37)



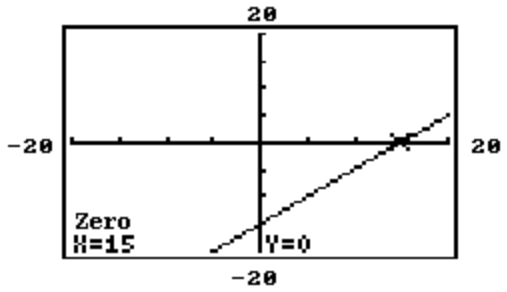

A) a. 5.5
b. x = 5.5
B) a. 5.5
b. x = 0
C) a. 5
b. x = 5
D) a. 0
b. x = 5.5

Answer: A



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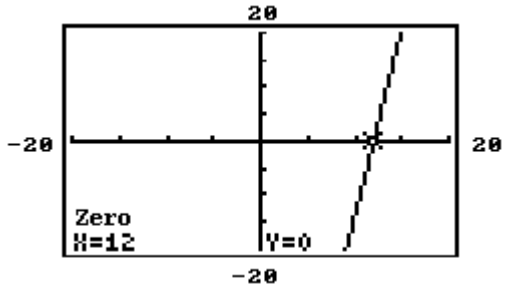
38)




A) a. 15
b. x = 15
B) a. 0
b. x = 15
C) a. 15
b. x = –15
D) a. 15
b. x = 0

Answer: A

39)




A) a. 0
b. x = 12
B) a. 0
b. x = 0
C) a. 12
b. x = 0
D) a. 12
b. x = 12

Answer: D

**Solve the equation using graphical methods. Round to the nearest thousandth when appropriate.**

40) $-5x + 9 = -1 + 8x$

A) x = –1.3
B) x = 0.375
C) x = 1.3
D) x = 0.769

Answer: D



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41) $(8x - 3) + 5 = 9(x - 3)$

A) $x = -5$
B) $x = 29$
C) $x = -19$
D) $x = -29$

Answer: B

42) $-4x + 4 - 7(x + 1) = 3x - 2$

A) $x = -2.25$
B) $x = -0.643$
C) $x = -0.071$
D) $x = -0.25$

Answer: C

43) $8x + 4(1 + x) = 3(x - 6) + 10x$

A) $x = 7$
B) $x = 22$
C) $x = -7$
D) $x = -22$

Answer: B

44) $\frac{x + 6}{5} - 7 = \frac{x + 8}{7} - 7$

A) $x = 2$
B) $x = -1$
C) $x = -2$
D) $x = 1$

Answer: B

45) $\frac{x + 8}{5} = \frac{13}{10} - \frac{x - 3}{4}$

A) $x = 10.5$
B) $x = 1$
C) $x = 26$
D) $x = 0$

Answer: B

46) $\frac{x - 8}{4} + \frac{x + 5}{5} = x + 7$

A) $x = -14.545$
B) $x = -7.273$
C) $x = -10.909$
D) $x = -18.182$

Answer: A



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**Solve the formula for the specified variable.**

47) $A = \frac{1}{2}bh$ for b

A) $b = \frac{h}{2A}$

B) $b = \frac{A}{2h}$

C) $b = \frac{Ah}{2}$

D) $b = \frac{2A}{h}$

Answer: D

48) $S = 2\pi rh + 2\pi r^2$ for h

A) $h = \frac{S - 2\pi r^2}{2\pi r}$

B) $h = 2\pi(S - r)$

C) $h = S - r$

D) $h = \frac{S}{2\pi r} - 1$

Answer: A

49) $V = \frac{1}{3}Bh$ for h

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

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

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

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

Answer: A

50) $I = \frac{nE}{nr + R}$ for n

A) $n = \frac{-R}{Ir - E}$

B) $n = IR(Ir - E)$

C) $n = \frac{IR}{Ir + E}$

D) $n = \frac{-IR}{Ir - E}$

Answer: D



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51) $P = a + b + c$ for a

A) $a = b + c - P$

B) $a = P + b + c$

C) $a = P - b - c$

D) $a = b + P - c$

Answer: C

52) $F = \frac{9}{5}C + 32$ for C

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

B) $C = \frac{5}{F - 32}$

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

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

Answer: D

53) $A = \frac{1}{2}h(b_1 + b_2)$ for $b_1$

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

B) $b_1 = \frac{2Ab_2 - h}{h}$

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

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

Answer: A

54) $a + b = s + r$ for r

A) $r = a + b - s$

B) $r = s(a + b)$

C) $r = \frac{a + b}{s}$

D) $r = \frac{a}{s} + b$

Answer: A



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55) $A = P(1 + nr)$ for r

A) $r = \frac{P - A}{Pn}$

B) $r = \frac{A}{n}$

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

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

Answer: C

56) $-6k + ar = r - 9y$ for r

A) $r = \frac{-6k + a}{1 - 9y}$ or $r = \frac{6k - a}{9y - 1}$

B) $r = \frac{6k - 9y}{a - 1}$ or $r = \frac{-6k + 9y}{1 - a}$

C) $r = \frac{-6k + 9y}{a - 1}$ or $r = \frac{6k - 9y}{1 - a}$

D) $r = \frac{a - 1}{6k - 9y}$ or $r = \frac{1 - a}{-6k + 9y}$

Answer: B

**Solve the equation for y.**

57) $6x + 9y = 17$

A) $y = \frac{2}{3}x + \frac{17}{9}$

B) $y = 6x - 17$

C) $y = -\frac{2}{3}x + \frac{17}{9}$

D) $y = \frac{2}{3}x - \frac{17}{9}$

Answer: C

58) $6x - 9y = 1$

A) $y = \frac{2}{3}x - \frac{1}{9}$

B) $y = \frac{3}{2}x + \frac{1}{6}$

C) $y = \frac{2}{3}x + \frac{1}{9}$

D) $y = 6x - 1$

Answer: A



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59) $x - 5y = 4$

A) $y = x - \frac{4}{5}$

B) $y = \frac{1}{5}x - 4$

C) $y = \frac{1}{5}x - \frac{4}{5}$

D) $y = 5x - 4$

Answer: C

60) $3x - 10y = -6$

A) $y = 3x + 11$

B) $y = \frac{3}{10}x + \frac{3}{5}$

C) $y = -\frac{3}{10}x + \frac{3}{5}$

D) $y = \frac{10}{3}x - 2$

Answer: B

61) $y - 2x^2 + 5 = 0$

A) $y = 2x^2 + 5$

B) $y = -2x^2 + 5$

C) $y = 2x^2 - 5$

D) $y = -2x^2 - 5$

Answer: C

**Solve the problem.**

62) Suppose the sales of a particular brand of appliance satisfy the relationship $S(x) = 80x + 3600$, where $S(x)$ represents the number of sales in year $x$, with $x = 0$ corresponding to 2010. In what year would the sales be 4320?

A) 2021

B) 2019

C) 2020

D) 2018

Answer: B

63) The mathematical model $C = 400x + 60{,}000$ represents the cost in dollars a company has in manufacturing $x$ items during a month. How many items were produced if costs reached $380,000?

A) 379,600 items

B) 800 items

C) 650 items

D) 1100 items

Answer: B



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64) The temperature, t, in degrees Fahrenheit, of water being heated is $65 + \frac{1}{4}$m where m is the number of minutes since heating began. How long will it take for the temperature of the water to reach 70 degrees Fahrenheit?

A) 14 min
B) 17 min
C) 40 min
D) 20 min

Answer: D

65) 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?

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

Answer: A

66) A repair company's charge for repairing a certain type of copy machine fits the model y = 47.38 + 0.617x where y is the number of dollars charged and x is the number of minutes the repair person is on the job. How many minutes would it take for the cost of repair to reach $120? (Round to the nearest minute.)

A) 12 min
B) 187 min
C) 271 min
D) 118 min

Answer: D

67) 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.)

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

Answer: D

68) The temperature of water in a certain lake on a day in October can be determined by using the model y = 15.2 – 0.537x where x is the number of feet down from the surface of the lake and y is the Celsius temperature of the water at that depth. Based on this model, how deep in the lake is the water 8 degrees? Round to the nearest foot.

A) 13 ft
B) 32 ft
C) 69 ft
D) 43 ft

Answer: A



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69) 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.

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

Answer: B

70) A student earned scores of 85, 83, 90, 94, 88, and 84 on the first six tests in a biology class. What score is needed on the seventh test to produce an 86 average?

A) 80
B) 79
C) 78
D) 81

Answer: C

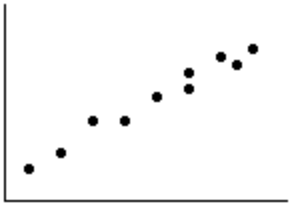
71) The future value of a simple interest investment is given by $S = P(1 + rt)$, where P is the principal invested at a simple interest rate r for t years. What principal P must be invested for $t = 4$ months at the simple interest rate $r = 11\%$ so that the future value grows to \$3600.

A) \$3243.24
B) \$3472.67
C) \$3503.65
D) \$127.33

Answer: B

**Use the data shown in the scatter plot to determine whether the data should be modeled by a linear function.**

72)



A) Yes, exactly linear
B) Yes, approximately linear
C) No, data points do not lie close to a line

Answer: B

73)



A) Yes, approximately linear
B) No, data points do not lie close to a line
C) Yes, exactly linear

Answer: A



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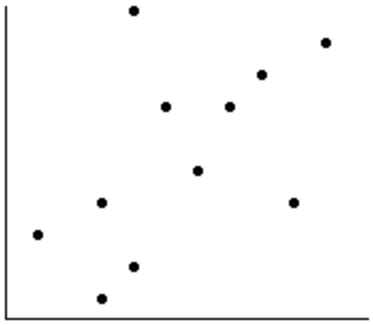
74)



A) Yes, exactly linear
B) Yes, approximately linear
C) No, data points do not lie close to a line

Answer: C

75)



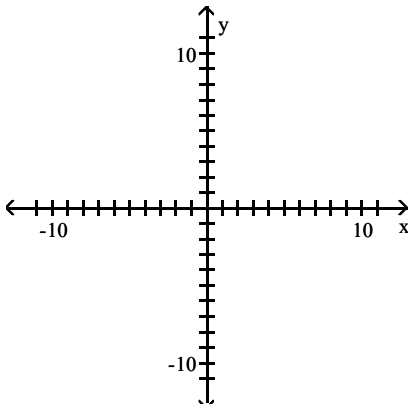
A) Yes, exactly linear
B) Yes, approximately linear
C) No, data points do not lie close to a line

Answer: C

**Construct a scatter plot of the data in the table.**

76)

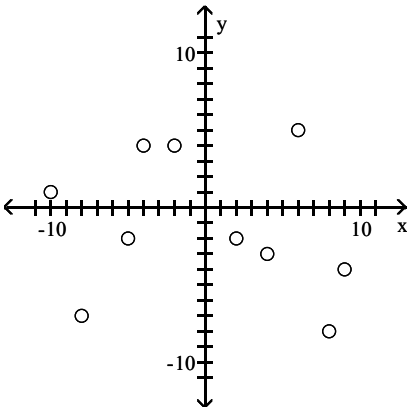
| x | −10 | −8 | −5 | −4 | −2 | 2 | 4 | 6 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| y | 1 | −7 | −2 | 4 | 4 | −2 | −3 | 5 | −8 | −4 |



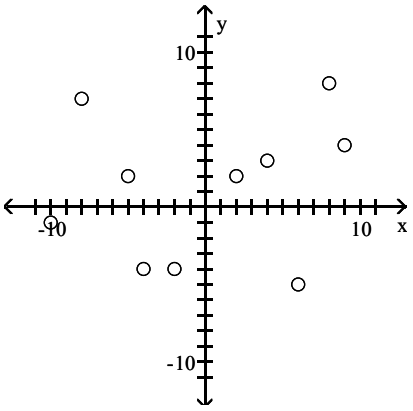



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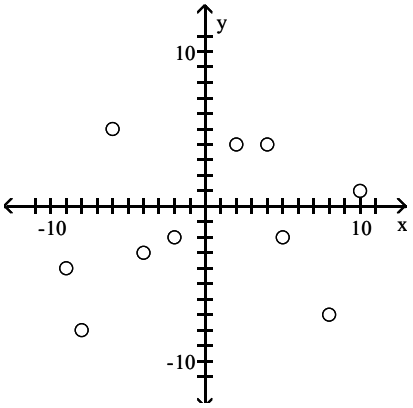
A)



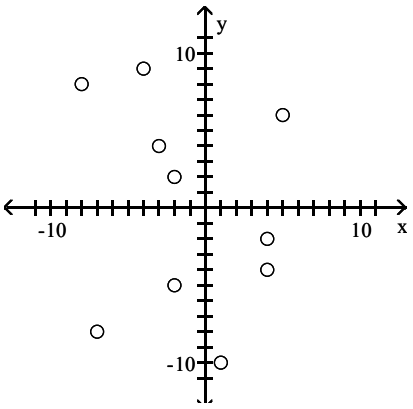

B)




C)




D)



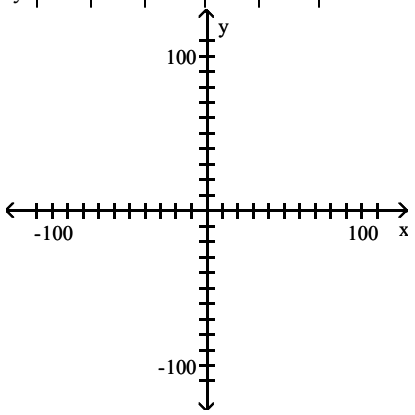

Answer: A



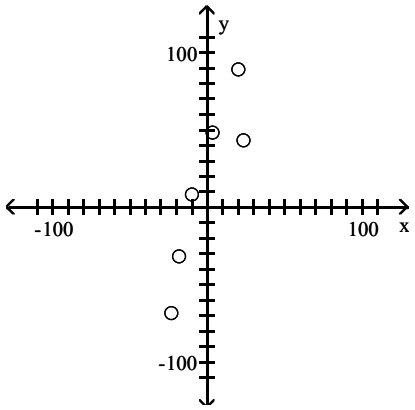
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77)

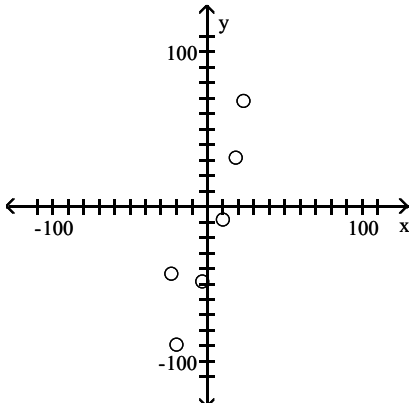
| x | 20 | 23 | −18 | 3 | −23 | −10 |
|---|---|---|---|---|---|---|
| y | −89 | −43 | 32 | −48 | 68 | −8 |




A)



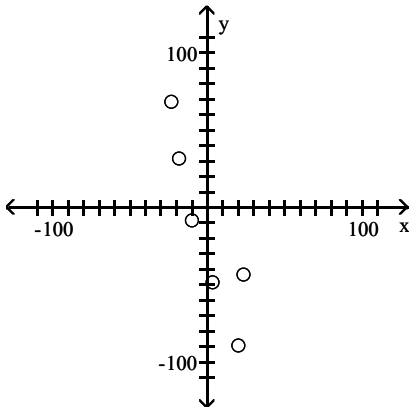

B)



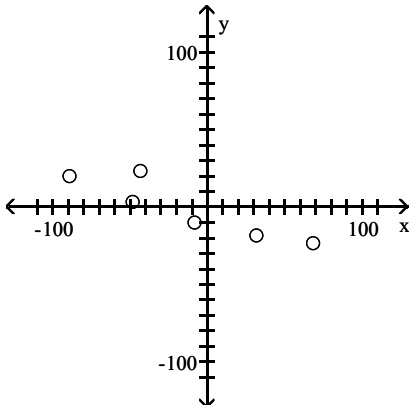



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C)



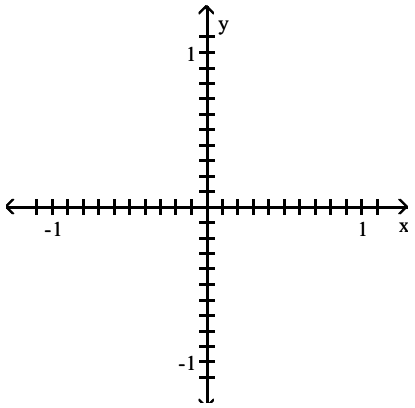

D)




Answer: C

78)

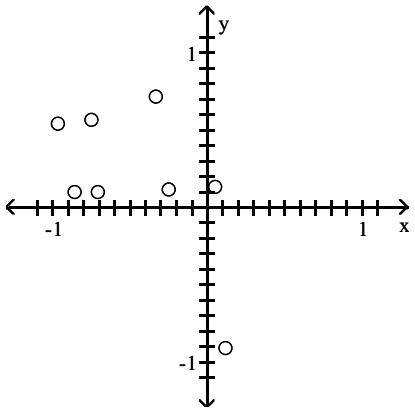
| x | 0.75 | 0.86 | 0.33 | 0.25 | −0.12 | 0.97 | 0.71 | −0.05 |
|---|---|---|---|---|---|---|---|---|
| y | 0.57 | 0.1 | 0.72 | 0.12 | −0.91 | 0.54 | 0.1 | 0.13 |



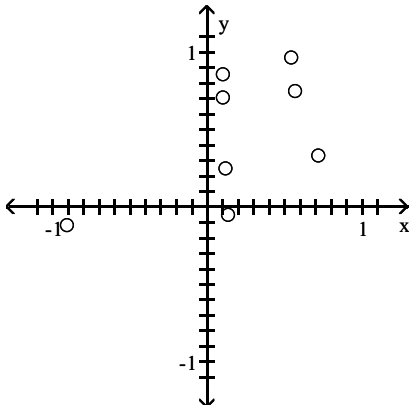



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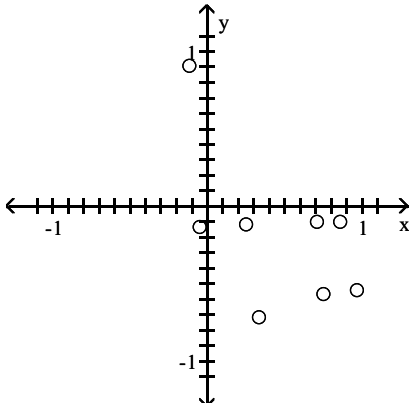
A)



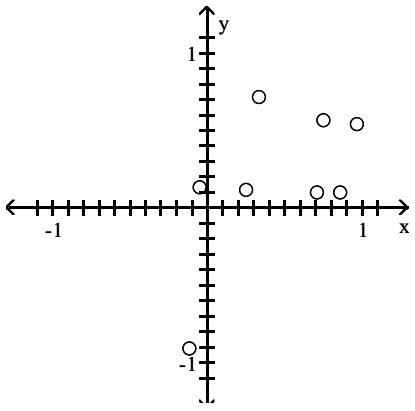

B)




C)




D)



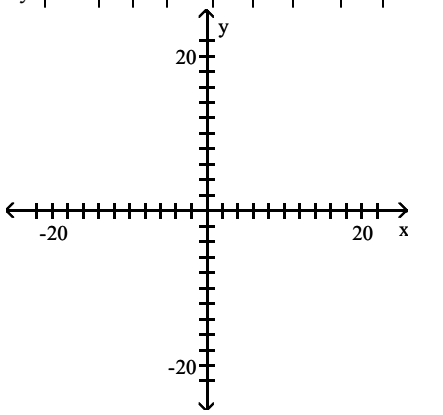

Answer: D



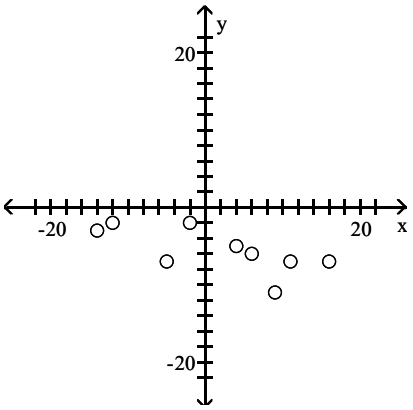
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79)

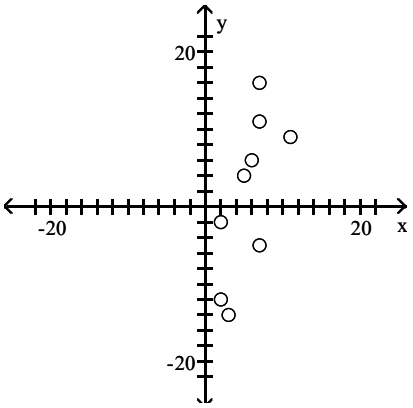
| x | −14 | 4 | 6 | 9 | 11 | 16 | −5 | −2 | −12 |
|---|---|---|---|---|---|---|---|---|---|
| y | 3 | 5 | 6 | 11 | 7 | 7 | 7 | 2 | 2 |




A)



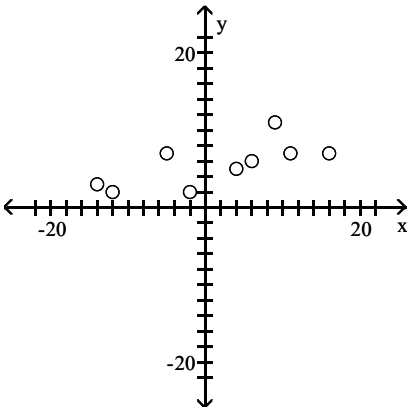

B)



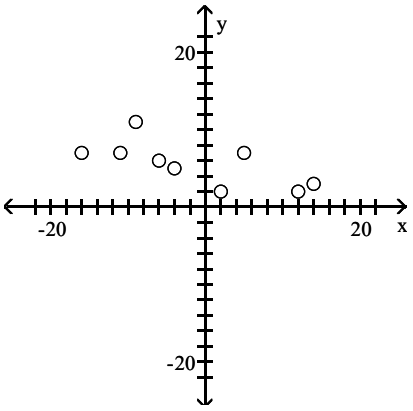



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C)




D)




Answer: C

**Without graphing, determine whether the following data set is exactly linear, approximately linear or nonlinear.**

80)

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| y | 9 | 13 | 17 | 21 | 25 |

A) nonlinear
B) exactly linear
C) approximately linear

Answer: B

81)

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| y | 9 | 13 | 19 | 27 | 37 |

A) approximately linear
B) exactly linear
C) nonlinear

Answer: C

82)

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| y | 9 | 11 | 12 | 15 | 17 |

A) approximately linear
B) nonlinear
C) exactly linear

Answer: A



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83)

| Foot Length (cm) | 25 | 26 | 28 | 29 | 30 | 31 | 32 | 33 | 37 |
|---|---|---|---|---|---|---|---|---|---|
| Forearm Length (cm) | 24 | 25 | 28 | 30 | 31 | 30 | 31 | 33 | 37 |

A) exactly linear
B) nonlinear
C) approximately linear

Answer: C

84)

| Age (years) | 18 | 23 | 20 | 26 | 29 | 16 | 25 | 20 | 32 |
|---|---|---|---|---|---|---|---|---|---|
| Grade Point Average | 2.5 | 3.0 | 2.7 | 3.2 | 3.9 | 2.0 | 3.5 | 3.1 | 3.6 |

A) nonlinear
B) exactly linear
C) approximately linear

Answer: C

85)

| Height (inches) | 57 | 60 | 72 | 59 | 63 | 65 | 66 | 68 | 61 |
|---|---|---|---|---|---|---|---|---|---|
| Time (seconds) | 32.9 | 40.1 | 35.7 | 41.8 | 47.4 | 37.3 | 39.1 | 41.5 | 32.8 |

A) exactly linear
B) nonlinear
C) approximately linear

Answer: B

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

86)

| x | 6 | 8 | 20 | 28 | 36 |
|---|---|---|---|---|---|
| y | 2 | 4 | 13 | 20 | 30 |

A) $y = 0.85x - 2.79$
B) $y = 0.95x - 2.79$
C) $y = 0.90x - 3.79$
D) $y = 0.80x - 3.79$

Answer: C

87)

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

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

Answer: B

88)

| x | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| y | 17 | 20 | 19 | 22 | 21 | 24 |

A) $y = 1.17x + 18.9$
B) $y = 1.03x + 16.4$
C) $y = 1.03x + 18.9$
D) $y = 1.17x + 16.4$

Answer: D



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89)

| x | 0 | 3 | 4 | 5 | 12 |
|---|---|---|---|---|---|
| y | 8 | 2 | 6 | 9 | 12 |

A) y = 0.53x + 4.88
B) y = 0.63x + 4.88
C) y = 0.43x + 4.98
D) y = 0.73x + 4.98

Answer: A

90)

| x | 3 | 5 | 7 | 15 | 16 |
|---|---|---|---|---|---|
| y | 8 | 11 | 7 | 14 | 20 |

A) y = 0.95x + 3.07
B) y = 0.85x + 3.07
C) y = 0.75x + 5.07
D) y = 0.75x + 4.07

Answer: C

91)

| x | 24 | 26 | 28 | 30 | 32 |
|---|---|---|---|---|---|
| y | 15 | 13 | 20 | 16 | 24 |

A) y = 0.95x + 11.8
B) y = 1.05x + 11.8
C) y = 0.95x – 11.8
D) y = 1.05x – 11.8

Answer: D

92)

| x | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|
| y | 15 | 37 | 60 | 75 | 94 |

A) y = 9x – 3
B) y = 9.8x – 2.6
C) y = 9.2x – 2.1
D) y = 10x – 3

Answer: B

93)

| x | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 |
|---|---|---|---|---|---|
| y | 54 | 53 | 55 | 54 | 56 |

A) y = 54
B) y = 2.5x + 50.4
C) y = 55.3
D) y = 3x + 50

Answer: B

94)

| x | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|
| y | 3.9 | 4.6 | 5.4 | 6.9 | 8.3 |

A) y = 0.17x + 2.11
B) y = 0.5x – 2
C) y = x – 8
D) y = 0.11x + 2.49

Answer: D



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95)

| x | 2 | 3 | 7 | 8 | 10 |
|---|---|---|---|---|---|
| y | 3 | 4 | 4 | 5 | 6 |

A) y = 0.32x + 2.57
B) y = 0.30x + 2.57
C) y = 0.32x + 4.29
D) y = 0.30x + 4.29

Answer: B

96)

| x | 2 | 3 | 7 | 8 | 10 |
|---|---|---|---|---|---|
| y | 2 | 4 | 4 | 6 | 6 |

A) y = −1.86x + 1.79
B) y = 1.79x − 1.86
C) y = 1.79x + 0.43
D) y = 0.43x + 1.79

Answer: D

**Write the best–fit linear model for the data.**

97) Ten students in a graduate program were randomly selected. Their grade point averages (GPAs) when they entered the program were between 3.5 and 4.0. The following data were obtained regarding their GPAs on entering the program versus their current GPAs. Find a linear function that approximates a student's current GPA as a function of his or her entering GPA.

| Entering GPA | Current GPA |
|---|---|
| 3.5 | 3.6 |
| 3.8 | 3.7 |
| 3.6 | 3.9 |
| 3.6 | 3.6 |
| 3.5 | 3.9 |
| 3.9 | 3.8 |
| 4.0 | 3.7 |
| 3.9 | 3.9 |
| 3.5 | 3.8 |
| 3.7 | 4.0 |

A) y = 2.51 + 0.329x
B) y = 4.91 + 0.0212x
C) y = 5.81 + 0.497x
D) y = 3.67 + 0.0313x

Answer: D

98) 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 approximates a student's score as a function of the number of hours he or she studied.

| 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

Answer: A



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99) The paired data below consist of the costs of advertising (in thousands of dollars) and the number of products sold (in thousands). Find a linear function that approximates the number of products sold as a function of the cost of advertising.

| Cost | 9 | 2 | 3 | 4 | 2 | 5 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|
| Number | 85 | 52 | 55 | 68 | 67 | 86 | 83 | 73 |

A) y = 55.8 – 2.79x
B) y = –26.4 – 1.42x
C) y = 55.8 + 2.79x
D) y = 26.4 + 1.42x

Answer: C

100) The paired data below consist of the temperatures on randomly chosen days and the amount a certain kind of plant grew (in millimeters). Find a linear function that approximates a plant's growth as a function of temperature.

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

A) y = 7.30 + 0.122x
B) y = 14.6 + 0.211x
C) y = –14.6 – 0.211x
D) y = 7.30 – 0.112x

Answer: B

101) A study was conducted to compare the average time spent in the lab each week versus course grade for computer students. The results are recorded in the table below. Find a linear function that approximates a student's course grade as a function of the number of hours spent in lab.

| Number of hours spent in lab | Grade (percent) |
|---|---|
| 10 | 96 |
| 11 | 51 |
| 16 | 62 |
| 9 | 58 |
| 7 | 89 |
| 15 | 81 |
| 16 | 46 |
| 10 | 51 |

A) y = 1.86 + 88.6x
B) y = 44.3 + 0.930x
C) y = 88.6 – 1.86x
D) y = 0.930 + 44.3x

Answer: C

102) Two separate tests are designed to measure a student's ability to solve problems. Several students are randomly selected to take both tests and the results are shown below. Find a linear function that approximates a student's score on Test B as a function of his or her score on Test A.

| Test A | 48 | 52 | 58 | 44 | 43 | 43 | 40 | 51 | 59 |
|---|---|---|---|---|---|---|---|---|---|
| Test B | 73 | 67 | 73 | 59 | 58 | 56 | 58 | 64 | 74 |

A) y = 19.4 + 0.930x
B) y = –0.930 + 19.4x
C) y = –19.4 – 0.930x
D) y = 0.930 – 19.4x

Answer: A



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103) Two different tests are designed to measure employee productivity and dexterity. Several employees are randomly selected and tested with these results. Find the linear function to model this data.

| Productivity | 23 | 25 | 28 | 21 | 21 | 25 | 26 | 30 | 34 | 36 |
|---|---|---|---|---|---|---|---|---|---|---|
| Dexterity | 49 | 53 | 59 | 42 | 47 | 53 | 55 | 63 | 67 | 75 |

A) y = 75.3 – 0.329x
B) y = 5.05 + 1.91x
C) y = 2.36 + 2.03x
D) y = 10.7 + 1.53x

Answer: B

104) 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.

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

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

Answer: B

105) The ages and lengths of several animals of the same species are recorded in the following table:

| Age (months) | Length (inches) |
|---|---|
| 12 | 10 |
| 15 | 11 |
| 17 | 17 |
| 21 | 23 |
| 26 | 23 |
| 28 | 24 |
| 32 | 32 |
| 38 | 40 |
| 41 | 38 |

Find the linear function to model this data.

A) y = 1.03x – 2.18
B) y = 0.93x – 1.18
C) y = 2.18x – 1.03
D) y = 0.93x + 2.18

Answer: A



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106) A pediatric speech therapist started her own practice in 2000. The table below shows the number of children she treated each year from 2004 to 2012. Align the data to the number of years past 2004 and fit a linear model to the data.

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|
| Number of Patients | 11 | 15 | 16 | 20 | 23 | 25 | 29 | 34 | 37 |

A) $y = 11x + 2$
B) $y = 3.2x + 10.53$
C) $y = 2x + 11$
D) $y = 10.53x + 3.2$

Answer: B

**Solve the problem.**

107) Ten students in a graduate program were randomly selected. Their grade point averages (GPAs) when they entered the program were between 3.5 and 4.0. The following data were obtained regarding their GPAs on entering the program versus their current GPAs. The linear model for this data is $y = 3.67 + 0.0313x$, where x is entering GPA and y is current GPA. Use this model to predict current GPA of a student whose entering GPA is 3.1.

| Entering GPA | Current GPA |
|---|---|
| 3.5 | 3.6 |
| 3.8 | 3.7 |
| 3.6 | 3.9 |
| 3.6 | 3.6 |
| 3.5 | 3.9 |
| 3.9 | 3.8 |
| 4.0 | 3.7 |
| 3.9 | 3.9 |
| 3.5 | 3.8 |
| 3.7 | 4.0 |

A) 3.77
B) 3.39
C) 3.57
D) 3.28

Answer: A

108) 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.

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

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

Answer: D



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109) The paired data below consist of the costs of advertising (in thousands of dollars) and the number of products sold (in thousands). The linear model for this data is y = 55.8 + 2.79x, where x is the cost of advertising (in thousands of dollars) and y is number of products sold (in thousands). Use this model to predict the number of products sold (in thousands) if the cost of advertising is $8000.

| Cost | 9 | 2 | 3 | 4 | 2 | 5 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|
| Number | 85 | 52 | 55 | 68 | 67 | 86 | 83 | 73 |

A) 84,820 products sold
B) 78,120 products sold
C) 22,375,800 products sold
D) 75,120 products sold

Answer: B

110) 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 57.

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

A) 27.08 mm
B) 26.63 mm
C) 27.54 mm
D) 25.43 mm

Answer: B

111) A study was conducted to compare the average time spent in the lab each week versus course grade for computer students. The results are recorded in the table below. The linear model for this data is y = 88.6 – 1.86x, where x is the number of hours spent in the lab and y is grade on the test. Use this model to predict the grade of a student who spends 12 hours in the lab.

| Number of hours spent in lab | Grade (percent) |
|---|---|
| 10 | 96 |
| 11 | 51 |
| 16 | 62 |
| 9 | 58 |
| 7 | 89 |
| 15 | 81 |
| 16 | 46 |
| 10 | 51 |

A) 76.6
B) 62.3
C) 68.7
D) 66.3

Answer: D



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112) The ages and lengths of several animals of the same species are recorded in the following table:

| Age (months) | Length (inches) |
|---|---|
| 12 | 9 |
| 15 | 12 |
| 17 | 20 |
| 21 | 21 |
| 26 | 24 |
| 28 | 27 |
| 32 | 35 |
| 38 | 40 |
| 41 | 40 |

Find and then use a linear model to predict the length of a 35–month–old animal.

A) 36.60 in.
B) 38.50 in.
C) 35.60 in.
D) 37.50 in.

Answer: C

113) The ages and lengths of several animals of the same species are recorded in the following table:

| Age (months) | Length (inches) |
|---|---|
| 12 | 9 |
| 15 | 12 |
| 17 | 20 |
| 21 | 21 |
| 26 | 24 |
| 28 | 27 |
| 32 | 35 |
| 38 | 40 |
| 41 | 40 |

Find and then use a linear model to determine the age of an animal whose length is 30 inches. Round to the nearest year.

A) 31 yr
B) 30 yr
C) 29 yr
D) 32 yr

Answer: B

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

**Provide an appropriate response.**

114) Sketch a scatter plot for a set of data points for which it would be appropriate to fit a linear function. Then sketch a second scatter plot for a set of data points for which it would not be appropriate to fit a linear function. For the second scatter plot, explain why it would not be reasonable to fit the data points to a linear function.

Answer: Examples will vary. The points in the first scatter plot should be clustered about a straight line. The points in the second scatter plot should be scattered about a curve.



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115) A set of data consists of the number of years that applicants for foreign service jobs have studied German and the grades that they receive in a proficiency test in that language. The following linear model is obtained: $y = 31.6 + 10.9x$, where x represents number of years of study and y represents grade in test. What does the slope of the model represent in terms of the grades on the test?

Answer: The slope indicates that grades on the test increase by an estimated 10.9 points for each additional year of study.

116) A linear model is obtained for the following set of data.

| x | 2 | 4 | 6 | 9 | 10 | 12 |
|---|---|---|---|---|---|---|
| y | 28 | 33 | 39 | 45 | 47 | 52 |

For what range of x–values would it be reasonable to use the model to predict the y–value corresponding to a given x–value? Why?

Answer: For x–values in the range 2 to 12 it would be reasonable to use the model to predict the y–value corresponding to a given x–value.

117) John has been a teacher at West Side High School for the past 12 years. His salary during that time can be modeled by the linear equation $y = 800x + 33{,}000$ where x is the number of years since he began teaching at West Side and y is his salary in dollars. Explain what the slope, 800, represents in this context.

Answer: The slope of 800 indicates that during his 12 years at the school, John's salary has increased by approximately $800 per year.

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

118) A pediatric speech therapist started her own practice in 2004. The function $y = 3.2x + 10.53$ models the number of patients she treated each year, where x is the number of years after 2004. The model was found using data for the years between 2004 and 2012. What does the model estimate as the number of patients in 2009? Round to the nearest whole number. Is this interpolation or extrapolation?

A) 25; extrapolation
B) 29; interpolation
C) 27; interpolation
D) 27; extrapolation

Answer: C

119) A pediatric speech therapist started her own practice in 2004. The function $y = 3.2x + 10.53$ models the number of patients she treated each year, where x is the number of years after 2004. The model was found using data for the years between 2004 and 2012. What does the model estimate as the number of patients in 2014? Round to the nearest whole number. Is this interpolation or extrapolation?

A) 45; extrapolation
B) 43; interpolation
C) 44; interpolation
D) 43; extrapolation

Answer: D



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**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

120) A pediatric speech therapist started her own practice in 2004. The table below shows the number of children she treated each year from 2004 to 2012. The data is to be aligned to the number of years past 2000 and fitted with a linear model.

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|
| Number of Patients | 11 | 15 | 16 | 20 | 23 | 25 | 29 | 34 | 37 |

Classify each of the following as discrete or continuous.

i) The data in the table
ii) A scatter plot made from the data
iii) The best–fit linear model obtained for the data
iv) The graph of the best–fit linear model obtained for the data

Answer: The data in the table and the scatter plot are discrete. The linear model and its graph are continuous.

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Give the coordinates of the point of intersection of the linear equations.**

121) $x + y = -11$
$x - y = -1$
A) (–5, –6)
B) (–6, –5)
C) (–5, –5)
D) (–6, –6)

Answer: B

122) $2x + y = 2$
$3x + 2y = 2$
A) (2, –2)
B) (2, 0)
C) (0, –2)
D) (–2, 2)

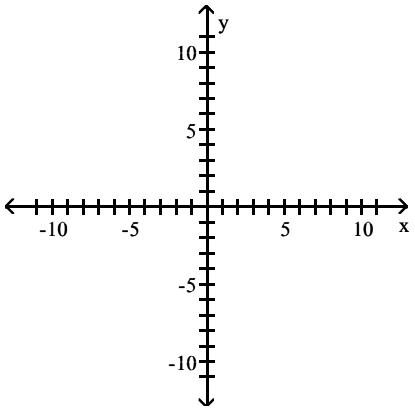
Answer: A



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**Solve the system of equations graphically, if a solution exists.**

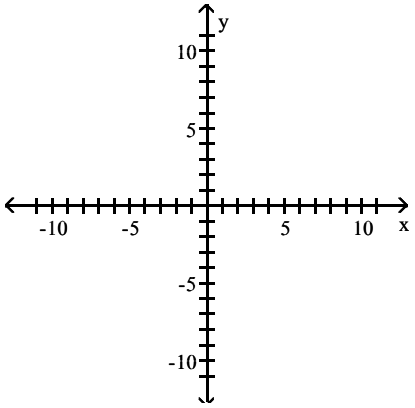
123) $4x + y = 6$
$x + 4y = 9$




A) $x = 1, y = 0$
B) $x = 1, y = 2$
C) $x = -1, y = 2$
D) $x = 2, y = -2$

Answer: B

124) $3x + 2y = 14$
$-2x + 3y = 8$



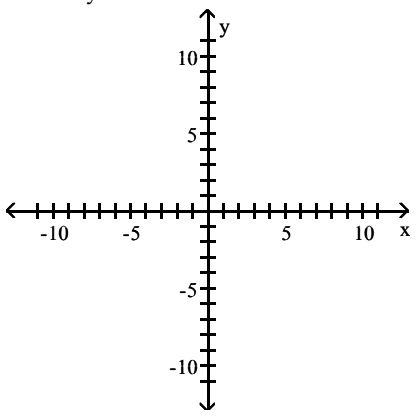

A) $x = 3, y = 14$
B) No solution
C) $x = 4, y = 2$
D) $x = 2, y = 4$

Answer: D



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125) $3x + 2y = 5$
$-6x - 4y = 5$




A) $x = -\frac{3}{2}, y = -1$

B) No solution

C) $x = 1, y = 1$

D) $x = \frac{3}{2}, y = -1$

Answer: B

**Does the system have a unique solution, no solution, or many solutions?**

126) $\begin{cases} x + y = 7 \\ x + y = 8 \end{cases}$

A) A unique solution

B) No solution

C) Many solutions

Answer: B

127) $\begin{cases} 2x - 4y = 2 \\ y = \frac{1}{2}x - \frac{1}{2} \end{cases}$

A) No solution

B) A unique solution

C) Many solutions

Answer: C

128) $\begin{cases} 6x - y = 18 \\ x + 5y = 34 \end{cases}$

A) Many solutions

B) A unique solution

C) No solution

Answer: B

129) $\begin{cases} 2x - y = 5 \\ -4x + 2y = -18 \end{cases}$

A) A unique solution

B) Many solutions

C) No solution

Answer: C



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130) $\begin{cases} 2x + 3y = 6 \\ 4x + 6y = 12 \end{cases}$

A) No solution
B) Many solutions
C) A unique solution

Answer: B

**Solve the system of equations by substitution, if a solution exists.**

131) $\begin{cases} x + 9y = 49 \\ -6x + 8y = 16 \end{cases}$

A) No solution
B) $x = -4, y = 6$
C) $x = 3, y = 6$
D) $x = 4, y = 5$

Answer: D

132) $\begin{cases} x + 2y = 16 \\ 2x + 3y = 24 \end{cases}$

A) $x = -8, y = 0$
B) $x = 0, y = 8$
C) No solution
D) $x = 1, y = 7$

Answer: B

133) $\begin{cases} -6x + 6y = 66 \\ -3x + 4y = 42 \end{cases}$

A) $x = -2, y = 10$
B) $x = -2, y = 9$
C) No solution
D) $x = -3, y = 10$

Answer: B

134) $\begin{cases} 5x + 9y = 36 \\ 3x + 5y = 20 \end{cases}$

A) $x = 0, y = 4$
B) No Solution
C) $x = 0, y = 5$
D) $x = -1, y = 5$

Answer: A

135) $\begin{cases} x + y = -3 \\ x + y = 1 \end{cases}$

A) No solution
B) $x = 0, y = -2$
C) $x = -3, y = 1$
D) $x = 1, y = -3$

Answer: A



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136) $\begin{cases} 3x + 5y = 5 \\ 9x = 10 + 15y \end{cases}$

A) $x = \frac{1}{18}, y = \frac{1}{6}$

B) Many solutions

C) No solution

D) $x = \frac{25}{18}, y = \frac{1}{6}$

Answer: D

**Solve the system of equations by elimination, if a solution exists.**

137) $\begin{cases} x - 6y = -30 \\ -5x - 5y = -25 \end{cases}$

A) $x = -5, y = 0$

B) No solution

C) $x = 1, y = 4$

D) $x = 0, y = 5$

Answer: D

138) $\begin{cases} x + 7y = 5 \\ -4x + 8y = -20 \end{cases}$

A) $x = 6, y = -1$

B) $x = 5, y = 0$

C) $x = 6, y = 5$

D) No solution

Answer: B

139) $\begin{cases} 7x - 7y = 14 \\ 5x + 3y = -22 \end{cases}$

A) $x = -3, y = -3$

B) $x = -2, y = -3$

C) $x = -2, y = -4$

D) No solution

Answer: C

140) $\begin{cases} 8x + 8y = 64 \\ 3x - 5y = -40 \end{cases}$

A) $x = -1, y = 9$

B) $x = 0, y = 9$

C) No solution

D) $x = 0, y = 8$

Answer: D

141) $\begin{cases} 8x + 9y = 8 \\ -5x + 7y = -5 \end{cases}$

A) $x = 1, y = 0$

B) $x = 1, y = 1$

C) No solution

D) $x = 0, y = 1$

Answer: A



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142) $\begin{cases} 6x - 3y = -5 \\ 18x - 9y = 15 \end{cases}$

A) $x = 0, y = 0$

B) $x = 30, y = -15$

C) $x = -30, y = 15$

D) No solution

Answer: D

**To find the number of units that gives break–even for the product, solve the equation R = C. Round your answer to the nearest whole unit.**

143) A manufacturer has total revenue given by the function $R = 70x$ and has total cost given by $C = 50x + 145{,}000$, where x is the number of units produced and sold.

A) 20 units

B) 120 units

C) 7250 units

D) 1208 units

Answer: C

144) A manufacturer has total revenue given by the function $R = 130x$ and has total cost given by $C = 112{,}000 + 10x$, where x is the number of units produced and sold.

A) 800 units

B) 933 units

C) 140 units

D) 120 units

Answer: B

145) A manufacturer has total revenue given by the function $R = 258x$ and has total cost given by $C = 26x + 974{,}000$, where x is the number of units produced and sold.

A) 3430 units

B) 284 units

C) 4198 units

D) 232 units

Answer: C

**Solve the problem.**

146) A certain product has supply and demand functions given by $p = 3q + 21$ and $p = 164 - 8q$, respectively, where p is the price in dollars and q is the quantity supplied or demanded at price p. What price gives market equilibrium?

A) $18

B) $39

C) $13

D) $60

Answer: D



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147) A certain product has supply and demand functions given by $p = 4q + 29$ and $p = 254 - 11q$, respectively, where p is the price in dollars and q is the quantity supplied or demanded at price p. How many units are supplied and demanded at market equilibrium?

A) 20 units
B) 18 units
C) 15 units
D) 89 units

Answer: C

148) The demand for a certain product is given by $p + 8q = 297$, and the supply is given by $p - 4q = 21$, where p is the price in dollars and q is the quantity demanded or supplied at price p. Find the price at which the quantity demanded equals the quantity supplied.

A) $110
B) $113
C) $116
D) $115

Answer: B

149) Suppose that the number of inhabitants of Country A is given by $y = -7.33x + 909.51$ million, and the number of inhabitants of Country B is given by $y = 2.07x + 815.51$ million, where x is the number of years since 2010. Find the year in which the number of inhabitants of Country A equals the number of inhabitants of Country B.

A) 2026
B) 2022
C) 2024
D) 2020

Answer: D

150) Suppose that the number of inhabitants of Country A is given by $y = -7.26x + 949.26$ million, and the number of inhabitants of Country B is given by $y = 4.14x + 790.8$ million, where x is the number of years since 2010. When the number of inhabitants of Country A equals the number of inhabitants of Country B, how many people inhabit each country?

A) 848,346,000 people
B) 847,620,000 people
C) 849,798,000 people
D) 849,072,000 people

Answer: A

151) Suppose that the total annual consumption of salmon in a certain country is given by $y = 7.39x + 727.1$ and that the total annual consumption of tuna in this country is given by $y = 1.99x + 808.1$, where consumption is measured in millions of pounds and x is the number of years since 2010. Find the year in which consumption of salmon reaches consumption of tuna.

A) 2027
B) 2023
C) 2025
D) 2028

Answer: C



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152) Suppose that the total annual consumption of salmon in a certain country is given by $y = 5.59x + 837.5$ and that the total annual consumption of tuna in this country is given by $y = 1.49x + 878.5$, where consumption is measured in millions of pounds and x is the number of years since 2010. When consumption of salmon reaches consumption of tuna, what is the annual consumption of salmon?

A) 897.87 million pounds
B) 893.4 million pounds
C) 890.42 million pounds
D) 894.89 million pounds

Answer: B

153) Nadine sold two kinds of tickets to her class play. Student tickets cost $4.00 each, and adult tickets cost $6.50 each. If Nadine sold a total of 37 tickets for $193.00, how many student tickets did she sell?

A) 23 tickets
B) 18 tickets
C) 21 tickets
D) 19 tickets

Answer: D

154) There were 28,000 people at a ballgame in Los Angeles. The day's receipts were $203,000. How many people paid $11 for reserved seats and how many paid $6 for general admission?

A) 8750 people paid $11, and 19,250 people paid $6
B) 19,250 people paid $11, and 8750 people paid $6
C) 21,000 people paid $11, and 7000 people paid $6
D) 7000 people paid $11, and 21,000 people paid $6

Answer: D

155) Jim wants to plan a meal with 150 grams of carbohydrates and 1400 calories. If green beans have 7 grams of carbohydrates and 30 calories per half–cup serving and french fried shrimp have 9 grams of carbohydrates and 190 calories per three–ounce serving, how many servings of green beans and shrimp should he use?

A) 5 half–cup servings of green beans and 15 three–ounce servings of shrimp
B) 7 half–cup servings of green beans and 9 three–ounce servings of shrimp
C) 9 half–cup servings of green beans and 7 three–ounce servings of shrimp
D) 15 half–cup servings of green beans and 5 three–ounce servings of shrimp

Answer: D

156) A chemist has two solutions that contain different concentrations of a certain acid. One is a 4% concentration and the other is an 11% concentration. How many cubic centimeters of each should the chemist mix to obtain 50 $cm^3$ of a solution with an acid concentration of 7.64%?

A) No solution
B) 24 cc of the 4% solution and 26 cc of the 11% solution
C) 26 cc of the 4% solution and 24 cc of the 11% solution
D) 25 cc of the 4% solution and 25 cc of the 11% solution

Answer: B

157) Mardi received an inheritance of $50,000. She invested part of it at 12% and the rest at 11%. Her total annual income from the investments was $5900. Find the amount invested at 12%.

A) $39,000
B) $20,000
C) $44,100
D) $40,000

Answer: D



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158) Walt made an extra $5000 by working a second job. He invested part of this money at 7% and the rest at 10%. If his annual return totaled $470, how much must he have invested at 10%?

A) $4000
B) $2500
C) $3000
D) $1000

Answer: A

159) Roberto invested some money at 8%, and then invested $2000 more than twice this amount at 10%. His total annual income from the two investments was $3000. How much did he invest at 10%?

A) $6000
B) $2200
C) $20,000
D) $22,000

Answer: D

**The table below gives the quantity of a product demanded and the quantity supplied for various prices. Solve the problem.**

160) Find the linear equation that gives the price as a function of the quantity supplied.

| Price (dollars) | Quantity Demanded | Quantity Supplied |
|---|---|---|
| 100 | 700 | 0 |
| 120 | 660 | 80 |
| 140 | 620 | 160 |
| 160 | 580 | 240 |
| 180 | 540 | 320 |

A) $p = \frac{1}{4}q + 100$

B) $p = 4q + 100$

C) $p = -\frac{1}{2}q + 450$

D) $p = \frac{1}{2}q + 100$

Answer: A

161) Find the linear equation that gives the price as a function of the quantity demanded.

| Price (dollars) | Quantity Demanded | Quantity Supplied |
|---|---|---|
| 100 | 850 | 0 |
| 120 | 830 | 30 |
| 140 | 810 | 60 |
| 160 | 790 | 90 |
| 180 | 770 | 120 |

A) $p = -\frac{2}{3}q + 100$

B) $p = -q + 950$

C) $p = q + 950$

D) $p = \frac{2}{3}q + 100$

Answer: B



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162) Find the market equilibrium price.

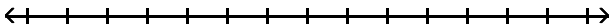
| Price (dollars) | Quantity Demanded | Quantity Supplied |
|---|---|---|
| 100 | 250 | 0 |
| 120 | 210 | 40 |
| 140 | 170 | 80 |
| 160 | 130 | 120 |
| 180 | 90 | 160 |

A) $162.50
B) $167.50
C) $157.50
D) $125.00

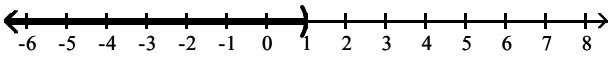
Answer: A

**Solve the inequality and draw a number line graph of the solution.**

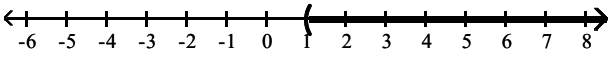
163) $5z + 2 > 4z + 3$



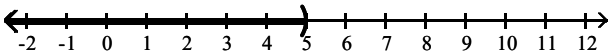
A) $a < 1$



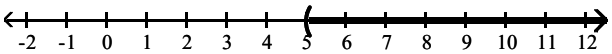

B) $a > 1$




C) $a < 5$




D) $a > 5$

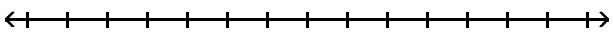



Answer: B

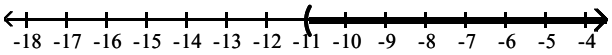


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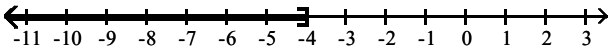
164) $-11x - 12 \leq -12x - 16$



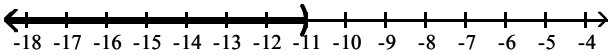
A) $a > -11$



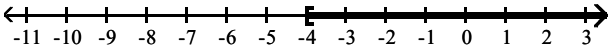

B) $a \leq -4$




C) $a < -11$

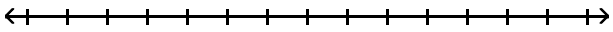



D) $a \geq -4$

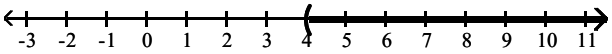



Answer: B

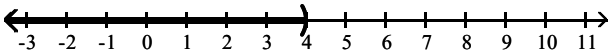
165) $4x - 6 \geq 3x + 1$



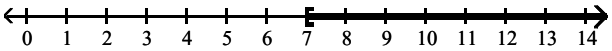
A) $x > 4$



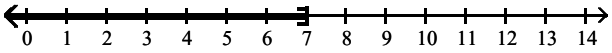

B) $x < 4$




C) $x \geq 7$




D) $x \leq 7$

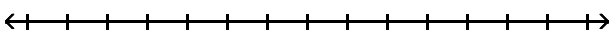



Answer: C

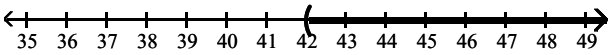


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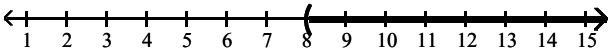
166) $42a + 18 > 6(6a + 11)$



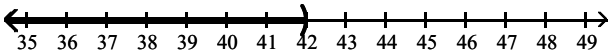
A) $x > 42$



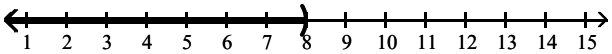

B) $x > 8$




C) $x < 42$

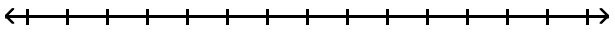



D) $x < 8$

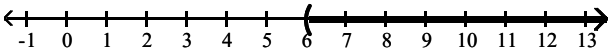



Answer: B

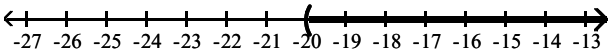
167) $-5(3z + 15) < -20z - 45$



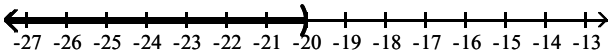
A) $z > 6$



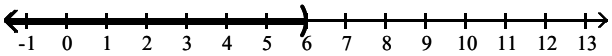

B) $z > -20$




C) $z < -20$




D) $z < 6$

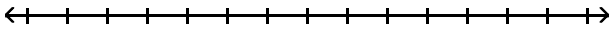



Answer: D

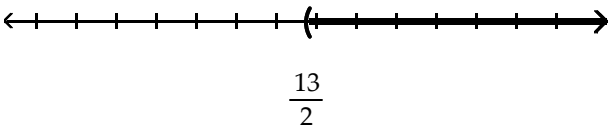


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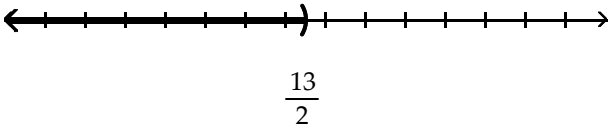
168) $\frac{2x + 5}{9} < \frac{13}{2}$



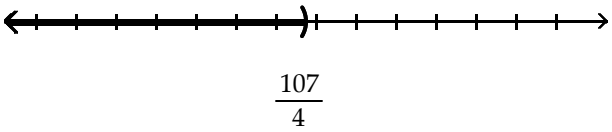
A) $x > \frac{13}{2}$



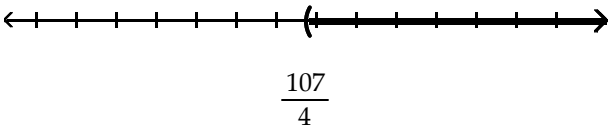

B) $x < \frac{13}{2}$




C) $x < \frac{107}{4}$




D) $x > \frac{107}{4}$

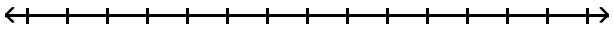



Answer: C

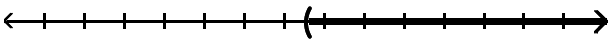


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169) $\frac{5x - 3}{-7} < -\frac{32}{5}$

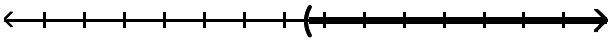


A) $x > -\frac{32}{25}$



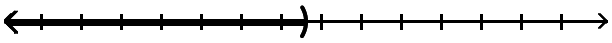
$-\frac{32}{25}$

B) $x > \frac{239}{25}$



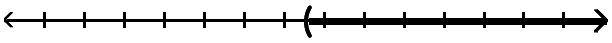
$\frac{239}{25}$

C) $x < -\frac{32}{5}$



$-\frac{32}{5}$

D) $x > \frac{239}{5}$



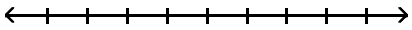
$\frac{239}{5}$

Answer: B

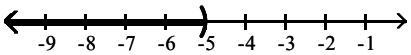


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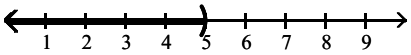
170) $\frac{4}{5}(x+5) > \frac{3}{5}(x+5)$



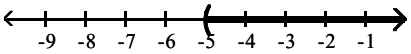
A) $x < -5$



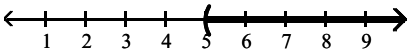

B) $x < 5$




C) $x > -5$

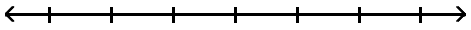



D) $x > 5$

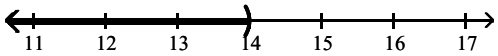



Answer: C

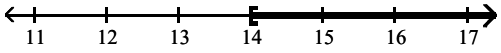
171) $0.5a > 7$



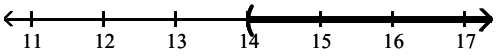
A) $k < 14$



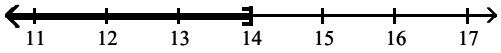

B) $k \geq 14$




C) $k > 14$




D) $k \leq 14$



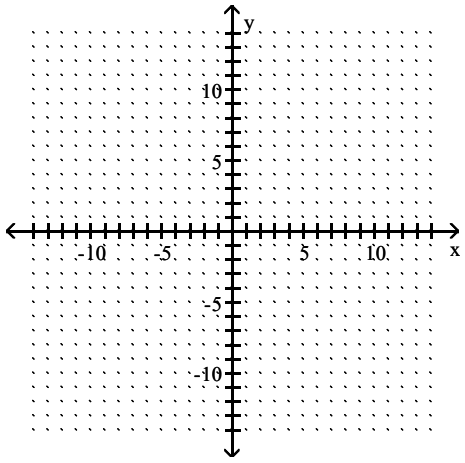

Answer: C



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**Solve the inequality graphically. Give the solution in interval notation.**

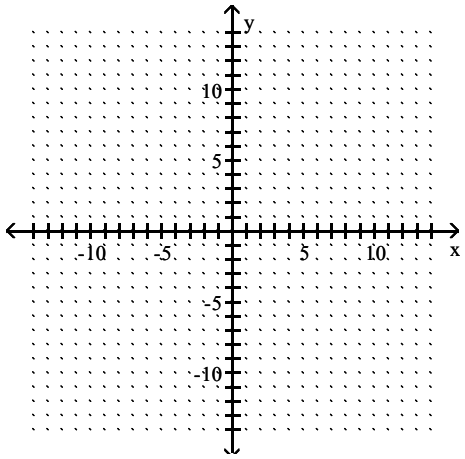
172) Use the intersection method to solve $13x - 4 \leq 12x - 2$.




A) [2, ∞)
B) (-∞, 2]
C) (-∞, 13)
D) (13, ∞)

Answer: B

173) Use the intersection method to solve $-11x - 8 \geq -12x - 6$.



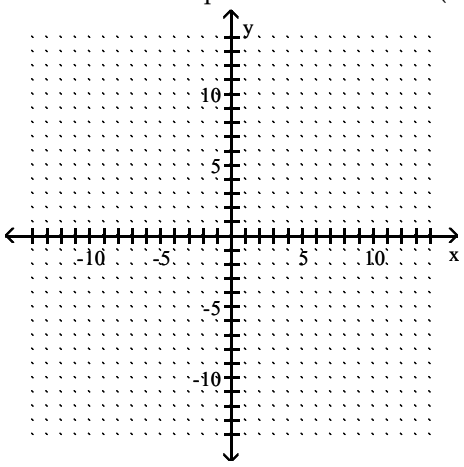

A) (-∞, –11)
B) (–11, ∞)
C) (-∞, 2]
D) [2, ∞)

Answer: D



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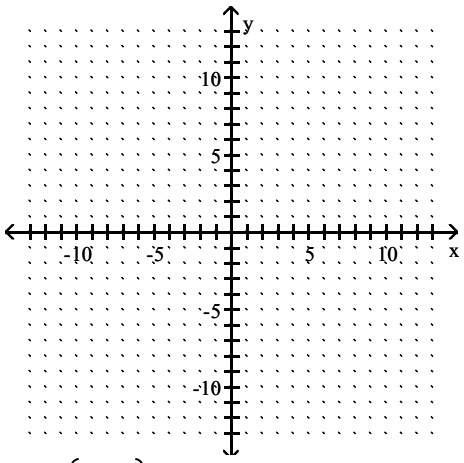
174) Use the x–intercept method to solve $9(2x - 4) > 27(x + 2)$.




A) $(-10, \infty)$
B) $(10, \infty)$
C) $(-\infty, 10)$
D) $(-\infty, -10)$

Answer: D

175) Use the x–intercept method to solve $-3(x - 1) < 3(3x - 2)$.




A) $\left(-\infty, \frac{3}{4}\right)$
B) $\left(-\frac{1}{4}, \infty\right)$
C) $\left(\frac{3}{4}, \infty\right)$
D) $\left(-\infty, -\frac{1}{4}\right)$

Answer: C



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**Solve the double inequality.**

176) $-20 < -5a \le 0$

A) $0 < a < 4$
B) $0 \le a < 4$
C) $0 \le a \le 4$
D) $-4 < a \le 0$

Answer: B

177) $14 < 5x + 4 \le 34$

A) $2 < x < 6$
B) $2 \le x < 6$
C) $2 < x \le 6$
D) $2 \le x \le 6$

Answer: C

178) $5 < 2a + 5 \le 13$

A) $0 < a \le 4$
B) $0 \le a \le 4$
C) $0 < a < 4$
D) $0 \le a < 4$

Answer: A

179) $-28 \le -4c + 4 < -4$

A) $2 \le c < 8$
B) $-8 < c \le -2$
C) $-8 \le c < -2$
D) $2 < c \le 8$

Answer: D

180) $13 < \dfrac{5x - 11}{11} < 15$

A) $-\dfrac{154}{5} < x < \dfrac{176}{5}$

B) $-\dfrac{154}{5} \le x \le \dfrac{176}{5}$

C) $-\dfrac{176}{5} < x < \dfrac{154}{5}$

D) $\dfrac{154}{5} < x < \dfrac{176}{5}$

Answer: D



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181) $-5 < \frac{6 - 5x}{10} \le 3$

A) $-\frac{24}{5} \le x < \frac{56}{5}$

B) $\frac{24}{5} \le x < \frac{56}{5}$

C) $-\frac{24}{5} \le x \le \frac{56}{5}$

D) $\frac{24}{5} < x < \frac{56}{5}$

Answer: A

182) $-24 \le \frac{-3 - 5x}{2} \le -14$

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

Answer: A

183) $-8 \le 0.2z + 3 \le -5$

A) $-55 \le z < -40$
B) $-55 \le z \le -40$
C) $-55 < z < -40$
D) $-55 \le z \le -40$

Answer: D

184) $-13 < -3a + 5$ and $-3a + 5 \le -1$

A) $-6 < a \le -2$
B) $-6 \le a < -2$
C) $2 \le a < 6$
D) $2 < a \le 6$

Answer: C

185) $-38 \le -5z + 2$ or $-5z + 2 \le -8$

A) $2 < z$ or $z < 8$
B) $-8 \le z$ or $z \le -2$
C) $2 \le z$ or $z \le 8$
D) $-8 < z$ or $z < -2$

Answer: C

**Translate the sentence to an algebraic inequality.**

186) The score on a test was between 82 and 70.

A) $82 < x < 70$
B) $x < 82$
C) $x > 70$
D) $70 < x < 82$

Answer: D



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187) The cost is no more than $336.95.
A) $x < 336.95$
B) $x \leq 336.95$
C) $x \geq 336.95$
D) $x > 336.95$

Answer: B

188) The number of people at a concert is not to exceed 2718.
A) $x \leq 2718$
B) $x < 2718$
C) $x \geq 2718$
D) $x > 2718$

Answer: A

189) The height of a member of the basketball team is at least 80 inches.
A) $x \leq 80$
B) $x > 80$
C) $x < 80$
D) $x \geq 80$

Answer: D

**Solve the problem.**

190) 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?
A) $8000
B) $8100
C) $16,000
D) $4000

Answer: A

191) Jim has gotten scores of 61 and 82 on his first two tests. What score must he get on his third test to keep an average of 80 or greater?
A) At least 71.5
B) At least 74.3
C) At least 96
D) At least 97

Answer: D

192) Jon has 791 points in his math class. He must have 72% of the 1200 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?
A) 73 points
B) 409 points
C) 570 points
D) 864 points

Answer: A



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193) Correct Computers, Inc. finds that the cost to make x laptop computers is C = 2529x + 128,651, while the revenue produced from them is R = 4034x (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?

A) 844,336,513 computers
B) 86 computers
C) 193,619,755 computers
D) 20 computers

Answer: B

194) Fantastic Flags, Inc. finds that the cost to make x flags is C = 32x + 18,695, while the revenue produced from them is R = 36x (C and R are in dollars). What is the smallest whole number of flags, x, that must be sold for the company to show a profit?

A) 1,271,260
B) 74,780
C) 275
D) 4674

Answer: D

195) During the first four months of the year, Jack earned $1180, $1170, $1460 and $1050. If Jack must have an average salary of at least $1180 in order to earn retirement benefits, what must Jack earn in the fifth month in order to qualify for benefits?

A) at most $1215
B) at most $1180
C) at least $1208
D) at least $1040

Answer: D

196) The formula for converting Fahrenheit temperature to Celsius is $C = \frac{5}{9}(F - 32)$. If a bottle of prescription medicine is to be kept below 35° Celsius, how would you describe this warning using Fahrenheit temperature?

A) It must be kept below −13° Fahrenheit.
B) It must be kept below 121° Fahrenheit.
C) It must be kept below 51° Fahrenheit.
D) It must be kept below 95° Fahrenheit.

Answer: D

197) DG's Plumbing and Heating charges $50 plus $60 per hour for emergency service. Bill remembers being billed just over $400 for an emergency call. How long to the nearest hour was the plumber at Bill's house?

A) 14 hours
B) 10 hours
C) 8 hours
D) 6 hours

Answer: D

198) The equation y = 0.003x + 0.50 can be used to determine the approximate profit, y in dollars, of producing x items. How many items must be produced so the profit will be at least $2937?

A) $0 < x \leq 978{,}833$
B) $x \leq 978{,}834$
C) $x \geq 978{,}834$
D) $x \geq 979{,}167$

Answer: C



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199) If the formula P = 0.5643Y – 1092.57 can be used to predict the average price of a theater ticket after 1945, for what years will the average theater ticket price be at least 43 dollars? (Y is the actual year.)

A) 2011 or after
B) 2015 or after
C) 2013 or after
D) 2023 or after

Answer: C

**Solve.**

200) 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 $6°C$, inclusive.

A) Between 33.1°F and 32.8°F, inclusive
B) Between 3.6°F and 10.8°F, inclusive
C) Between 19.6°F and 26.8°F, inclusive
D) Between 35.6°F and 42.8°F, inclusive

Answer: D

201) Assume that the mathematical model C(x) = 16x + 140 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 $526,000 and $782,000?

A) $340 < x < 510$
B) $480 < x < 640$
C) $320 < x < 480$
D) $510 < x < 680$

Answer: C

202) Suppose that the sales of a particular brand of appliance satisfy the relationship S(x) = 120x + 1600, where S(x) represents the number of sales in year x, with x = 0 corresponding to 1990. For what years will sales be between 1960 and 2320?

A) Between 1992 and 1995
B) Between 1993 and 1996
C) Between 4 and 7
D) Between 1993 and 1995

Answer: B

203) An omelette costs $1.00 more than Mario's order of pancakes. After treating his family to breakfast, Mario is sure that 6 omelettes and 3 orders of pancakes cost more than $25 but not more than $40, including tax of 7% and a tip of $3.50. In what price range is an order of pancakes?

A) ($1.57, $3.12)
B) [$1.54, $3.10]
C) ($1.54, $3.10]
D) ($1.57, $3.12]

Answer: D

**Provide an appropriate response.**

204) True or False? If $x < 4$ then $-3x < -12$.

A) True
B) False

Answer: B



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205) True or False? If $x > 3$ then $9x > 27$.

A) True

B) False

Answer: A

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

206) Under what conditions must the inequality symbol be reversed when solving an inequality?

Answer: When multiplying or dividing by a negative number.

207) In solving the inequality $5x \le -45$, would you have to reverse the inequality symbol? Explain why.

Answer: Explanations will vary. One possible answer: No, since you don't have to divide or multiply by a negative number. The fact that the number you are dividing into is negative is irrelevant.

208) The double inequality $a < x \le b$ means "a is less than x and x is less than or equal to b". Which of these inequalities is not satisfied by any real number x?

(a) $-5 < x \le -11$

(b) $-8 < x \le -7$

(c) $0 < x \le 4$

(d) $-2 < x \le 6$

Answer: Choice (a) is not.

209) If $a < b$, is it always true that $\frac{1}{a} > \frac{1}{b}$ ? Explain.

Answer: Explanations will vary. One possible answer:No. The second statement only follows from the first if a and b are either both positive or both negative. Divide both sides of the original inequality by (ab). If a and b are of opposite signs, then $(ab) < 0$. When dividing by a negative number, the inequality sign must be reversed $\left(\text{thus, } \frac{a}{ab} > \frac{b}{ab}, \text{ and } \frac{1}{b} > \frac{1}{a}\right)$.In addition, if a (or b) is zero, then its reciprocal is undefined.

210) If $b < 0$, is it true that $b^2 > b$? Explain.

Answer: Yes, since $b^2 > 0 > b$.

211) If $a \le b$, is it always true that $a + 6 \le b + 6$? Explain.

Answer: Explanations will vary. One possible answer:Yes. Adding a positive or negative number to both sides of an inequality produces an equivalent inequality.

212) If $a \le b$, is it always true that $-4a \le -4b$? Explain.

Answer: Explanations will vary. One possible answer:No. Multiplying an inequality by a negative number requires reversing the inequality symbol.

213) If $a \le b$, is it always true that $a^2 \le b^2$? Explain.

Answer: Explanations will vary. One possible answer:No. It is only true that $a^2 \le b^2$ if $|a| \le |b|$. For example, it is true that $-5 \le -3$. However, it is not true that $(-5)^2 \le (-3)^2$ since $25 > 9$.



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