Math 1101
Chapter 2 Review

Solve the equation.

1) \((y - 7) - (y + 2) = 4\)
   A) \(-\frac{1}{2}\)  B) \(-\frac{9}{5}\)  C) \(-\frac{9}{7}\)  D) \(-\frac{9}{4}\)

2) \(\frac{2}{5}x - \frac{1}{3}x = 5\)
   A) \(-150\)  B) \(75\)  C) \(-75\)  D) \(150\)

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

3) \(f(x) = 6x + 12\)
   A) \(-12\)  B) \(-2\)  C) \(12\)  D) \(2\)

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.

4) What is the \(y\)-intercept of the graph of \(y = f(x)\)?

<table>
<thead>
<tr>
<th>(x)</th>
<th>(y_1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00</td>
<td>-1.00</td>
</tr>
<tr>
<td>-1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>0.00</td>
<td>5.00</td>
</tr>
<tr>
<td>1.00</td>
<td>9.00</td>
</tr>
<tr>
<td>2.00</td>
<td></td>
</tr>
</tbody>
</table>

\(x = -2\)

A) 3  B) 0  C) -3  D) -1

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 \(f(x) = 0\).

5) A) a. 5  b. \(x = 5\)  B) a. 5  b. \(x = 0\)  C) a. 0  b. \(x = 5\)  D) a. -5  b. \(x = -5\)

Solve the equation for \(y\).

6) \(6x - 9y = 1\)
   A) \(y = \frac{3}{2}x + \frac{1}{6}\)  B) \(y = \frac{2}{3}x - \frac{1}{9}\)  C) \(y = 6x - 1\)  D) \(y = \frac{2}{3}x + \frac{1}{9}\)
Solve the formula for the specified variable.

7) \( S = 2\pi rh + 2\pi r^2 \) for \( h \)
   
   \[ A) h = \frac{S - 2\pi r^2}{2\pi r} \quad B) h = \frac{S}{2\pi r} - 1 \quad C) h = S - r \quad D) h = 2\pi(S - r) \]

Solve the problem.

8) 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?
   
   \[ A) 2021 \quad B) 2020 \quad C) 2019 \quad D) 2018 \]

9) 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?
   
   \[ A) 40 \text{ min} \quad B) 14 \text{ min} \quad C) 17 \text{ min} \quad D) 20 \text{ min} \]

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

10)

   \[ \text{A) Yes, approximately linear} \quad \text{B) No, data points do not lie close to a line} \quad \text{C) Yes, exactly linear} \]

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

11) \[ \begin{array}{c|ccccc}
        x & 1 & 2 & 3 & 4 & 5 \\
        y & 9 & 11 & 12 & 15 & 17 \\
\end{array} \]

   \[ A) \text{nonlinear} \quad B) \text{approximately linear} \quad C) \text{exactly linear} \]

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

12) \[ \begin{array}{c|cccc}
        x & 10 & 20 & 30 & 40 & 50 \\
        y & 3.9 & 4.6 & 5.4 & 6.9 & 8.3 \\
\end{array} \]

   \[ A) y = x - 8 \quad B) y = 0.11x + 2.49 \quad C) y = 0.5x - 2 \quad D) y = 0.17x + 2.11 \]
Write the best-fit linear model for the data.

13) 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.

<table>
<thead>
<tr>
<th>Hours</th>
<th>5</th>
<th>10</th>
<th>4</th>
<th>6</th>
<th>10</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>64</td>
<td>86</td>
<td>69</td>
<td>86</td>
<td>59</td>
<td>87</td>
</tr>
</tbody>
</table>

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

Solve the problem.

14) 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.

<table>
<thead>
<tr>
<th>Cost</th>
<th>9</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>2</th>
<th>5</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>85</td>
<td>52</td>
<td>55</td>
<td>68</td>
<td>67</td>
<td>86</td>
<td>83</td>
<td>73</td>
</tr>
</tbody>
</table>

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

Provide an appropriate response.

15) 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) 43; interpolation    B) 45; extrapolation    C) 43; extrapolation    D) 44; interpolation

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

16) \[
\begin{align*}
3x + 2y &= 14 \\
-2x + 3y &= 8
\end{align*}
\]

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

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

17) \[
\begin{align*}
2x - 4y &= 2 \\
y &= \frac{1}{2}x - \frac{1}{2}
\end{align*}
\]

A) No solution    B) A unique solution    C) Many solutions
Solve the system of equations by substitution, if a solution exists.

18) \[
\begin{align*}
\begin{cases}
x + 2y &= 16 \\
2x + 3y &= 24
\end{cases}
\end{align*}
\]
A) No solution  
B) \(x = 1, y = 7\)  
C) \(x = -8, y = 0\)  
D) \(x = 0, y = 8\)

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

19) \[
\begin{align*}
\begin{cases}
8x + 8y &= 64 \\
3x - 5y &= -40
\end{cases}
\end{align*}
\]
A) \(x = -1, y = 9\)  
B) No solution  
C) \(x = 0, y = 8\)  
D) \(x = 0, y = 9\)

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.

20) 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) 4198 units  
B) 3430 units  
C) 284 units  
D) 232 units

Solve the problem.

21) 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) \$60  
C) \$13  
D) \$39

22) 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) 893.4 million pounds  
B) 890.42 million pounds  
C) 897.87 million pounds  
D) 894.89 million pounds

23) 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) 18 tickets  
B) 21 tickets  
C) 23 tickets  
D) 19 tickets
Solve the inequality and draw a number line graph of the solution.

24) \(4x - 6 \geq 3x + 1\)

A) \(x < 4\)

B) \(x \geq 7\)

C) \(x > 4\)

D) \(x \leq 7\)

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

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

A) \((13, \infty)\)

B) \([2, \infty)\)

C) \((-\infty, 2]\)

D) \((-\infty, 13)\)
26) Use the x-intercept method to solve \( 9(2x - 4) > 27(x + 2) \).

\[27) \quad 13 < \frac{5x - 11}{11} < 15\]

A) \(-\frac{154}{5} < x < \frac{176}{5}\)

B) \(-\frac{154}{5} < x < \frac{176}{5}\)

C) \(-\frac{154}{5} < x < \frac{176}{5}\)

D) \(-\frac{154}{5} < x < \frac{176}{5}\)

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

A) \(x < 82\)

B) \(82 < x < 70\)

C) \(x > 70\)

D) \(70 < x < 82\)

29) The cost is no more than $336.95.

A) \(x > 336.95\)

B) \(x \geq 336.95\)

C) \(x \leq 336.95\)

D) \(x < 336.95\)

30) The number of people at a concert is not to exceed 2718.

A) \(x > 2718\)

B) \(x \leq 2718\)

C) \(x < 2718\)

D) \(x \leq 2718\)

31) 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

32) 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 $526,000 and $782,000?

A) \(320 < x < 480\)

B) \(480 < x < 640\)

C) \(340 < x < 510\)

D) \(510 < x < 680\)
33) True or False? If $x < 4$ then $-3x < -12$.

A) True  B) False
1) D
2) B
3) B
4) A
5) A
6) B
7) A
8) C
9) D
10) B
11) B
12) B
13) A
14) B
15) C
16) B
17) C
18) D
19) C
20) A
21) B
22) A
23) D
24) B
25) C
26) C
27) C
28) D
29) C
30) B
31) D
32) A
33) B