Test 2 covers all cumulative material, including new sections 3.1 - 3.7, and 4.1 - 4.3. Bring a non-graphing calculator and something to write with and erase with. Be prepared to show your work on all test problems in order to receive full or partial credit.

Word problems (#1 and #2): You must define a variable, set up an equation, and express your answer with units, separate from your work.

1. Find the dimensions of a rectangle whose length is three cm less than twice its width, with a perimeter of 33 cm.
2. You and a friend have lunch and your total bill is $24.60. If you pay $2.10 more than your friend, how much does each of you pay?
3. Solve for \( y \): \( ax - by = c \)
4. What number is 8.5% of 20?
5. 15 is 60% of what number?

6. A bus travels from Austin to Dallas, a distance of 200 miles, using 11.1 gallons of gasoline. The total cost of the gasoline was $18.54. Find the following rates:
   a. Fuel consumption, in miles per gallon
   b. Price of gasoline, in dollars per gallon
   c. Cost of driving, in dollars per mile

7. The value of a computer that was purchased new in 2000 is described by the graph below. What is the rate of change of the value of the computer? Include units in your answer.

8. The population of Texas was 3,055,000 in 1900, and 5,844,000 in 1930. What was the average growth rate of the population between those years? Include units in your answer.

9. Graph the line \( y = 2x - 3 \) by making a table of values and plotting at least three points.

10. For the line described by the equation \( 3x - 2y = 12 \)
    a. What is the x-intercept?
    b. What is the y-intercept?
    c. What is the slope?
    d. Graph the line.

11. Find the slope-intercept equation of the line with slope \( \frac{1}{3} \) and y-intercept \((0, 5)\).
12. Find an equation of the horizontal line through the point \( \left( \frac{1}{2}, 3 \right) \).

13. For the horizontal line through the point \((2, -3)\), find each of the following:
   a. equation
   b. slope
   c. Graph the line

14. For the vertical line through the point \((2, -3)\), find each of the following:
   a. equation
   b. slope
   c. Graph the line

15. Find the slope-intercept equation of each line whose graph is drawn.
   a. 
   b. 

16. For each line whose graph is drawn, find the slope and find an equation of the line.
   a. 
   b. 

17. Find the slope of the line passing through the points \((2, -2)\) and \((1, 3)\).

18. For the line described by the equation \( x = 2 \)
   a. What is the slope?
   b. Graph the line.

19. For the line described by the equation \( y = -3 \)
   a. What is the slope?
   b. Graph the line.

20. Draw the line passing through the point \((-2, -1)\) with slope \( \frac{-2}{3} \).

21. Draw the line passing through the origin with slope 2.

22. Draw the line with slope \( \frac{1}{4} \) and y-intercept \((0, -2)\).

23. Determine whether the lines are parallel. Explain your answer.
   a. \( 3x - 5y = 10 \)
   b. \( 2x + 3y = 6 \)
   a. \( 3x + 5y = 10 \)
   b. \( y = -\frac{2}{3}x - 1 \)
24. Graph the line by any method.
   a. \(2x - 3y = 12\) 
   b. \(y = \frac{3}{2}x - 2\)
   c. \(4x - y = -4\)
   d. \(x + 3y = 0\)

25. Find the slope-intercept equation of the line passing through the points \((3, -2)\) and \((1, 4)\).

26. Find the slope-intercept equation of the line passing through the point \((6, -3)\) with slope \(\frac{1}{4}\).

27. Find the slope-intercept equation of the line passing through the point \((-1, -3)\) with slope \(-5\).

28. Due to inflation, prices have increased 15% since 1995.
   a. Estimate the current price of a textbook that cost $65 in 1995.
   b. A jacket costs $74 now. Estimate what the cost of this jacket would have been in 1995.

29. Solve the inequality. Express your answer in set-builder notation and graph it.
   a. \(-\frac{5}{3}t \geq -10\)
   b. \(4 - x > 5 - 3x\)

30. Simplify.
   a. \(\frac{3x^2}{9x}\)
   b. \((x^3 \cdot x^7)^2\)
   c. \((2mn^2)^3\)
   d. \(\left(\frac{16z^5}{4z^3}\right)^2\)
   e. \(\left(\frac{5x^2y^5}{25y^2}\right)^3\)
   f. \(9x^0\)
   g. \((9x)^0\)

31. List each term, and the degree and coefficient of each term, and state the degree of the polynomial: \(-3x^7 - 1.8x^5 + x^4 - 2x + 5\)

32. Add. \((4x^2 - 8x - 2) + (7x^3 + 5x - 6)\)

33. Subtract.
   a. \((3x^2 + 2x - 1) - (-x^2 - 3x + 2)\)
   b. \(-\left(\frac{1}{2}x^2 + \frac{1}{3}x\right) - \left(\frac{1}{4}x^2 - \frac{1}{2}\right)\)
ANSWERS:

1. Let $w$ be the width in cm.
   Length is $2w - 3$ cm.
   Equation: $6w - 6 = 33$ OR
   $w + w + (2w - 3) + (2w - 3) = 33$
   Answer:
   length = 10 cm, width = 6.5 cm

2. Let $x$ be the amount ($) friend pays.
   You pay $x + 2.10$.
   Equation: $x + (x + 2.10) = 24.60$
   Answer: Your friend pays $11.25 and you pay $13.35.

3. $y = \frac{ax - c}{b}$

4. 1.7

5. 25

6. 
   a. 18 miles per gallon
   b. $1.67$ per gallon
   c. $0.0927$ or $9.27\text{¢}$ per mile

7. decreasing by $400$ per year

8. about $93,000$ people per year

9. points chosen may vary:

10. 
   a. x-intercept: $(4, 0)$
   b. y-intercept: $(0, -6)$
   c. slope: $\frac{3}{2}$

11. $y = \frac{1}{3}x + 5$

12. $y = 3$

13. 
   a. equation is $y = -3$
   b. slope = 0
   c. 

14. 
   a. equation is $x = 2$
   b. slope undefined
   c. 

15. 
   a. $y = \frac{2}{3}x + 2$
   b. $y = \frac{2}{3}x - \frac{7}{3}$
16. a. slope undefined
equation is $x = 2$

b. slope = 0
equation is $y = -3$

17. slope = –5

18. a. slope undefined

21.

22.

23. a. No (different slopes)

b. Yes (same slope)
24. 

a. 

b. 

c. 

d. 

25. \( y = -3x + 7 \) 

26. \( y = \frac{1}{4}x - \frac{9}{2} \) 

27. \( y = -5x - 8 \) 

28. 

a. \( $74.75 \) 

b. \( $64.35 \) 

29. 

a. \( \{t | t \leq 6\} \) 

b. \( \{x | x > \frac{1}{2}\} \) 

30. 

a. \( \frac{x}{3} \) 

b. \( x^{20} \) 

c. \( 8m^3n^6 \) 

d. \( 16z^4 \) 

e. \( \frac{x^6y^9}{125} \) 

f. 9 

g. 1 

31. degree of polynomial = 7 

<table>
<thead>
<tr>
<th>Term</th>
<th>Coefficient</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-3x^7)</td>
<td>(-3)</td>
<td>7</td>
</tr>
<tr>
<td>(-1.8x^5)</td>
<td>(-1.8)</td>
<td>5</td>
</tr>
<tr>
<td>(x^4)</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>(-2x)</td>
<td>(-2)</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

32. \( 7x^3 + 4x^2 - 3x - 8 \) 

33. 

a. \( 4x^2 + 5x - 3 \) 

b. \( -\frac{3}{4}x^2 + \frac{1}{3}x + \frac{1}{2} \)