Start of Test I Review

1. Find the slope of the line that passes through the points $(3, -2)$ and $(-4, 5)$.

2. Is $(-2, 5)$ a solution to $3x - y = 7$?

3. Solve for $x$: $-(x + 16) = 2(x + 1)$.


5. A car rental agency offers two rental plans. With Plan 1, the customer pays $20.00 per day plus $0.10 per mile. With Plan 2, the customer pays $40.00 per day plus $0.05 per mile. How many miles must be driven to make the daily cost of Plan 2 the better deal?

6. Solve for $x$: $-9 \leq 6 - 3x < -3$. Express the answer in interval notation.

7. Find the slope and $y$-intercept of $6x - 2y = 11$.

8. Find the equation of a line parallel to $3x + y = 5$ that passes through the point $(-2, -2)$.

9. Solve $a - b(x - y) = c$ for $x$.

10. What is the $y$-intercept of the horizontal line that passes through $(-3, -7)$?

11. What is the domain, in interval notation of $f(x) = \sqrt{6 - 7x}$?

12. Solve and graph: $2x - 11 \geq -9$ or $x < 8 - x$.

13. A lawyer charges a consultation fee of $125.00 plus $50.00 for every 30 minutes spent working for a client. Write the equation (you do not have to solve) that represents the charges to the client for $x$ hours of work.

14. If $g(x) = 2x^2 - 1$, what is $g(5)$?

15. Solve for $x$: $|x - 14| \leq 3$.

16. Is the following relation a function? $(-1, 8), (3, 2), (5, -1), (8, 200), (16, -1)$.
17. The relationship between the number of pages read, \( P \), and the number of hours, \( h \), spent reading is linear. If someone reads 92 pages in 4 hours one day and 23 pages in one hour the next day, how long will it take to read 108 pages?

18. Consider the graph of \( y=f(x) \) below. Are the following statements true or false?

![Graph]

a. : The \( y \)-intercept is at \((2,0)\).

b. The \( x \)-intercept is at \((-2,0)\).

c. The slope of the line is negative.

d. The slope of the line is 2.

e. \( f(1) = 3 \).

f. The graph represents a function.

g. \( f(-3) = 1 \).

19. What is the equation of the line shown in the graph above?

20. The profit from a sale of tickets to an event is represented by \( P(t) = 25t - 2.4 \). What does the slope of this equation represent?

21. Solve for \( x \) and write the solution in interval notation:

\[
\frac{1}{6}(6x + 2) - 25 < -\frac{1}{4}(8x - 4).
\]
Start of Test II Review

1. Find the values of \( x \) and \( y \) that solve the system:
\[
\begin{align*}
3x + 5y &= 4 \\
-8x + y &= 18
\end{align*}
\]

2. How many terms does the polynomial have and what is its degree?
\[4p^3 + 6p - 7p^4 + 2p^2\]

3. Simplify:
\[ (3a^2 - 2a + 4) - (7a^2 + 4a - 3) + (4a^2 - 3a + 1) \]

4. If \( f(x) = 9 - 2x - 4x^2 \), evaluate \( f(m+4) \).

5. Factor, if possible: \( 30z^2 - 19z - 63 \).

6. Solve for \( v \):
\[ v^2 - 10v + 16 = 0 \]

7. For what value(s) is the following expression undefined?
\[ \frac{3x + 1}{x^2 - 8x + 15} \]

8. What is the LCD of
\[ \frac{y}{y^2 + 5y + 4} \quad \text{and} \quad \frac{y - 3}{y^2 + 9y + 20} \]

9. Factor completely:
\[ 6st + 15t - 10s - 25 \]

10. A ball is thrown upward. Its height after \( t \) seconds is given by
\[ h(t) = -16t^2 + 32t + 768 \]. In how many seconds does the ball hit the ground?

11. Let \( f(x) = 6 + x \) and \( g(x) = x - 4 \). Find (a) \( f(x) - g(x) \) and (b) \( f(x) \cdot g(x) \) and simplify.

12. Multiply and simplify:
\[ \frac{y^2 - y - 30}{5y^3 - 4y^2} \cdot \frac{25y^3 - 16y}{6y - 36} \]

13. The zoo charges $13.00 for adult tickets and $5.00 for children’s tickets. The bill for 140 people on a school trip was $892.00. How many adults and how many children went to the zoo?

14. Factor completely:
\[ 9w^2 + 16 + 24w \]

15. If \( f(x) = x^2 + 12x + 35 \) and \( g(x) = 3 \), for what value(s) is \( f(x) = g(x) \)?
16. The length of the top of a table is 7 m greater than the width. If the area is 78 square meters, find the dimensions of the table.

17. Divide and simplify: \( \frac{t^2 + 2t - 63}{t^2 + 3t - 70} \div \frac{t^2 - 8t - 20}{t^2 + 11t + 18} \).

18. Which of the following is not a polynomial? Are any of the polynomials prime?
   a. \( x^2 + 3x + 5 \)  
   b. \( 4x^2 - 36 \)  
   c. \( x^2 + 2x^{-1} + 3 \)

19. A company determines that its revenue from selling washing machines is determined by \( R(x) = 272.04x - 0.2x^2 \). What is the revenue from selling 152 washing machines?

20. The graph below represents a system of equations. You may assume that each tick mark represents one unit.

a. What is the solution to this system of equations?

b. Find the two equations that the graph above represents.

c. Check that the solution solves the system of equations set up in (b).
Start of Test III Review

1. Divide and simplify: \(16x^3 - 12x^2 - 44x - 16 \div (4x + 4)\).

2. Simplify: \(\frac{\sqrt[3]{72x^7}}{125}\). Assume that all variables represent positive real numbers.

3. Write as an exponential expression: \(\sqrt[3]{x^4}\).

4. Add and simplify: \(9\sqrt{63b^2a} + 2b\sqrt[3]{252a}\). Assume that all variables represent positive real numbers.

5. Multiply and simplify: \((4 + 2\sqrt{3})(7 - \sqrt{2})\).

6. Divide and simplify: \(\frac{\sqrt{28n^9}}{\sqrt{7n}}\).

7. Rationalize the denominator: \(\frac{1}{5 + \sqrt{7}}\).

8. Solve for \(z\): \(\frac{2}{z + 9} = \frac{1}{z - 5}\).

9. Solve \(\frac{1}{A} = \frac{1}{w} + \frac{1}{x}\) for \(x\).

10. Simplify: \(3\sqrt{200} - \sqrt{98} + 2\sqrt{18}\).

11. Use division to determine if \((y - 3)\) is a factor of \(y^2 + 7y + 12\).

12. Simplify: \((2\sqrt{x} + 3)^2\).

13. For \(x\) visits to an aquarium, the cost per visit is represented by \(\frac{\$175}{x} + \$1.95\). Write this as a single rational expression. What is the cost of 4 visits to the aquarium?

14. What is the domain, in interval notation, of \(f(x) = \sqrt{4 - x}\)?
15. Simplify: \[ \frac{\sqrt{32x^8} \cdot \sqrt{z^9}}{\sqrt{x^6z^2} \cdot \sqrt{4}}. \]

16. Are the following statements true or false?

   a. \( \sqrt{x^2 - 16} = x - 4. \)
   
   b. \( \sqrt{16x} = 4x \)
   
   c. \( (\sqrt{x} + \sqrt{y})^2 = x + y. \)
   
   d. \( (3\sqrt{2})(\sqrt{3}) = 3\sqrt{6} \)

17. If \( f(x) = 5x\sqrt{27x} \) and \( g(x) = 4\sqrt{3x^3} \), find
   
   a. \( f(x) + g(x). \)
   
   b. \( f(x) - g(x). \)

18. Find the area of a rectangle whose length is \( \sqrt{5} \) inches and whose width is \( 2\sqrt{5} \) inches.

19. Rationalize the denominator and simplify: \( \frac{\sqrt{a} - \sqrt{b}}{\sqrt{a} + \sqrt{b}}. \)

20. Solve: \( \frac{9 + \frac{8}{p}}{p^2} = \frac{20}{p^2}. \)
Start of Test IV Review

1. Solve for $y$: \(\sqrt{4y + 4} - \sqrt{3y + 7} = 0\), where $y$ is a real number.

2. Multiply and simplify: \((6 + 8i)(3 - 9i)\).

3. Solve: \((3k - 1)^2 + 9 = 1\).

4. Find the value of $t$ such that \(z^2 - 8z + t\) is a perfect square.

5. If \(f(x) = x^2 - 8\) and \(g(x) = 8x - 11\) find all value(s) of $x$ such that \(f(x) = g(x)\).

6. Solve: \(x^2 + 10x + 4 = 0\).

7. Write the quadratic equation that has \(x = 2, x = -10\) as solutions.

8. Solve for $z$: \(2z^3 - 2z^2 - 3 = 0\).

9. Use the discriminant to find the number and type of solutions for \(4x^2 + x = -5\).

10. Find the vertex and domain and range of: \(f(x) = 3x^2 + 18x + 5\).

11. The temperature, $t$, in degrees Fahrenheit, of a chemical reaction is approximated by the function \(t(s) = 3s^2 - 36s + 70\) where $s$ is the number of seconds after the reaction begins. What is the lowest temperature attained by the reaction, and when will it occur?

12. Consider the function \(f(x) = -x^2 + 9x - 20\). Which statement(s) is/are true?
   a. The roots occur at \((4,0)\) and \((-5,0)\).
   b. The vertex is at \((\frac{9}{2}, \frac{1}{4})\).
   c. The $y$-intercept is at \((-20,0)\).
   d. The domain is \((-\infty, \infty)\).
   e. The graph is a parabola that opens upward.
13. Simplify: \(5\sqrt{\frac{1}{25}}\).

14. Solve: \(2x^2 + 16 = 0\).

15. What is the range, in interval notation, of the function below? You may assume that each tick mark represents one unit.

![Graph of a quadratic function with axis of symmetry at x=2]

16. Simplify: \(\frac{18 + \sqrt{-72}}{6}\).

17. Evaluate and simplify: \((2 + 3i)^2\).

18. Evaluate: \(\sqrt{-16}(\sqrt{-5} - \sqrt{-16})\).

19. Solve by completing the square: \(x^2 + 6x + 7 = 0\).

20. What is the vertex of the graph of the quadratic function \(f(x) = -2x^2 + 4x + 1\)?
Answers to MAT 135 Test Review

Test I

1) \( m = -1 \)
2) No
3) \( x = -6 \)
4) \( x = \frac{14}{5}, x = -2 \)
5) \( x > 400 \)
6) \( (3, 5]\)
7) \( m = 3, b = \frac{-11}{2} \)
8) \( y = -3x - 8 \)
9) \( x = \frac{a+by-c}{b} \)
10) \( (0, -7) \)
11) \( (-\infty, \frac{6}{7}] \)
12) \( (-\infty, \infty) \)
13) \( 125 + 100x \)
14) \( 49 \)
15) \( [11, 17] \)
16) Yes
17) \( 4\frac{16}{23} \) hours
18) a) F
d) F
g) F
19) \( y = x + 2 \)
20) cost of tickets
21) \( (-\infty, \frac{77}{9}) \)

Test II

1) \( (-2, 2) \)
2) 4 terms, degree of 4
3) \(-9a + 8\)
4) \(-4m^2 - 34m - 63\)
5) \((5z - 9)(6z + 7)\)
6) \(v = 2, v = 8\)
7) \(x = 3, x = 5\)
8) \((y + 1)(y + 4)(y + 5)\)
9) \((2s + 5)(3t - 5)\)
10) \(t = 8\)
11) a) 10
d) \(x^2 + 2x - 24\)
12) \(\frac{(y+5)(5y+4)}{6y}\)
13) 24 adults, 116 children
14) \((3w + 4)^2\)
15) \(x = -8, x = -4\)
16) \(w = 6, l = 13\)
17) \(\frac{(t + 9)^2}{(t^2 - 100)}\)
18) a is prime, c is not a polynomial
19) $36,729.28
20) a) (6,2)
   b) \(l_1: y = x - 4; l_2: y = -x + 8\)
   c) yes
Test III
1) \(4x^2 - 7x - 4\)
2) \(\frac{2x^2}{5} \sqrt[3]{9x}\)
3) \(x^{\frac{4}{3}}\)
4) \(39b\sqrt[4]{7a}\)
5) \(28 - 4\sqrt{2} + 14\sqrt{3} - 2\sqrt{6}\)
6) \(2n^4\)
7) \(\frac{5 - \sqrt{7}}{18}\)
8) \(z = 19\)
9) \(x = \frac{A^w}{w - A}\)
10) \(29\sqrt{2}\)
11) No
12) \(4x + 12\sqrt{x} + 9\)
13) \$182.80
14) \((-\infty, 4]\)
15) \(2xz\sqrt{2}\)
16) a) F  
b) F  
c) F  
d) T  
17) a) \(19x\sqrt{3x}\)  
b) \(11x\sqrt{3x}\)
18) \(A = 10\)
19) \(\frac{a - 2\sqrt{ab} + b}{a - b}\)
20) \(p = -2, \ p = \frac{10}{9}\)

Test IV
1) \(y = 3\)
2) \(90 - 30i\)
3) \(k = \frac{1 \pm 2i\sqrt{2}}{3}\)
4) \(t = 16\)
5) \(x = 4 \pm \sqrt{13}\)
6) \(x = -5 \pm \sqrt{21}\)
7) \(x^2 + 8x - 20 = 0\)
8) \(z = 27, z = -1\)
9) 2 complex numbers solutions
10) \((-3, -22), D(-\infty, \infty), \ R(-22, \infty)\)
11) Lowest temp: \(-38^\circ\) occurs at 6 seconds
12) a) F  
b) T  
c) F  
d) T  
e) F  
13) \(i\)
14) \(x = \pm 2i\sqrt{2}\)
15) \((-\infty, 6]\)
16) \(3 + i\sqrt{2}\)
17) \(12i - 5\)
18) \(-4\sqrt{5} + 16\)
19) \(x = -3 \pm \sqrt{2}\)
20) \((1, 3)\)