This review is a general representation of what you will find on the Final Exam. If there are variations of a review problem, do not forget to study the variations. For example, if the review problem involves perpendicular lines, study the characteristics of perpendicular and parallel lines. Remember to memorize all of the needed formulas.

The following formulas will be provided on the final exam:

**Absolute Formulas**

- \(|u| < c\) \(\iff -c < u < c\)
- \(|u| > c\) \(\iff u < -c\) or \(u > c\)
- \(|u| = c\) \(\iff u = c, u = -c\)

**Cube Formulas**

- \(r^3 + s^3 = (r + s)(r^2 - rs + s^2)\)
- \(r^3 - s^3 = (r - s)(r^2 + rs + s^2)\)

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

**Solve the equation.**

1) \((y - 7) - (y + 7) = 9y\)

A) \(\left\{-\frac{14}{5}\right\}\)
B) \(\left\{-\frac{2}{9}\right\}\)
C) \(\{-2\}\)
D) \(\left\{-\frac{14}{9}\right\}\)

2) \(8(3x - 9) = 6(4x + 6)\)

A) 108
B) 0
C) No solution
D) All real numbers

3) \(\frac{P - 3P}{8} = 3\)

A) \{21\}
B) \{-24\}
C) \{-21\}
D) \{24\}

4) \(0.04(4x - 6) = 0.16(x + 7) - 1.36\)

A) -0.24
B) -1.36
C) all real numbers
D) no solution

**Solve the problem.**

5) In a recent school board election, the two candidates for president received 2398 votes. The loser received 1406 fewer votes than the winner. How many votes did the winner receive?

A) 992 votes
B) 1902 votes
C) 496 votes
D) 1654 votes

**Solve the mixture problems.**

6) How many liters of a 30% alcohol solution must be mixed with 60 liters of a 50% solution to get a 40% solution?

A) 6 liters
B) 12 liters
C) 120 liters
D) 60 liters

7) Ellen wishes to mix candy worth $1.64 per pound with candy worth $3.36 per pound to form 30 pounds of a mixture worth $2.33 per pound. How many pounds of the $3.36 per pound candy should she use?

A) 18 pounds
B) 12 pounds
C) 17 pounds
D) 20 pounds

**Solve the investment problem.**

8) Walt made an extra $10,000 last year from a part-time job. He invested part of the money at 7% and the rest at 8%. He made a total of $740 in interest. How much was invested at 8%?

A) $6000
B) $4000
C) $8000
D) $5000
Solve the inequality. Give the solution set in both interval and graph forms.

9) $9 < -3y + 3 \leq 21$

- **A)** $[2, 6)$
- **B)** $(2, 6]$
- **C)** $[-6, -2)$
- **D)** $(-6, -2]$

10) $-18x + 12 \leq -6(2x + 2)$

- **A)** $(-\infty, 4)$
- **B)** $[4, \infty)$
- **C)** $(4, \infty)$
- **D)** $(-\infty, 4]$

For the compound inequality, give the solution set in both interval and graph forms.

11) $12x - 8 < 4x \text{ or } -4x \leq -12$

- **A)** $\emptyset$
- **B)** $(1, 3)$
- **C)** $[1, 3]$
- **D)** $(-\infty, 1) \cup [3, \infty)$
Solve the inequality and graph the solution set.

12) \( |x - 9| \geq 8 \)

- \[\text{A)} [1, 17]\]
- \[\text{B)} [1, \infty)\]
- \[\text{C)} [17, \infty)\]
- \[\text{D)} (-\infty, 1] \cup [17, \infty)\]

Find the slope of the line through the pair of points.

13) \((7, -7)\) and \((-2, -8)\)

- \[\text{A)} \frac{7}{3}\]
- \[\text{B)} \frac{1}{9}\]
- \[\text{C)} 9\]
- \[\text{D)} \frac{3}{7}\]
^Find the x- and y-intercepts. Then graph the equation.
14) \(-2x + 8y = -4\)

A) \(\left(\frac{-1}{2}, 0\right)\); \((0, 2)\)

B) \((-2, 0); \left(0, \frac{-1}{2}\right)\)

C) \(\left(\frac{-1}{2}, 0\right); (0, -2)\)

D) \((2, 0); \left(0, \frac{-1}{2}\right)\)
Find the x- and y-intercepts. Then graph the equation.

15) \( x = -3 \)

\[ \text{A) None; (0, -3)} \]

\[ \text{B) None; (0, -3)} \]

\[ \text{C) (-3, 0); none} \]

\[ \text{D) (-3, 0); none} \]
Convert to Slope–Intercept Form and sketch the graph.

16) $4x + 5y = 27$

A) Slope: $-\frac{4}{5}$

B) Slope: $\frac{5}{4}$

C) Slope: $-\frac{5}{4}$

D) Slope: $\frac{4}{5}$
Graph the linear inequality.

17) \(-4y > 3x + 12\)

A) Dashed line; shading below the line
B) Dashed line; shading above the line
C) Solid line; shading above the line
D) Dashed line; shading below the line

Decide whether the pair of lines is parallel, perpendicular, or neither.

18) \(3x - 2y = -9\) and \(2x + 3y = -3\)
A) Parallel
B) Perpendicular
C) Neither

Write an equation of the line through the given point with the given slope. Write the equation in slope-intercept form.

19) \(({-6, -8}), m = \frac{2}{3}\)
A) \(y = -\frac{2}{3}x + 4\)
B) \(y = \frac{2}{3}x - 4\)
C) \(y = \frac{3}{2}x - 4\)
D) \(y = \frac{2}{3}x + 4\)
Find an equation of the line passing through the two points. Write the equation in standard form.

20) (4, -2) and (0, 3)
A) -6x + 3y = -9  
B) -5x + 4y = 12  
C) 6x - 3y = -9  
D) 5x + 4y = 12  

Write the equation of the line in y = mx + b format with the given slope and y-intercept.
Hint: Is there any math needed on this problem?

21) slope 9;  
y-intercept (0, -2)
A) y = 9x + 2  
B) y = -2x + 9  
C) y = 9x - 2  
D) y = 2x + 9  

^Determine the slope and y-intercept. Write the slope-intercept form of the equation of the line and then, using the equation, predict the value of y when x = 24.

22) 

A) y = \frac{4}{5}x + 4; 25  
B) y = \frac{5}{4}x - 5; 25  
C) y = -4x - 5; -85  
D) y = 4x - 5; 75
23) The graph shows the total cost $y$ (in dollars) of owning and operating a mini-van where $x$ is the number of miles driven.

a. Calculate the slope using the slope formula. Express the slope in decimal form, rounded to the nearest cent.

b. What is the cost when miles driven = 0? (Hint: What is the $y$-intercept?)

c. Write the cost equation in $y = mx + b$ format that represents the graph. (No math required.) Use the information from questions 21a and 21b.

d. Using the cost equation, predict the cost if the mini-van drives 30,000 miles.

A) $30.00$ per mile, cost = 5000, $y = 30x + 5000$, $y = 30(30000) + 5000 = 905000$
B) $2.75$ per mile, cost = 0, $y = 2.75x + 0$ same as $y = 2.75$, $y = 2.75(30000) = 82500$
C) cannot be determined
D) $0.36$ per mile, cost = 0, $y = 0.36x + 0$ same as $y = 0.36x$, $y = 0.36(30000) = 10800$

24) Solve the system by substitution or elimination. What is the value of the variable "y"?

\[ 5x - 2y = -1 \]
\[ x + 4y = 35 \]
A) 9 B) 3 C) 8 D) 9

25) Solve the system by elimination or substitution. What is the value of the variable "x"?

\[ 7x + 5y = -25 \]
\[ 2x + 2y = -10 \]
A) -1 B) Inconsistent: no solutions C) 0 D) -4

26) Solve the system by elimination or substitution. What is the value of the variable "y"?

\[ 4x - 8y = 4 \]
\[ 16x - 32y = 12 \]
A) 12 B) -2/5 C) $\emptyset$ D) 3

27) Solve the system of equations. What is the value of the variable "y"?

\[ 5x + 2y + z = -3 \]
\[ 4x - 3y - z = -9 \]
\[ 2x + y + 4z = -15 \]
A) -4 B) 3 C) 2 D) 1

28) Evaluate the expression.

\[ (-13)^0 + (-13)^0 \]
A) -2 B) 2 C) -26 D) 0
Use a combination of rules for exponents to simplify. Write answers with only positive exponents.

29) \((6x^{-4})^5(x^2)^{-5}\)
   A) \(\frac{6^5}{x^2}\)  
   B) \(6^5x^{200}\)  
   C) \(\frac{6^5}{x^{30}}\)  
   D) \(\frac{1}{6^{20}x^{30}}\)  

Use a combination of rules for exponents to simplify. Write answers with only positive exponents.

30) \(\frac{4p^{-3}q^2}{3^{-1}m^3}\)^2
   A) \(\frac{12q^2}{p^3m^3}\)  
   B) \(\frac{144q^2}{p^6m^6}\)  
   C) \(\frac{144q^2}{m^6}\)  
   D) \(\frac{12}{p^6m^6}\)  

Express the number in standard notation.

31) \(5.67 \times 10^{-4}\)
   A) -567,000  
   B) 0.00567  
   C) 0.000567  
   D) 0.0000567  

Multiply.

32) \((10x - y)^2\)
   A) \(100x^2 + y^2\)  
   B) \(100x^2 - 20xy - 2y^2\)  
   C) \(100x^2 - 20xy + y^2\)  
   D) \(100x^2 - 10xy + y^2\)  

33) \(2t^4(t - 2)(3t + 3)\)
   A) \(6t^6 - 6t^5 - 12t^4\)  
   B) \(6t^6 - 12t^5 - 12t^4\)  
   C) \(6t^6 - 12t^5 - 6t^4\)  
   D) \(6t^6 - 12t^4\)  

For the pair of functions, find the difference \((f - g)(x)\).

34) \(f(x) = x^2 + 3x - 4\), \(g(x) = -7x^2 + 7x - 6\); \((f - g)(x)\)
   A) \(8x^2 - 4x + 2\)  
   B) \(-6x^2 + 10x - 2\)  
   C) \(8x^2 - 11x + 8\)  
   D) \(-7x^2 - 10x + 2\)  

For the pair of functions, find the product \((fg)(x)\).

35) \(f(x) = 5x + 4\), \(g(x) = -x^2 + 5x + 7\)
   A) \(-5x^3 + 22x^2 + 55x - 28\)  
   B) \(-10x^2 + 21x^2 + 55x + 28\)  
   C) \(5x^3 + 21x^2 - 55x - 28\)  
   D) \(-5x^3 + 21x^2 + 55x + 28\)  

Divide.

36) \(\frac{-24x^6 + 24x^4 - 56x^2}{-8x^4}\)
   A) \(3x - 3 + \frac{7}{x}\)  
   B) \(3x - 3 + \frac{7}{x^2}\)  
   C) \(3x^2 - 3 + \frac{7}{x}\)  
   D) \(3x^2 - 3 + \frac{7}{x^2}\)  

Divide.

37) \(\frac{5r^3 - 32r^2 - 17r - 28}{r - 7}\)
   A) \(5r^2 + 3r + 4\)  
   B) \(5r^2 + 3r + \frac{4}{r - 7}\)  
   C) \(5r^2 - 3r - 4\)  
   D) \(r^2 + 4r + 3\)  

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Factor completely.

38) 6x² + x - 5
   A) (6x - 5)(x + 1)   B) (6x - 1)(x + 5)   C) (6x + 1)(x - 5)   D) (6x + 5)(x - 1)

39) 3x³ + 3x²y - 18xy²
   A) 3x(x - 2y)(x + 3y)   B) Prime
   C) 3x(x + 2y)(x - 3y)   D) (3x² + 6xy)(x - 3y)

40) 125a³ - 27b³
   A) (125a - 3b)(a² + 15ab + 9b²)   B) (5a + 3b²)(25a² - 15ab + 9b²)
   C) (5a - 3b)(25a² + 15ab + 9b²)   D) (5a - 3b)(25a² + 9b²)

41) 4n + 4x - n² - nx
   A) (n - x)(4 - n)   B) (n + x)(4 - n)   C) (n - x)(4 + n)   D) (n + x)(4 - x)

Find all solutions by factoring.

42) 2x² + 9x = -9
   A) {-3, -6}   B) \[ \left\{ 3, \frac{3}{2} \right\} \]   C) \[ \left\{ -\frac{3}{2}, -3 \right\} \]   D) \[ \left\{ 3, -\frac{3}{2} \right\} \]

43) 9k² = 16
   A) \[ \left\{ \frac{2}{3}, -\frac{2}{3} \right\} \]   B) \[ \left\{ \frac{3}{2}, -\frac{2}{3} \right\} \]   C) \[ \left\{ \frac{3}{2}, 0 \right\} \]   D) \{2, 0\}

Find all numbers that are not in the domain of the function. Then give the domain using set notation.

44) f(x) = \( \frac{16}{x² - 9x + 8} \)
   A) 1, 8; \{x | x ≠ 1, 8\}   B) 0; \{x | x ≠ 0\}
   C) -8, -1; \{x | x ≠ -8, -1\}   D) 0, 1; \{x | x ≠ 0, 1\}

Express the rational expression in lowest terms.

45) \( \frac{16m⁶p²}{2m⁹p} \)
   A) 8m³p²   B) \( \frac{8m³}{p} \)   C) 8mp   D) \( \frac{8p}{m³} \)

46) \( \frac{4x + 4}{12x² + 20x + 8} \)
   A) \( \frac{4x + 3}{3x + 20} \)   B) \( \frac{4x + 4}{12x² + 20x + 8} \)   C) \( \frac{1}{3x + 2} \)   D) \( \frac{4x}{3x + 2} \)
Perform the indicated operation and express in lowest terms.

47) \( \frac{k^2 + 12k + 32}{k^2 + 13k + 40} \cdot \frac{k^2 + 5k}{k^2 + 6k + 8} \)

A) \( \frac{k}{k^2 + 13k + 40} \)
B) \( \frac{k^2 + 5k}{k + 2} \)
C) \( \frac{1}{k + 2} \)
D) \( \frac{k}{k + 2} \)

48) \( \frac{4p - 4 + 9p - 9}{4p^2} \)

A) \( \frac{16p^3 - 16p^2}{9p^2 - 9p} \)
B) \( \frac{9}{16p} \)
C) \( \frac{16p}{9} \)
D) \( \frac{36p^2 + 72p + 36}{4p^3} \)

Add or subtract as indicated. Write the answer in lowest terms.

49) \( \frac{2}{15x} - \frac{4}{21x^2} \)

A) \( \frac{2(7x - 10)}{105x^2} \)
B) \( \frac{-8}{105x^2} \)
C) \( \frac{-2}{15x + 21x^2} \)
D) \( -\frac{2}{315x^2} \)

Perform the indicated operation and simplify.

50) \( \frac{2}{r} + \frac{8}{r + 3} \)

A) \( \frac{-6r - 10}{r(r + 3)} \)
B) \( \frac{10r + 6}{r(r + 3)} \)
C) \( \frac{10r + 6}{r(-3 - r)} \)
D) \( \frac{6r - 10}{r(-3 - r)} \)

Simplify the complex fraction.

51) \( \frac{1}{k + 2} \)

A) \( \frac{k + 2}{3} \)
B) \( \frac{k - 2}{3} \)
C) \( k - 2 \)
D) \( \frac{3}{k - 2} \)

Solve the equation.

52) \( 1 - \frac{3}{2x} = \frac{7}{4} \)

A) \{2\} 
B) \( \left\{ \frac{1}{2} \right\} \)
C) \( \left\{ -\frac{1}{2} \right\} \)
D) \{-2\}

53) \( \frac{2}{t} = \frac{t}{-3t - 4} \)

A) \( \left\{ 0, \frac{4}{3} \right\} \)
B) \{-2, -4\}
C) \( \emptyset \)
D) \{0, 16\}

54) \( \frac{6}{x - 6} = 1 + \frac{8}{x + 6} \)

A) \( \emptyset \)
B) \{10, -12\}
C) \{-8, 12\}
D) \{-10, 12\}
55) Martha can rake the leaves in her yard in 4 hours. Her younger brother can do the job in 5 hours. How long will it take them to do the job if they work together?  
A) 20 hr  
B) \( \frac{9}{20} \) hr  
C) 5 hr  
D) \( \frac{20}{9} \) hr

56) If \( s \) varies directly as \( t^2 \), and \( s = 192 \) when \( t = 8 \), find \( s \) when \( t = 4 \).  
A) 48  
B) 24  
C) 32  
D) 96

57) The current \( I \) in an electrical conductor varies inversely as the resistance \( R \) of the conductor. The current is 3 amperes when the resistance is 654 ohms. What is the current when the resistance is 770 ohms?  
A) 0.28 amps  
B) 3.5 amps  
C) 2.5 amps  
D) 0.39 amps

58) \( 125^{\frac{4}{3}} \)  
A) 625  
B) 78,125  
C) 15,625  
D) 3125

59) \( (4a^{\frac{1}{7}}b^{\frac{5}{7}})^2 \)  
A) \( 4a^2b^{\frac{10}{7}} \)  
B) \( 16a^2b^{\frac{10}{7}} \)  
C) \( 16(ab)^{\frac{10}{7}} \)  
D) \( 8a^2b^{\frac{5}{7}} \)

60) \( \sqrt[3]{4m^{11}} \)  
A) \( 2m^5 \)  
B) \( 2m^5\sqrt[3]{m} \)  
C) \( 2m^4\sqrt[3]{m} \)  
D) \( 2m^6 \)

61) \( \sqrt[3]{320} \)  
A) \( 4\sqrt[3]{20} \)  
B) 4  
C) \( 4\sqrt[3]{5} \)  
D) 20

62) \( \sqrt[5]{5x} + 7\sqrt[5]{80x} + 2\sqrt[5]{180x} \)  
A) \( 10\sqrt[5]{265x} \)  
B) \( 9\sqrt[5]{265x} \)  
C) \( 40\sqrt[5]{5x} \)  
D) \( 41\sqrt[5]{5x} \)

63) \( (5 - 2\sqrt{3})^2 \)  
A) \( 25 + 4\sqrt{3} \)  
B) \( 25 - 4\sqrt{3} \)  
C) \( 37 + 20\sqrt{3} \)  
D) \( 37 - 20\sqrt{3} \)

64) \( \frac{3}{\sqrt{50}} \)  
A) \( \frac{3\sqrt{2}}{10} \)  
B) \( \frac{3\sqrt{2}}{50} \)  
C) \( \frac{\sqrt{6}}{10} \)  
D) \( \frac{3\sqrt{50}}{50} \)
Solve the equation.

65) \(\sqrt{8q + 2} = 6\)
   A) \(\frac{19}{4}\)\hspace{1cm} B) 1\hspace{1cm} C) \(\frac{17}{4}\)\hspace{1cm} D) \(\frac{1}{2}\)

66) \(\sqrt{x + 7} + 5 = x\)
   A) \{9, 18\}\hspace{1cm} B) \{2, 9\}\hspace{1cm} C) \{2\}\hspace{1cm} D) \{9\}

Simplify and write result in terms of \(i\).

67) \(5 - \sqrt{-48}\)
   A) \(5 - 4\sqrt{3}i\)\hspace{1cm} B) \(5 - 4i\sqrt{3}\)\hspace{1cm} C) \(5 - 4i\sqrt{3}\)\hspace{1cm} D) \(5 + 4i\sqrt{3}\)

Find each product. Write the result in the form \(a + bi\).

68) \((5 + i\sqrt{3})(5 - i\sqrt{3})\)
   A) 28\hspace{1cm} B) 34\hspace{1cm} C) 25 + 3i\hspace{1cm} D) 22

Solve the equation by completing the square.

69) \(z^2 + 12z + 24 = 0\)
   A) \(\{6 + 2\sqrt{6}, 6 - 2\sqrt{6}\}\)\hspace{1cm} B) \(\{6 + 2\sqrt{3}\}\)\hspace{1cm} C) \(\{-6 + 2\sqrt{3}, -6 - 2\sqrt{3}\}\)\hspace{1cm} D) \(\{-12 + 2\sqrt{6}\}\)

Use the quadratic formula to solve the given equation.

70) \(3n^2 = -12n - 1\)
   A) \(\left\{\frac{-6 + \sqrt{33}}{6}, \frac{-6 - \sqrt{33}}{6}\right\}\)\hspace{1cm} B) \(\left\{\frac{-6 + \sqrt{39}}{3}, \frac{-6 - \sqrt{39}}{3}\right\}\)
   C) \(\left\{\frac{-12 + \sqrt{33}}{3}, \frac{-12 - \sqrt{33}}{3}\right\}\)\hspace{1cm} D) \(\left\{\frac{-6 + \sqrt{33}}{3}, \frac{-6 - \sqrt{33}}{3}\right\}\)

Use the quadratic formula to solve the given equation.

71) \(x^2 + x + 1 = 0\)
   A) \(\left\{\frac{1 + i\sqrt{3}}{2}, \frac{1 - i\sqrt{3}}{2}\right\}\)\hspace{1cm} B) \(\frac{-1 \pm \sqrt{3}}{2}\)
   C) \(\left\{\frac{-1 + i\sqrt{3}}{2}, \frac{-1 - i\sqrt{3}}{2}\right\}\)\hspace{1cm} D) \(\frac{1 \pm \sqrt{3}}{2}\)

Solve the problem.

72) If a ball is projected upward with an initial velocity of 96 ft per sec from a height \(h\) of 112 ft, then its height \(t\) sec after it is projected is defined by the equation \(h = -16t^2 + 96t + 112\). How many sec after it is projected will it hit the ground?
   A) 9 sec \hspace{1cm} B) 1 sec \hspace{1cm} C) 8 sec \hspace{1cm} D) 7 sec
Solve the inequality, and graph the solution set. Also express answer in interval notation.

73) \( x^2 + 4x \leq -3 \)

A) \([-3, -1]\)

B) \((\infty, 1) \cup [3, \infty)\)

C) \((1, 3)\)

D) \([1, 3]\)

74) \(\frac{2y + 5}{y - 7} \leq 0\)

A) \([-\frac{5}{2}, 7]\)

B) \(\left(-\infty, -\frac{5}{2}\right] \cup (7, \infty)\)

C) \(\left(-\infty, -\frac{5}{2}\right] \cup [7, \infty)\)

D) \(\left[-\frac{5}{2}, 7\right]\)
Find the vertex and sketch the parabola.

75) $y = 3(x - 6)^2 - 2$

A) 

B) 

C) 

D)
Find the vertex and sketch parabola. Do you have \( x = -\frac{b}{2a} \) memorized?

76) \( f(x) = -x^2 + 2x - 3 \)
Answer Key
Testname: 2015S M330 FEXAM REVIEW

1) D          53) B
2) C          54) B
3) B          55) D
4) C          56) A
5) B          57) C
6) D          58) A
7) B          59) B
8) B          60) B
9) C          61) C
10) B         62) D
11) D         63) D
12) D         64) A
13) B         65) C
14) D         66) D
15) D         67) C
16) A         68) A
17) A         69) C
18) B         70) D
19) B         71) C
20) D         72) D
21) C         73) A
22) B         74) A
23) D         75) C
24) C         76) A
25) C
26) C
27) B
28) B
29) C
30) B
31) C
32) C
33) A
34) A
35) D
36) D
37) A
38) A
39) A
40) C
41) B
42) C
43) A
44) A
45) D
46) C
47) D
48) C
49) A
50) B
51) B
52) D