

MIDDLESEX COUNTY COLLEGE

MAT 014 FINAL REVIEW

1. Simplify.

$$(-4zp^5u^3)^3$$

[A] $-12z^4p^8u^6$

[B] $-64z^3p^{15}u^9$

[C] $-64z^4p^{15}u^6$

[D] $-12z^3p^8u^9$

2. Evaluate $3cd + c^2$ when $c = -3$ and $d = -4$.

[A] -1089

[B] 45

[C] 1089

[D] -45

3. Simplify.

$$(x^2 - 7x + 10) + (3x^2 - 14x + 33) - (x^2 + 4x - 4)$$

[A] $3x^2 - 25x + 47$

[B] $3x^2 - 17x + 39$

[C] $5x^2 - 25x + 47$

[D] $5x^2 - 17x + 39$

4. Simplify.

$$(5x + 2y)^2$$

[A] $25x^2 + 14xy + 4y^2$

[B] $25x^2 + 20xy + 4y^2$

[C] $25x^2 + 10xy + 4y^2$

[D] $25x^2 + 4y^2$

5. Simplify.

$$(3x + 7y)(3x - 7y)$$

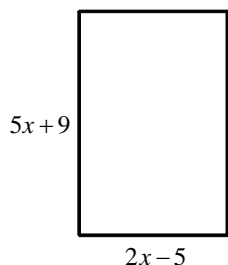
[A] $9x^2 - 42x + 49y^2$

[B] $9x^2 + 49y^2$

[C] $9x^2 - 49y^2$

[D] $9x^2 + 42x - 49y^2$

6. Find the area of the rectangle written as a simplified polynomial.



[A] $14x + 8$

[B] $7x^2 + 4x - 45$

[C] $7x^2 - 7x + 45$

[D] None of these

7. Factor.

$$12x^2 - 42x^5$$

- [A] $6(2x^2 - 7x^5)$ [B] $6x(x - 7x^4 + 5)$ [C] $x^2(12 - 42x^3)$ [D] $6x^2(2 - 7x^3)$

8. Factor.

$$2x^2 - 14x - 2x + 14$$

- [A] $(2x - 6)(2x - 2)$ [B] $2x(x - 7)(x - 1)$ [C] $2(x - 7)(x - 1)$ [D] $x(2x - 6)(2x - 2)$

9. Factor.

$$4x^2 - 9y^2$$

- [A] $(2x + 3y)^2$ [B] $(2x + 3)(2x - 3)$ [C] $(2x - 3y)^2$ [D] $(2x + 3y)(2x - 3y)$

10. Factor.

$$4x^2 - 13x + 3$$

- [A] $(x + 3)(4x + 1)$ [B] $(4x + 3)(x + 1)$ [C] $(x - 3)(4x - 1)$ [D] $(4x - 3)(x - 1)$

11. Factor.

$$c^2 - 8c + 16$$

- [A] $(c - 4)^2$ [B] $(c + 4)^2$ [C] $(c - 4)(c + 4)$ [D] $(c - 16)(c + 1)$

12. Factor completely.

$$3x^3 - 3x^2 - 6x$$

- [A] $-(x + 1)(x - 2)$ [B] $3x(x + 1)(x - 2)$ [C] $(x + 1)(x - 2)$ [D] $-3x(x + 1)(x - 2)$

13. Solve the equation and check your solution.

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

- [A] 3 [B] -17 [C] 5 [D] -7

14. Solve the equation.

$$\frac{x + 2}{3} - \frac{x - 2}{5} = 4$$

- [A] -6 [B] 22 [C] 28 [D] 0

15. Solve.

$$2x(7x-2)=0$$

[A] $-2, -\frac{2}{7}$

[B] $0, -\frac{7}{2}$

[C] $0, \frac{2}{7}$

[D] $-2, \frac{7}{2}$

16. The length of a rectangle is 16 centimeters less than four times its width. If the area is 20 square centimeters, find the length and width.

[A] Length: 5 cm; Width: 5 cm

[B] Length: 4 cm; Width: 5 cm

[C] Length: 4 cm; Width: 6 cm

[D] Length: 6 cm; Width: 4 cm

17. Find the distance between the points $(-3, -4)$ and $(-7, -4)$.

[A] 8

[B] 10

[C] 18

[D] 4

18. Find the midpoint of the segment connecting $(13, -15)$ and $(-12, 12)$.

[A] $(-1, 3)$

[B] $(1, -3)$

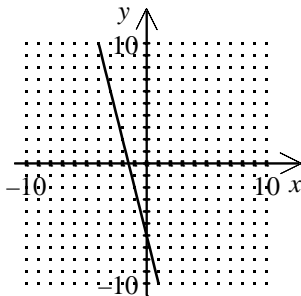
[C] $\left(\frac{25}{2}, -\frac{27}{2}\right)$

[D] $\left(\frac{1}{2}, -\frac{3}{2}\right)$

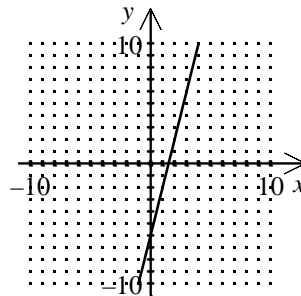
19. Graph the linear equation:

$$y = -4x + 6$$

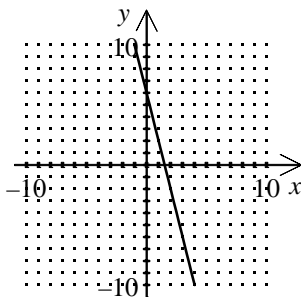
[A]



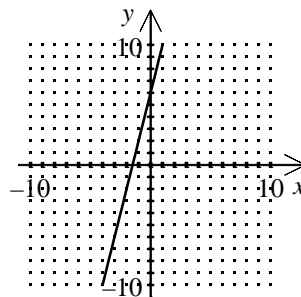
[B]



[C]



[D]

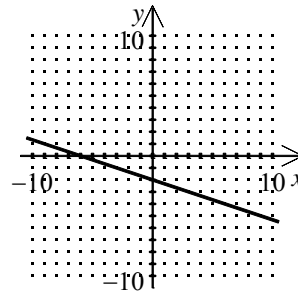
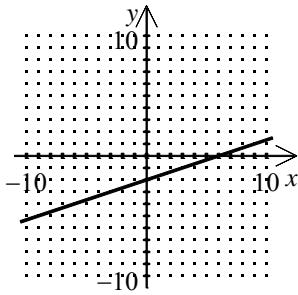


20. Rewrite the equation in slope-intercept form. Then graph the equation.

$$-x + 3y = 6$$

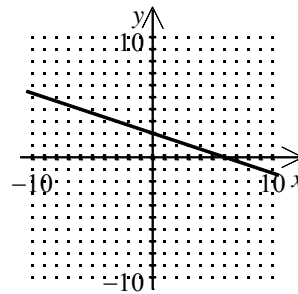
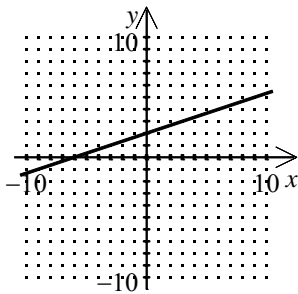
[A] $y = \frac{1}{3}x - 2$

[B] $y = -\frac{1}{3}x - 2$



[C] $y = \frac{1}{3}x + 2$

[D] $y = -\frac{1}{3}x + 2$



21. Find the slope of the line that contains $(-7, -5)$ and $(-4, -6)$.

[A] -13

[B] -3

[C] $-\frac{1}{3}$

[D] 1

22. Which best describes the relationship between the lines with equations $8x + y = 6$ and $16x + 2y = 0$?

[A] Perpendicular

[B] Parallel

[C] Same line

[D] Neither parallel nor perpendicular

23. Which relation has domain $\{-8, 7, -7\}$ and range $\{-7, -1, 6\}$?

[A] $\{(-8, -7), (7, -1), (-7, 6)\}$

[B] $\{(-7, -8), (-1, 7), (6, -7)\}$

[C] $\{-8, 7, -7\}$

[D] $\{-7, -1, 6\}$

24. Determine which relation is a function.

[A] $\{(9, 1), (3, 1), (2, 4), (4, 9)\}$

[B]

x	y
-8	5
-7	3
-8	1

[C]

x	y
-9	5
-8	3
-8	1

[D]

x	y
-7	5
-7	3
-8	1

25. Find $f(-2)$ given that $f(x) = 4x^2 - 2x - 25$.

[A] 20

[B] -5

[C] -29

[D] -17

26. Determine the domain of the function.

$$f(x) = \frac{2}{6 - x}$$

[A] All real numbers $x \neq 6$

[B] All real numbers $x \neq -6$

[C] All real numbers $x \neq 0$

[D] All real numbers $x \neq -2$

27. Which is the equation of a vertical line through $(-8, 10)$?

[A] $y = -8$

[B] $y = 10$

[C] $x = -8$

[D] $x = 10$

28. Find the point-slope form of an equation of the line that passes through the given point and has the given slope.

$$(-3, -2), m = \frac{1}{2}$$

[A] $y + 2 = \frac{1}{2}(x - 3)$

[B] $y - 2 = \frac{1}{2}(x + 3)$

[C] $y - 2 = \frac{1}{2}(x - 3)$

[D] $y + 2 = \frac{1}{2}(x + 3)$

29. Which is the equation in slope-intercept form of the line that is perpendicular to $y = \frac{10}{9}$ and contains $(2, 8)$?

[A] $x = 8$

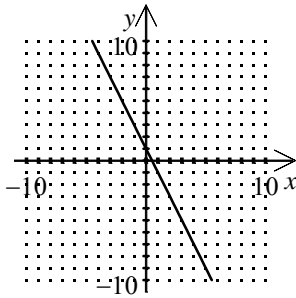
[B] $x = 2$

[C] $y = 2$

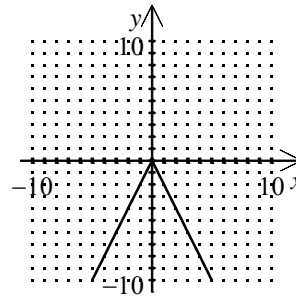
[D] $y = 8$

30. Use the Vertical Line Test to determine which graph does *not* represent y as a function of x .

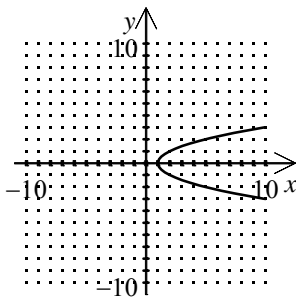
[A]



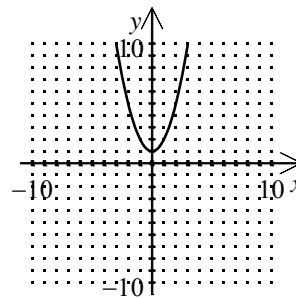
[B]



[C]



[D]



31. The daily cost of renting a car is \$30 plus \$0.10 per mile. If John paid \$52.50 for a 1-day rental, how many miles did John travel?

[A] 225

[B] 23

[C] 525

[D] 825

32. Train A leaves a station traveling at 48 kilometers per hour. Two hours later, train B leaves the same station traveling in the same direction at 58 kilometers per hour. How long does it take train B to catch up to train A?

[A] 9.6 hr

[B] 10.6 hr

[C] 7.6 hr

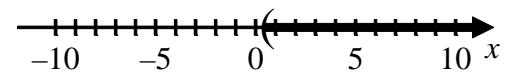
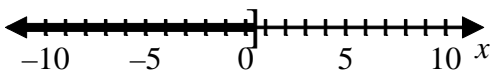
[D] 8.6 hr

33. Solve the inequality and sketch the solution on the real number line.

$$4x - 3 \geq 2(x - 1)$$

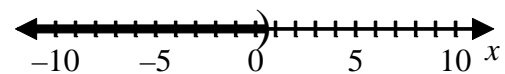
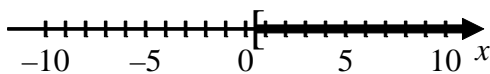
[A] $x \leq \frac{1}{2}$

[B] $x > \frac{1}{2}$



[C] $x \geq \frac{1}{2}$

[D] $x < \frac{1}{2}$



34. Solve the inequality.

$$-15 \leq 3x + 12 \leq 12$$

[A] $0 \leq x \leq -9$

[B] $-3 \leq x \leq 24$

[C] $24 \leq x \leq -3$

[D] $-9 \leq x \leq 0$

35. Solve the equation.

$$|x + 8| = 9$$

[A] 17, -1

[B] -1

[C] 1, -17

[D] \emptyset

36. Solve the inequality.

$$|3x + 4| > 4$$

[A] $x < -\frac{8}{3}$ or $x > 0$

[B] $-\frac{8}{3} \leq x \leq 0$

[C] $-\frac{8}{3} < x < 0$

[D] $x \leq -\frac{8}{3}$ or $x \geq 0$

37. Solve the system of equations using substitution.

$$\begin{cases} 3x + 2y = -7 \\ -x + y = 4 \end{cases}$$

[A] (-3, 1)

[B] (-3, -1)

[C] (-2, 6)

[D] (1, -5)

38. Solve the system of equations using elimination.

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

[A] $\left(\frac{3}{11}, \frac{10}{11}\right)$

[B] $\left(0, -\frac{10}{11}\right)$

[C] (0, -1)

[D] No solution

39. Simplify.

$$\frac{6a^4b^{-2}}{36a^{-2}b^{-4}}$$

[A] $\frac{6}{a^6b^{-2}}$

[B] $\frac{a^6b^2}{6}$

[C] $\frac{a^6b^{-2}}{6}$

[D] $\frac{6}{a^6b^2}$

40. Identify the number in scientific notation.

$$0.00000481$$

[A] 481×10^{-6}

[B] 4.81×10^{-6}

[C] 4.81×10^7

[D] 4.81×10^{-4}

41. Use rules of exponents to rewrite the expression in simpler form.

$$216^{-2/3}$$

[A] 6

[B] $\frac{1}{36}$

[C] 36

[D] $\frac{1}{6}$

42. Perform the operation and simplify.

$$x^{-1/3} \cdot x^{-3/5}$$

[A] $x^{14/15}$

[B] $\frac{1}{x^{14/15}}$

[C] $x^{1/5}$

[D] $\frac{1}{x^{1/5}}$

43. Simplify.

$$\sqrt{27a^2b^3c^5}$$

[A] $9a^2bc^2\sqrt{3bc}$

[B] $3abc\sqrt{3bc}$

[C] $3abc^2\sqrt{3bc}$

[D] $3a^2b^2c^2\sqrt{3bc}$

44. Simplify the expression.

$$\frac{15}{\sqrt[3]{9}}$$

[A] $\frac{5}{6}$

[B] $5\sqrt[3]{3}$

[C] $\frac{5}{2}\sqrt[3]{3}$

[D] $\frac{5}{3}$

45. Simplify.

$$x - 3\sqrt{x} - 6\sqrt{x} + 4$$

[A] $-18x^2 + 4$

[B] $18x^2 + 4$

[C] $x - 9\sqrt{x} + 4$

[D] $x + 3\sqrt{x} + 4$

46. Simplify.

$$3\sqrt{2}(\sqrt{3} + 2\sqrt{9})$$

[A] $3\sqrt{6} + 18\sqrt{2}$

[B] $3\sqrt{6} + 6\sqrt{2}$

[C] $3\sqrt{5} + 6\sqrt{11}$

[D] $15\sqrt{6} + 18\sqrt{2}$

47. Rationalize the denominator and simplify.

$$\frac{3}{3\sqrt{2} - \sqrt{3}}$$

[A] $\frac{3\sqrt{2} - \sqrt{3}}{5}$

[B] $\frac{3\sqrt{2} - \sqrt{3}}{22}$

[C] $\frac{3\sqrt{2} + \sqrt{3}}{5}$

[D] $\frac{3\sqrt{2} + \sqrt{3}}{22}$

48. Solve.

$$\sqrt[3]{5x-8} + 4 = 6$$

- [A] 0 [B] $\frac{12}{7}$ [C] $\frac{16}{5}$ [D] $-\frac{4}{5}$

49. Solve.

$$\sqrt{x+2} + \sqrt{x} = 4$$

- [A] 7 [B] 196 [C] No solution [D] $\frac{49}{16}$

50. Simplify the number by using the imaginary number i .

$$\sqrt{-48}$$

- [A] $-4i\sqrt{3}$ [B] $i\sqrt{-48}$ [C] $4i\sqrt{3}$ [D] $-48i$

51. Solve:

$$3x^2 + 17x = -20$$

- [A] $4, \frac{5}{3}$ [B] $-4, \frac{5}{3}$ [C] $-4, -\frac{5}{3}$ [D] $4, -\frac{5}{3}$

52. Solve:

$$x^2 - 180 = 0$$

- [A] $6\sqrt{5}$ [B] $-6\sqrt{5}, 6\sqrt{5}$ [C] $-36, 36$ [D] $-5\sqrt{6}, 5\sqrt{6}$

53. Solve using the Quadratic Formula.

$$3x^2 - 4x - 6 = 0$$

- [A] $\frac{-2 + \sqrt{22}}{3}, \frac{-2 - \sqrt{22}}{3}$ [B] $\frac{2 + \sqrt{22}}{3}, \frac{2 - \sqrt{22}}{3}$
[C] $\frac{-2 + 2\sqrt{22}}{3}, \frac{-2 - 2\sqrt{22}}{3}$ [D] $\frac{2 + 2\sqrt{22}}{3}, \frac{2 - 2\sqrt{22}}{3}$

54. Determine the type of solution for the quadratic equation.

$$5x^2 - 20x + 20 = 0$$

- [A] A unique real solution [B] Two distinct imaginary solutions
[C] Two distinct real solutions [D] Cannot be determined

55. The product of two consecutive positive integers is 62 more than the third consecutive integer. What is the largest of the three integers?

[A] 5

[B] 8

[C] 6

[D] 10

56. Write the rational expression in simplest form.

$$\frac{x^2 + 3x - 4}{x^2 + 10x + 24}$$

[A] $\frac{x-1}{x+6}$, $x \neq -6$, $x \neq -4$

[B] $\frac{x+1}{x+6}$, $x \neq -6$, $x \neq 4$

[C] $\frac{x-1}{x-6}$, $x \neq 6$, $x \neq -4$

[D] $\frac{x+1}{x-6}$, $x \neq 6$, $x \neq 4$

57. Simplify.

$$\frac{c^3}{de} \cdot \frac{7d^3e}{6c^2}$$

[A] $\frac{7c^3d^3}{6cde}$

[B] $\frac{1}{2}$

[C] $\frac{7cd^2}{6}$

[D] $\frac{6c^5}{7d^4e^2}$

58. Divide and simplify.

$$\frac{x+3}{x-3} \div \frac{x^2-9}{3-x}$$

[A] $\frac{1}{3-x}$, $x \neq \pm 3$

[B] $\frac{1}{x-3}$, $x \neq \pm 3$

[C] $\frac{x+3}{x-3}$, $x \neq 3$

[D] $\frac{1}{1-x}$, $x \neq -3$

59. Simplify the complex fraction.

$$\frac{\left(\frac{x^2-6x+9}{10x}\right)}{\left(\frac{x-3}{5x}\right)}$$

[A] $\frac{x+9}{2x}$

[B] $\frac{x+3}{2}$

[C] $\frac{x-3}{2}$

[D] $-5x-3$

60. Simplify.

$$\frac{x-7}{-8x} + \frac{-2x+7}{-8x}$$

[A] $\frac{1}{4}$

[B] $\frac{x-2x}{-16x}$

[C] $\frac{x}{8}$

[D] $\frac{1}{8}$

61. Simplify.

$$\frac{x-1}{x^2-3x-10} + \frac{x+1}{x^2-25}$$

[A] $\frac{2x^2-3x+7}{(x-5)(x+5)(x+2)}$

[B] $\frac{2x^2+7x-3}{(x-5)(x+5)(x+2)}$

[C] $\frac{2x^2+7x+7}{(x-5)(x+5)(x+2)}$

[D] $\frac{2x^2-3x-3}{(x-5)(x+5)(x+2)}$

62. Simplify the complex fraction.

$$\frac{\left(\frac{4}{x} - \frac{1}{2x}\right)}{\left(\frac{2}{3x} + \frac{3}{4x}\right)}$$

[A] $\frac{42}{17}$

[B] $\frac{3}{12x^2}$

[C] $\frac{5}{12x^2}$

[D] $\frac{17}{42}$

63. Simplify.

$$\frac{10x^2y^4 + 25x^2y + 5xy}{5xy}$$

[A] $2xy^3 + 5x + 1$

[B] $2xy^3 + 25x^2y + 5xy$

[C] $2xy^3 + 5x + xy$

[D] $2xy^3 + 25x^2y + 1$

64. Solve.

$$\frac{x^2}{2} - \frac{7x}{4} = -\frac{3}{2}$$

[A] $-\frac{3}{2}, -2$

[B] $-\frac{2}{3}, -\frac{1}{2}$

[C] $\frac{3}{2}, 2$

[D] $\frac{2}{3}, \frac{1}{2}$

65. Solve.

$$\frac{4}{x} + \frac{12}{x-5} = -11$$

[A] $-\frac{5}{11}, 4$

[B] 4

[C] $\frac{6}{11}, 5$

[D] 5