

NAME: _____ DATE: _____

2018 PRE-CAL PAP SUMMER REVIEW

*****DUE AUGUST 1ST*****

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DROP OFF & PUT IN MY BOX AT THE HIGH SCHOOL**

You can see this site for help: <https://www.khanacademy.org/math/algebra2>

1. Simplify the following radical expression. Provide answers in simplest radical form.

$$-5\sqrt{240} =$$

2. Simplify the following rational expression: $\frac{2\sqrt{5}}{-\sqrt{75}} =$

3. Simplify the following expression: $\left(\frac{4a^{-3}b^2}{5a^4b^3}\right)^2$

4. Simplify the following expression: $(2a^{-2}b^4)^{-3}$

5. Solve the following equation: $3(4 - 2x) = -5x - 3(x - 1)$

6. Solve the following equation: $\frac{x-2}{\frac{1}{4}} = \frac{2}{7}$

7. Solve the following inequality: $\frac{2x-8}{3} \geq 2x-20$

8. On your basketball team, the starting players' scoring averages are between 10 and 24 points per game. What absolute value inequality describes the scoring averages for the players?

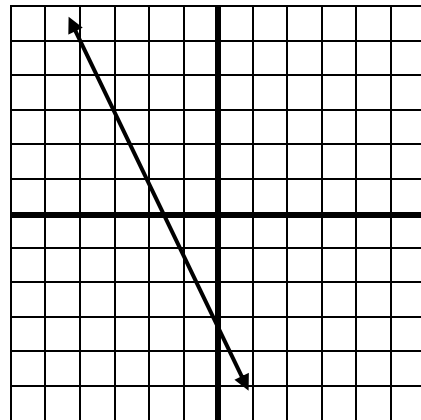
- A. $|x - 10| < 24$
- B. $|x - 24| < 10$
- C. $|x - 17| < 7$
- D. $|x - 17| \leq 7$

9. Is this a linear function?

X	-6	-1	4	9	14	16
y	1	3	5	7	9	11

- A. Yes, because there is a constant additive change in the x values.
- B. Yes, because there is a constant additive change in the x and y values.
- C. No, because there is not a constant additive change in the x values.
- D. No, because there is not a constant additive change in the y values.

10. What is the equation of the line?



11. Write the equation of the line that passes through the point (2,3) and is parallel to the line $x-2y=6$ in slope intercept form.

Determine whether the following statements are always true, sometimes true, or never true.

12. A line that has a slope of zero is perpendicular to the y-axis.

- A. Always
- B. Sometimes
- C. Never

13. A line with a negative slope and a positive y-intercept will pass through quadrant III.

- A. Always
- B. Sometimes
- C. Never

14. A line that passes through (0,0) and (2,4) will have the slope of 4.

- A. Always
- B. Sometimes
- C. Never

15. Solve for x: $|2(x-4)| \leq 8$

16. Identify the domain for the following function.

$$f(x) = \frac{x^2 - 7}{2x + 3}$$

17. Identify the domain for the following function.

$$f(x) = \sqrt{-4x + 5}$$

$$\text{Let } f(x) = 2x^2 - 3x + 1 \quad g(x) = \frac{2x - 3}{x + 2} \quad h(x) = \frac{1}{5}x - 7$$

18. Find $f(-3) - h(2)$.

- A) 27.75
- B) 34.6
- C) 7.75
- D) -7.75

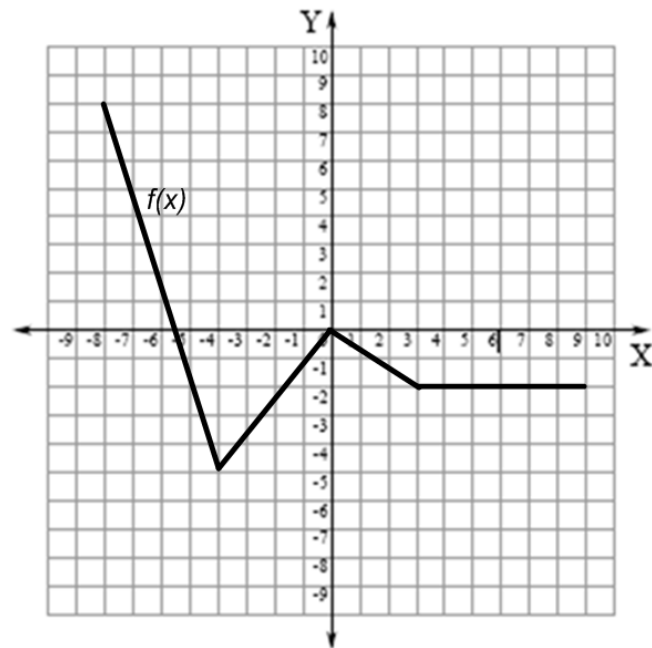
$$\text{Let } f(x) = 2x^2 - 3x + 1 \quad g(x) = \frac{2x-3}{x+2} \quad h(x) = \frac{1}{5}x - 7$$

19. Find $h(g(-1))$.

- A) 2
- B) -2
- C) -8
- D) 8

20. Which statement about the function $f(x)$ is **not true**.

- A) $f(-4) = -5$ and $f(0) = 0$
- B) $f(-2) = -2$ and $f(-2) = 4$
- C) $f(-5.5) = 0$ and $f(0) = 0$
- D) $f(-8) = 8$ and $f(9) = -2$

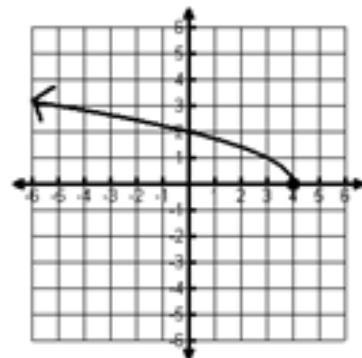


21. Suppose the *Mighty Mustang Team* is selling tickets to its annual Powder Puff Game. The stadium seats 500 people. For this particular game, the amount of money collected is a function of the number of people, n , in attendance. Each ticket for the game costs \$5.00. Which of the following statements is **not true** regarding this situation?

- A) The function $f(n) = 5n$ describes the amount of money collected at the game.
- B) The amount of money collected depends on the number of people, n , in attendance.
- C) A reasonable range for this function is $n = \{0, 5, 10, 15, \dots\}$
- D) This function represents discrete data.

22. The graph to the right represents $f(x)$. Which statement below describing $f(x)$ is true?

- A) The range is $[0, \infty)$ and $f(x)$ does not represent a function.
- B) The range is $(-\infty, \infty)$ and $f(x)$ represents a function.
- C) The domain is $(-\infty, 4]$ and $f(x)$ does not represent a function.
- D) The domain is $(-\infty, 4]$ and $f(x)$ represents a function.



23. Which statement about quadratic parent function is true?

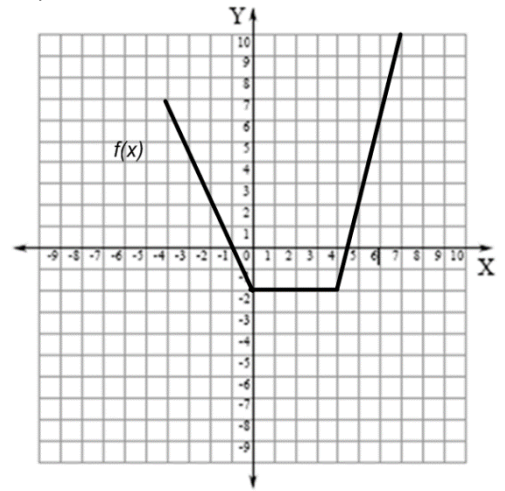
- A) The domain and range is all real numbers.
- B) The vertex is $(0, 0)$
- C) The graph of the quadratic parent function is a parabola that opens down.
- D) The range is all real numbers.

24. Given a function $f(x)$, which of the following functions accurately describes $f(x)$ with a reflection across the x axis, a horizontal translation right 3 units, and a vertical translation up 7 units.

- A) $g(x) = -f(x-3) + 7$
- B) $g(x) = f(-x-3) - 7$
- C) $g(x) = -f(x+3) + 7$
- D) $g(x) = f(-x+3) - 7$

25. The function $f(x)$ has a domain of $\{-4 < x < 2\}$ and a range of $\{-1 < y < 6\}$. What is the domain and range of $g(x)$ if $g(x) = -f(x-3)$?

26. The function $f(x)$ is graphed to the right. If $g(x) = 2f(x-3) + 4$, find the new location of the original point with coordinates $(0, -2)$.

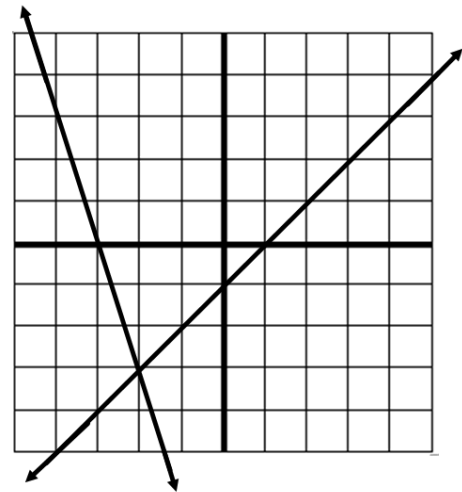


27. Write the function which translates $f(x) = |x|$ left 7 units and down 5.

28. Consider the following system of equations $\begin{cases} x - \frac{1}{3}y = -2 \\ 6x + 2y = -12 \end{cases}$. What is the solution to the system?

29. Which system of equations represents the following graph?

- A) $\begin{cases} x = -2 \\ y = -3 \end{cases}$
- B) $\begin{cases} 3x + y = -9 \\ x - y = 1 \end{cases}$
- C) $\begin{cases} x + y = 1 \\ 3x - y = -9 \end{cases}$
- D) $\begin{cases} y = 3x - 9 \\ y = -x + 1 \end{cases}$



30. Bryan has a combination of nickels and dimes worth \$2.90. If he has a total of 35 coins, how many nickels does he have?

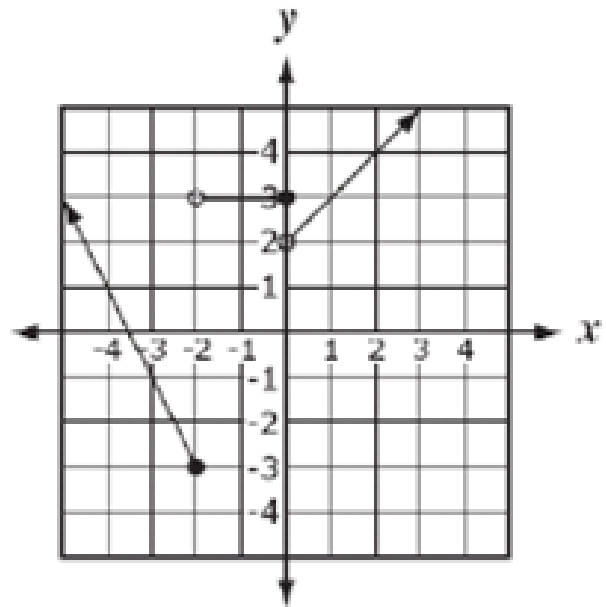
31. Which function is best represented by the graph?

A. $f(x) = \begin{cases} -2x - 3.5 & \text{for } x \leq -2 \\ 3 & \text{for } -2 < x \leq 0 \\ x + 2 & \text{for } x > 0 \end{cases}$

B. $f(x) = \begin{cases} -2x - 7 & \text{for } x \leq -2 \\ 3 & \text{for } -2 < x \leq 0 \\ 2x & \text{for } x > 0 \end{cases}$

C. $f(x) = \begin{cases} -2x - 7 & \text{for } x \leq -2 \\ 3 & \text{for } -2 < x \leq 0 \\ x + 2 & \text{for } x > 0 \end{cases}$

D. $f(x) = \begin{cases} -2x - 7 & \text{for } x \leq -2 \\ 3x & \text{for } -2 < x \leq 0 \\ x + 2 & \text{for } x > 0 \end{cases}$



32. What is the solution of this system?

$$\begin{cases} 5x - 2y + z = 0 \\ 2x - y + z = -3 \\ 3x + 4y = 18 \end{cases}$$

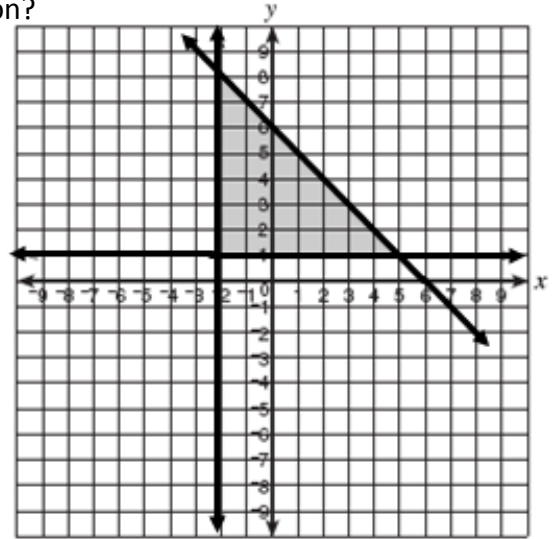
33. Which set of constraints produced the shaded feasible region?

A. $\begin{cases} y \geq 6 - x \\ x \geq 1 \\ y \geq -2 \end{cases}$

B. $\begin{cases} x + y \leq 6 \\ x \geq -2 \\ y \geq 1 \end{cases}$

C. $\begin{cases} x \leq 6 - y \\ x \geq 1 \\ y \leq 2 \end{cases}$

D. $\begin{cases} x + y \leq 8 \\ x - y \leq 6 \\ x \geq -2 \\ y \geq 1 \end{cases}$



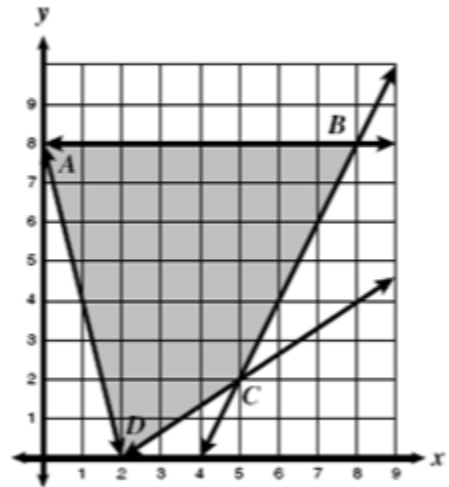
34. The graph of the linear programming model consists of polygon ABCD and its interior. Under these constraints, which is the point where the maximum value of $4x + 3y$ occurs?

A. A

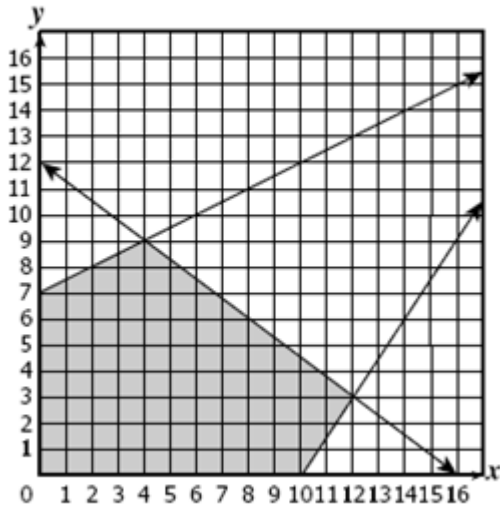
B. B

C. C

D. D



35. What appears to be the maximum value of $P = 5x + 6y$ for the feasible region in the graph?



A. 72

B. 74

C. 78

D. 80

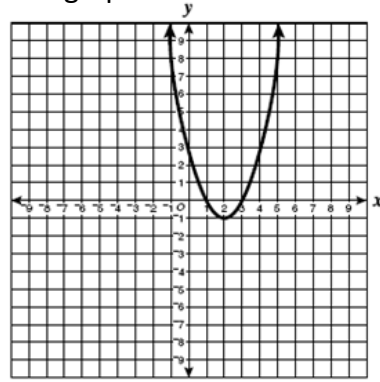
36. Which of the following is most likely the equation of the graph?

A. $f(x) = (x-2)^2 - 1$

B. $f(x) = (x-2)^2 + 1$

C. $f(x) = (x+2)^2 + 1$

D. $f(x) = 5(x-1)^2 - 2$



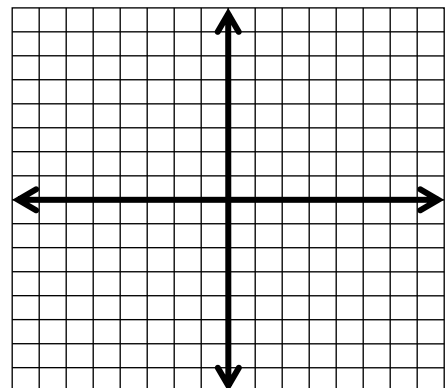
37. What are the coordinates of the vertex of $f(x) = \frac{2}{3}(x-4)^2 + 1$?

38. In the function $f(x) = a(x-4)^2$, where $a > 0$, what happens to the graph of f as the value of a increases?

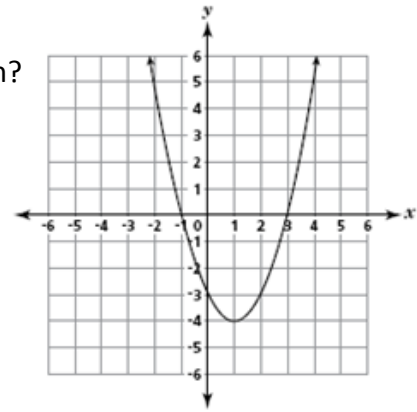
39. Which of the following sentences is true about the graphs of $y = 3(x-5)^2 + 1$ and $y = 3(x+5)^2 + 1$?

- A. Their vertices are maximums.
- B. The graphs have the same shape with different vertices.
- C. The graphs have different shapes with different vertices.
- D. One graph has a vertex that is a maximum while the other graph has a vertex that is a minimum.

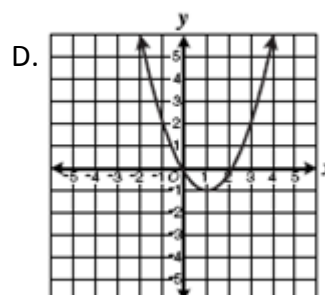
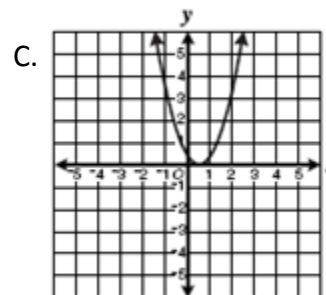
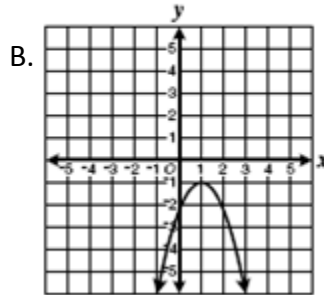
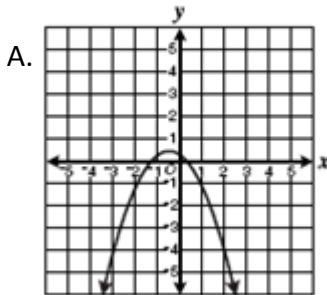
40. Graph the quadratic function $f(x) = x^2 + 10x + 25$?



49. What are the roots of the graph of this quadratic equation?



50. Which graph represents a quadratic equation with no real solutions?



51. What are the roots of the equation $3x^2 - x + 2 = 0$

52. The height h of a golf ball in feet t seconds after it is hit into the air is modeled by $h(t) = -16t^2 + 64t$. How long is the ball in the air?

53. A farmer wants to enclose his pasture which is bordered by a river. If he uses 750 feet of fencing on three sides of the field, what is the largest area he can enclose?

54. Which statement about the function $g(x) = -\frac{1}{2}(x-5)^2 + 2$ is not true?

- A) There is a shift right 5.
- B) There is a shift up 2.
- C) It is reflected across the y-axis.
- D) There is a vertical compression by $\frac{1}{2}$.

55. Write the correct representation of the quadratic function.

The parent function $f(x) = x^2$ is vertically stretched by a factor of 4 and translated 1 unit left and 5 units down to create $h(x)$.

56. Which statement is true about the following function $f(x) = -3x^2 + 6x + 9$.

- A) The graph opens up.
- B) The vertex is (1, 12).
- C) The range is $y \leq 9$.
- D) The axis of symmetry is $x = -1$

57. What are the roots of the equation: $16x^2 - 8x = 0$?

58. What are the solutions to the following equation: $\frac{1}{2}(x-1)^2 = 12$

59. What term would go in the blank if you were to complete the square?

$$x^2 + 12x + \underline{\hspace{2cm}}$$

60. An airline sells a 3-day vacation package. Sales from this vacation package can be modeled by the quadratic function $a(p) = -12p^2 + 36000p$. Sales are dependent of the price, p , of the package. If the price is set too high, the package won't sell, but if the price is too low, prospective buyers will think it's a scam. At what price does the company have the greatest revenue?

- a) \$1500
- b) \$3000
- c) \$27000000
- d) \$3600

61. The dosage d of a drug that a physician prescribes varies directly as the patient's mass m , and $d = 100$ mg when $m = 65$ kg. Find d to the nearest milligram when $m = 90$ kg.

62. For what values of the variable is the expression undefined? $\frac{4x^6}{2x-6}$

63. Simplify the following expression. $\frac{\frac{2}{x} + \frac{x}{x+1}}{x}$

64. Subtract the following rational expressions. $\frac{3x-2}{2x+5} - \frac{2}{5x-2}$

65. Given the following function, identify the zeros and the vertical asymptotes.

$$\frac{x^2 - x - 12}{x}$$

66. Identify the holes in the graph of the following function: $\frac{x^2 - 9}{x - 3}$

66. Simplify the following expression.

$$2\sqrt[3]{54} - 3\sqrt[3]{2}$$

A) $3\sqrt[3]{2}$

B) $\sqrt[3]{2}$

C) $-\sqrt[3]{2}$

D) 0

67. Solve the following radical equation.

$$3\sqrt[3]{x} - 2 = 16$$

68. Solve the following radical equation.

$$\sqrt{x+5} = x-1$$

69. Solve the following radical equation.

$$(3x+3)^{\frac{2}{3}} = 36$$

70. What would the expression $\sqrt[3]{4^2}$ written with an exponent look like?

71. How many roots (real or imaginary) will the following expression have: $\sqrt[2]{-216}$

72. Simplify the following expression: $\frac{(2a^4b)^2}{(3ac^4)(4a^5b)}$

73. Which of the following is not a transformation of the following function from its parent function?

$$y = -2\sqrt{x-3} + 4$$

- A) vertical stretch
- B) shift up 4 units
- C) shift right 3 units
- D) reflection over the y-axis

74. **True / False** The following functions demonstrate exponential decay.

$$f(x) = .5(1+.03)^x \qquad f(x) = \frac{7}{8}(1.4)^x$$

75. You purchased a new car for \$22,500 in 2008. The value of the car decreases by 16% each year. Which equation below can be used to calculate the value of the car in 2014?

- A) $V = 22500(1-16)^{14}$
- B) $V = 22500(1-16)^6$
- C) $V = 22500(1-.16)^6$
- D) $V = 22500(1+.16)^6$

76. Rewrite in exponential form: $\log_7 343 = 3$

77. Which expression below is equivalent to the following?

$$\log_3 \frac{x^2 y}{5}$$

A) $\frac{\log x^2 y}{\log 5}$

B) $\left(\frac{x^2 y}{5}\right) \log_3$

C) $2 \log_3 x + \log_3 y - \log_3 5$

D) $2 \log_3 x + \log_3 x + \log_3 y - \log_3 5$

78. Solve the following logarithmic equation. $\log_7(-x+6) = 2$

79. Solve the following logarithmic equation. $3 \ln x + 4 \ln x = 14$

80. Solve the following logarithmic equation. $10^{4x} + 8 = 15$

81. Between what consecutive integers must the solution to $\log_2 60$ lie?

A) 4 and 5

B. 5 and 6

C. 30 and 31

D. 14 and 15

82. Find the difference. $(4x^2 - 3x^3 + 8x - 1) - (6x^3 + 5x - 4)$

83. Find the product. $(3x^2 + x - 5)(2x - 1)$

84. Find the quotient using synthetic division. $(x^3 - 5x^2 - 18x + 28) \div (x - 7)$

85. What is the 6th row of Pascal's triangle? (Count the apex, 1, as the first row.)

A. 1 3 6 3 1

B. 1 4 6 4 1

C. 1 4 9 9 4 1

D. 1 5 10 10 5 1

86. Which is a factor of $x^3 + 64$?

A. $x - 4$

B. $x + 4$

C. $x - 8$

D. $x + 8$

87. How many solutions does the equation $y = x^5 - 6x^3 + 4x$ have?

88. The polynomial function $f(x) = 2x^3 - 15x^2 + 6x + 7$ has one zero at $x = 1$. What are the other zeros of $f(x)$ (use synthetic division)?

89. Which of the following functions of x has the greatest number of roots in the complex (imaginary) number system?

A. $y = x + x^2$

B. $y = -x + 3$

C. $y = x^2 - 4x + 2$

D. $y = x^3 + x^2 - 1$

90. What are the zeros of the polynomial function $f(x) = 2x^3 + 3x^2 + 8x + 12$?

A. $-\frac{3}{2}, -2i, 2i$

B. $-\frac{3}{2}i, -2i, 2i$

C. $-3, -2i, 2i$

D. $-3, i, -i$