

SUMMER STUDY PACKET  
Precalculus and Trigonometry

Dear Precalculus and Trigonometry student,

This summer packet will enable you to be successful in knowing prerequisites for your next course. The content and philosophy of this summer packet is consistent with our departmental goals for all high school students: The summer packet will enable you to:

- (1) value mathematics
- (2) become confident in your ability to do mathematics
- (3) become a mathematical problem solver
- (4) communicate mathematically
- (5) reason mathematically

This summer assignment will not be collected. You are responsible for knowing how to solve every single problem, but this does not mean you need to do every single one. The problems should be done in chronological order. Each problem should include a summary of the problem statement, a complete step-by-step solution, and a boxed final answer. You should not use a calculator to do the problems, but you may use your calculator to check your answer.

You will take a quiz on this summer packet study material on Friday of the first week of school. The quiz will consist of approximately twenty (20) free-response questions (no multiple choice, matching, etc.); you will not be able to use a calculator on the test. This will count as a quiz grade for the first quarter.

If you do not know how to do a problem you are expected to use the sources available to you (notes, handouts, books, Internet, etc.) to figure it out independently. The best study routine during the summer months is to constantly review topics and do a few problems each day, not attempt to do the entire packet the day before school starts.

If you need some examples, you can access

You can find videos on how to solve problems of any of the subjects at the following links:

<http://thealgebracorner.shutterfly.com/videosonalgebra>

<http://www.khanacademy.org/>

[http://www.mathtv.com/videos\\_by\\_topic](http://www.mathtv.com/videos_by_topic)

Contact Info

If you have any questions regarding the summer assignment, please contact me at [june.mitsubishi@asfg.edu.mx](mailto:june.mitsubishi@asfg.edu.mx) or [leticia.garcia@asfg.edu.mx](mailto:leticia.garcia@asfg.edu.mx).

Enjoy your summer and do your best!

Sincerely,

The ASFG Math Department

Solve each equation.

2)  $|-7 + 2b| = 7$

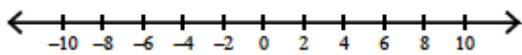
3)  $|10m + 3| = -67$

4)  $4|10v + 2| = 72$

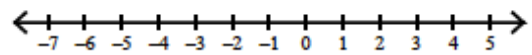
5)  $\frac{|7 + 2x|}{10} = 3$

Solve each inequality and graph its solution.

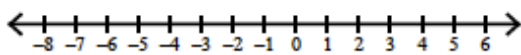
6)  $|10a + 7| < 93$



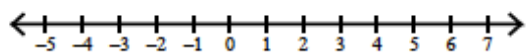
7)  $|4n + 2| < -14$



8)  $|-5 + k| + 10 > 3$

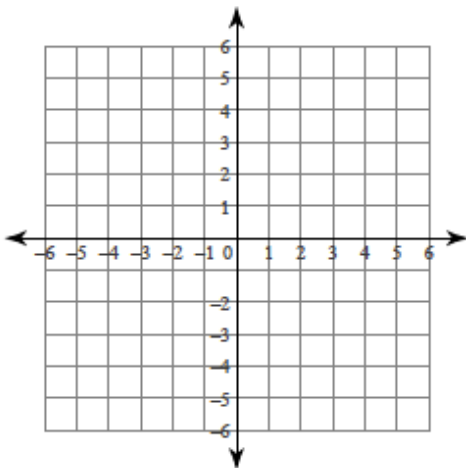


9)  $-5|-2x + 1| < -15$

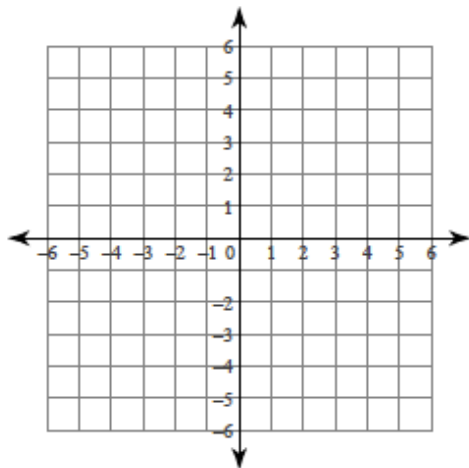


Graph each equation.

10)  $y = |x| + 2$



11)  $y = |x| - 2$



Simplify each expression.

12)  $-2(5m + 2) - 3(1 - 7m)$

13)  $5(1 - 5p) - 2p(1 + 6p)$

Find the value that completes the square and then rewrite as a perfect square.

14)  $a^2 + 17a + \underline{\hspace{1cm}}$

15)  $x^2 - 13x + \underline{\hspace{1cm}}$

Solve each equation by completing the square.

16)  $4b^2 + 8b - 84 = -7$

17)  $4r^2 + 8r - 66 = -9$

Simplify.

18)  $(1 - 4i)^2 + 3 + (8i) - (-2 - 7i)$

19)  $(-3 + 7i)(-3 - 5i)(-1 - 4i)$

20)  $\frac{10}{10 + \sqrt{7}}$

21)  $\frac{6}{4 + \sqrt{2}}$

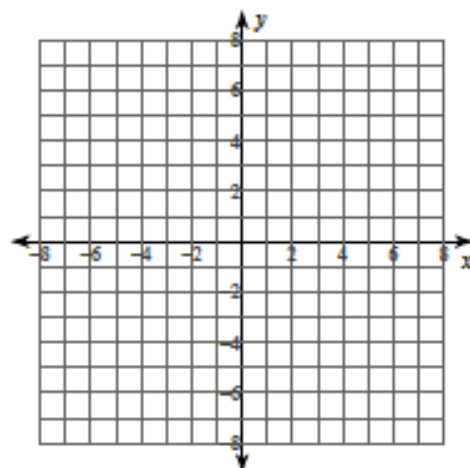
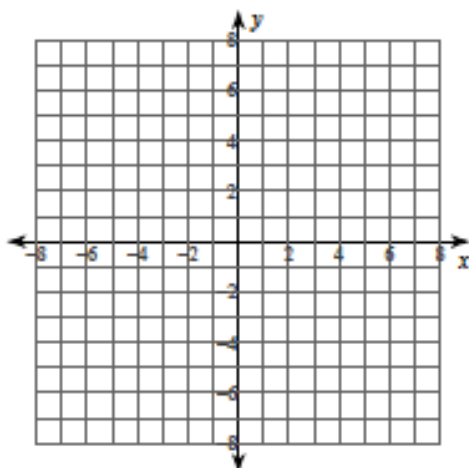
22)  $\frac{-3 - 8i}{-10 - 7i}$

23)  $\frac{-10 + 10i}{-7 + 3i}$

Identify the vertex and axis of symmetry of each. Then sketch the graph.

24)  $y = -x^2 - 4x - 1$

25)  $y = 2x^2 - 16x + 28$



Use the information provided to write the standard form equation of each parabola.

26) Vertex:  $(-4, -6)$ , Focus:  $(-4, -\frac{49}{8})$

27) Vertex:  $(-2, 1)$ , Focus:  $(-2, \frac{3}{2})$

**Long division**

28)  $(7n^3 + 32n^2 - 64n - 24) \div (n + 6)$

29)  $(m^3 + m^2 - 73m + 15) \div (m - 8)$

30)  $(7r^3 + 74r^2 + 110r + 43) \div (7r + 4)$

31)  $(6x^3 - 57x^2 - 6x + 9) \div (6x + 3)$

**Synthetic division**

32)  $(b^3 + 17b^2 + 63b - 48) \div (b + 7)$

33)  $(2n^3 - 2n^2 - 61n + 13) \div (n - 6)$

**Solve each equation by factoring.**

34)  $x^2 = -6x + 7$

35)  $v^2 + 4v = 0$

36)  $n^2 = -24 - 10n$

37)  $a^2 + 40 = -13a$

**Solve each equation. Remember to check for extraneous solutions.**

38)  $\frac{2x}{x^2 + 2x - 15} - \frac{1}{x^2 + 2x - 15} = \frac{7}{x - 3}$

39)  $\frac{5}{8k} = \frac{1}{8k} - 1$

40)  $\frac{1}{n^2 - 4n - 5} = \frac{1}{n + 1}$

41)  $\frac{2x + 10}{x^2 + x} = \frac{5}{x}$

**Simplify. Your answer should contain only positive exponents.**

42)  $2a^2b^2 \cdot 2a^2$

43)  $x^{-3}y^3 \cdot xy^4$

44)  $-m^0 \cdot (-n^0)^{-2}$

45)  $y^{-5}(x^4y^5)^3$

**Factor each completely.**

46)  $5a^3 + 30a^2 - 8a - 48$

47)  $v^3 + v^2 + 2v + 2$

48)  $x^3 + 11x^2 + 28x$

49)  $3m^4 - 6m^3 - 72m^2$

50)  $p^2 - 10p + 21$

51)  $k^3 - 15k^2 + 50k$

52)  $150x^2 - 216$

53)  $243p^2 - 192$

54)  $1 + 14m + 49m^2$

55)  $648n^2 - 144n + 8$

56)  $54a^3 + 2$

57)  $125x^3 + 216$

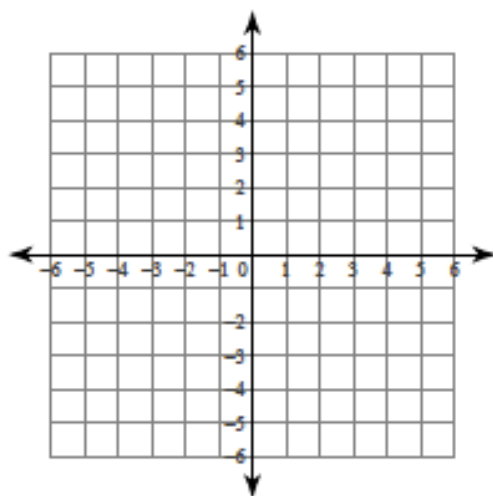
**Evaluate each function.**

58)  $p(a) = -2|a|$ ; Find  $p(10)$

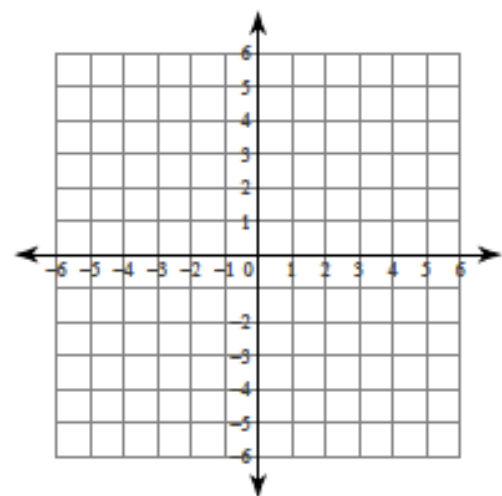
59)  $p(t) = -2 \cdot 4^t + 2$ ; Find  $p(1)$

**Sketch the graph of each line.**

60)  $x - 3 = 0$

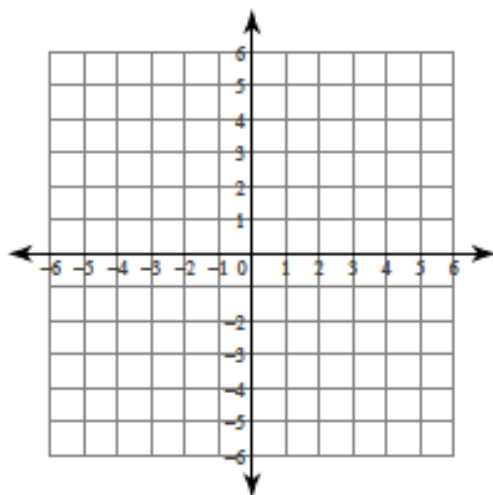


61)  $x = 5$

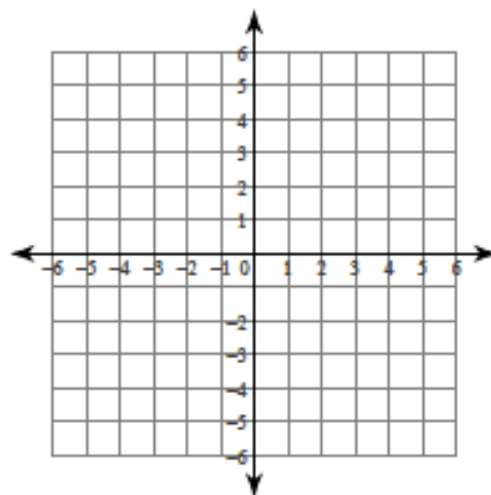


Sketch the graph of each linear inequality.

62)  $5x + y < 0$

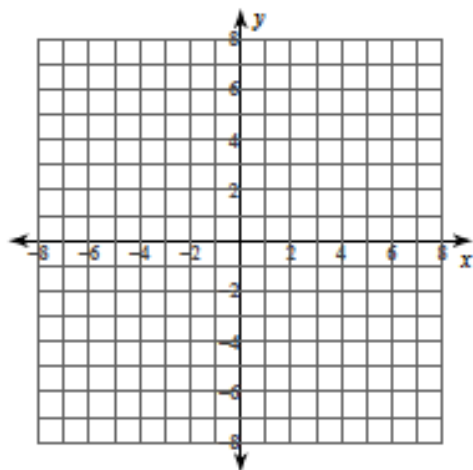


63)  $x + y \geq 1$

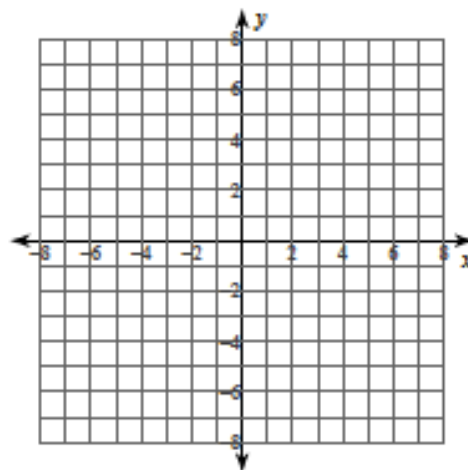


Identify the vertex and axis of symmetry of each. Then sketch the graph.

64)  $y = -2x^2 - 4x - 5$

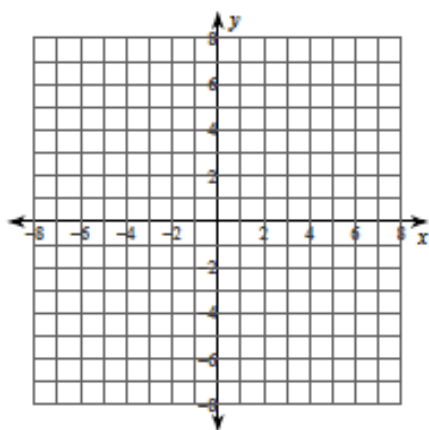


65)  $y = 2x^2 + 12x + 13$

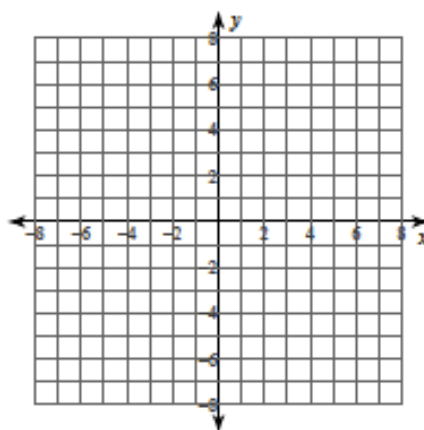


Graph each function.

$$66) f(x) = \frac{1}{x+2} + 3$$

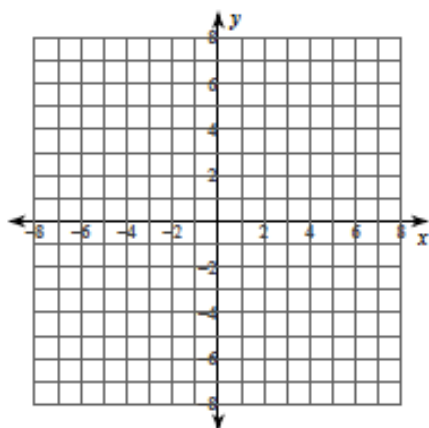


$$67) f(x) = \frac{2}{x-3} + 2$$

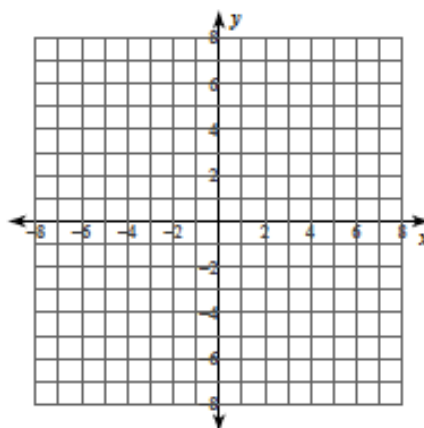


Identify the vertical asymptotes, x-intercepts, horizontal asymptote, and domain of each. Then sketch a graph.

$$68) f(x) = \frac{x-4}{-4x+4}$$

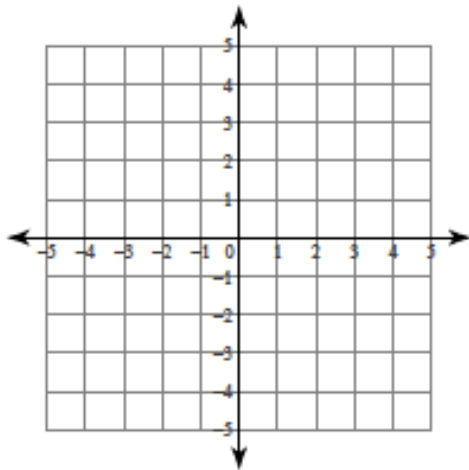


$$69) f(x) = \frac{x^2 + 2x}{x^2 + 4x}$$

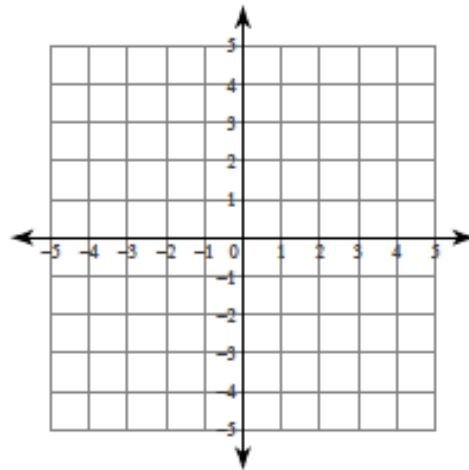


Sketch the solution to each system of inequalities.

$$70) \begin{cases} x + y \geq -3 \\ 2x - y \leq -3 \end{cases}$$



$$71) \begin{cases} x - 2y > -2 \\ 5x - 2y \geq 6 \end{cases}$$



Evaluate each determinant.

$$72) \begin{vmatrix} 4 & -5 \\ 1 & 4 \end{vmatrix}$$

$$73) \begin{vmatrix} -3 & -4 \\ 2 & 0 \end{vmatrix}$$

$$74) \begin{vmatrix} 2 & 2 & -7 \\ -6 & 4 & -6 \\ 7 & -4 & -6 \end{vmatrix}$$

$$75) \begin{vmatrix} -1 & -6 & 2 \\ -1 & -6 & -3 \\ 0 & -2 & 5 \end{vmatrix}$$

Evaluate each expression.

$$76) (-6) - \left( \frac{(-16) - (-4)}{-6} - ((-1) + 1 + 3) \right)$$

$$77) \left( \left( \frac{-15}{-3} \right) (6) - 3 \right) \left( \frac{4}{(-5) + 1} \right)$$

$$78) \frac{((15 - 6 + (-4) - 2)(3))(2)}{-3}$$

$$79) \frac{(-6) - (1 - 4)}{(-4) + 2 + 6 - 5}$$

Simplify.

$$80) 3\sqrt[3]{54} - 2\sqrt[3]{6} - 2\sqrt[3]{2}$$

$$81) 3\sqrt[7]{-768} + 3\sqrt[7]{384} + 3\sqrt[7]{3}$$



**Simplify each expression.**

$$82) \frac{6}{2p^2 - 2p} + \frac{5}{2}$$

$$83) \frac{6x}{3x^2 + 9x} + \frac{5}{3}$$

$$84) \frac{3n}{2n^3 - 4n^2} - \frac{4}{n + 4}$$

$$85) 4m - \frac{2m}{2m^2 - 4m + 2}$$

$$86) \frac{2r^2}{r^2 + 3r - 28} \div \frac{1}{r - 4}$$

$$87) \frac{x^2 - x - 56}{4} \div \frac{16 + 6x - x^2}{4}$$

$$88) \frac{3n + 6}{6n + 9} \cdot \frac{8n + 12}{3}$$

$$89) \frac{21b + 21}{7b + 35} \cdot \frac{b^2 - 3b - 40}{18b + 18}$$

**Simplify each and state the excluded values.**

$$90) \frac{20v - 20}{12v + 12}$$

$$91) \frac{x^2 - 4x - 12}{x^2 + 10x + 16}$$

**Evaluate each function at the given value.**

$$92) f(n) = -3n^4 + 13n^3 - 6n^2 - 21n + 6 \text{ at } n = 3$$

**Solve each system by elimination.**

$$\begin{aligned} 93) \quad & 2x - 4y + 4z = 16 \\ & x - 2y + 2z = 8 \\ & -3x + 2y + z = -22 \end{aligned}$$

$$\begin{aligned} 94) \quad & -3x + 2y + 3z = -30 \\ & -3x + 3y - 5z = -17 \\ & 3x - 4y + 2z = 26 \end{aligned}$$

### Answers to Summer assignment

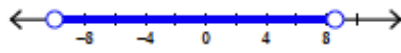
1) The dot next to the choice indicates that it is the answer.

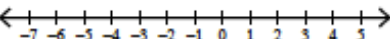
2)  $\{7, 0\}$

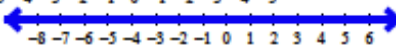
3) No solution.

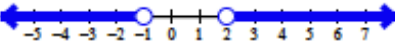
4)  $\left\{\frac{8}{5}, -2\right\}$

5)  $\left\{\frac{23}{2}, -\frac{37}{2}\right\}$

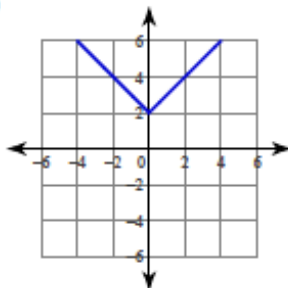
6)  $-10 < a < \frac{43}{5}$  : 

7) No solution. : 

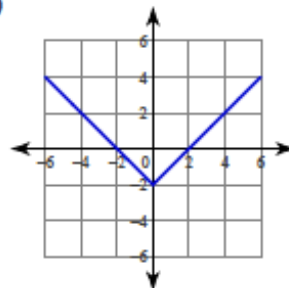
8)  $\{\text{All real numbers}\}$  : 

9)  $x < -1$  or  $x > 2$  : 

10)



11)



12)  $11m - 7$

13)  $5 - 27p - 12p^2$

14)  $\frac{289}{4}; \left(a + \frac{17}{2}\right)^2$

15)  $\frac{169}{4}; \left(x - \frac{13}{2}\right)^2$

16)  $\left\{\frac{7}{2}, -\frac{11}{2}\right\}$

17)  $\left\{\frac{-2 + \sqrt{61}}{2}, \frac{-2 - \sqrt{61}}{2}\right\}$

18)  $-10 + 7i$

19)  $-68 - 170i$

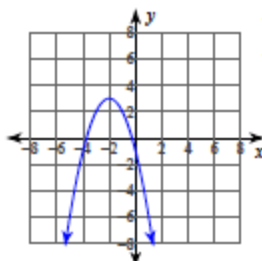
20)  $\frac{100 - 10\sqrt{7}}{93}$

21)  $\frac{12 - 3\sqrt{2}}{7}$

22)  $\frac{86 + 59i}{149}$

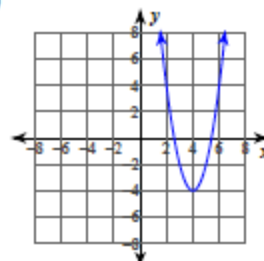
23)  $\frac{50 - 20i}{29}$

24)



Vertex:  $(-2, 3)$   
Axis of Sym:  $x = -2$

25)



Vertex:  $(4, -4)$   
Axis of Sym:  $x = 4$

26)  $y = -2x^2 - 16x - 38$

27)  $y = \frac{1}{2}x^2 + 2x + 3$

28)  $7m^2 - 10m - 4$

29)  $m^2 + 9m - 1 + \frac{7}{m-8}$

30)  $r^2 + 10r + 10 + \frac{3}{7r+4}$

31)  $x^2 - 10x + 4 - \frac{1}{2x+1}$

32)  $b^2 + 10b - 7 + \frac{1}{b+7}$

33)  $2n^2 + 10n - 1 + \frac{7}{n-6}$

34)  $\{1, -7\}$

35)  $\{-4, 0\}$

36)  $\{-4, -6\}$

37)  $\{-8, -5\}$

38)  $\left\{-\frac{36}{5}\right\}$

39)  $\left\{-\frac{1}{2}\right\}$

40)

41)

42)  $4a^4b^2$

43)  $\frac{y^7}{x^2}$

44)  $-1$

45)  $x^{12}y^{10}$

46)  $(5a^2 - 8)(a + 6)$

47)  $(v^2 + 2)(v + 1)$

48)  $x(x + 7)(x + 4)$

49)  $3m^2(m + 4)(m - 6)$

50)  $(p - 7)(p - 3)$

31)  $x(x-10)(x-3)$

55)  $8(9m-1)^2$

58)  $-20$

32)  $6(3x+6)(3x-6)$

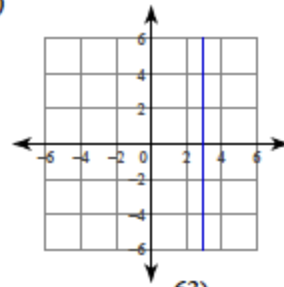
56)  $2(3a+1)(9a^2-3a+1)$

59)  $-6$

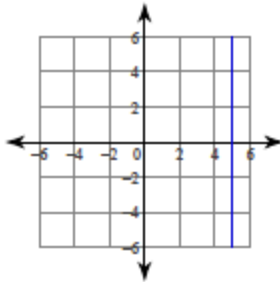
33)  $3(3p+8)(3p-8)$

57)  $(5x+6)(25x^2-30x+36)$

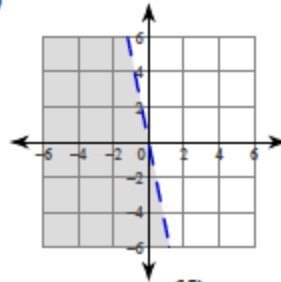
60)



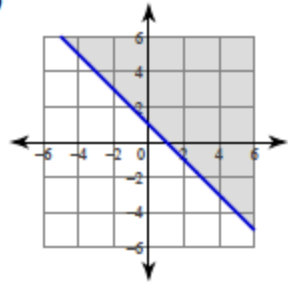
61)



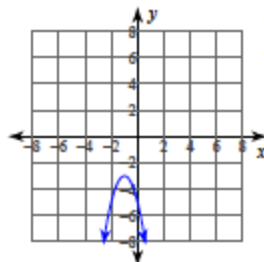
62)



63)

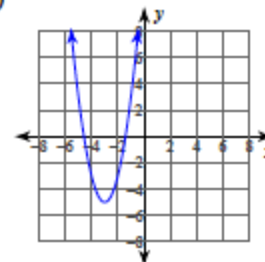


64)



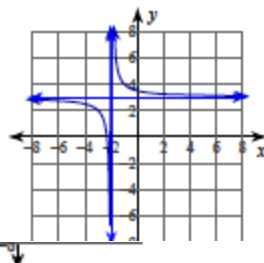
Vertex:  $(-1, -3)$   
Axis of Sym:  $x = -1$

65)

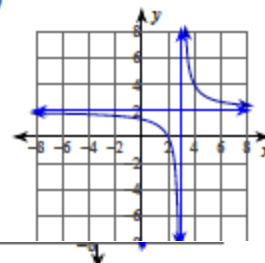


Vertex:  $(-3, -3)$   
Axis of Sym:  $x = -3$

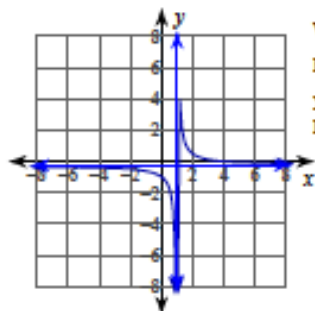
66)



67)

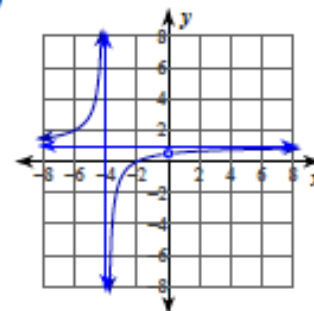


68)



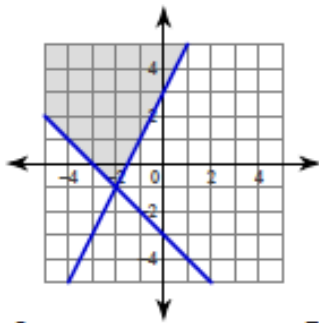
Vertical Asym:  $x = 1$   
Horiz. Asym:  $y = -\frac{1}{4}$   
X-intercepts: 4  
Domain:  
All reals except 1

69)



Vertical Asym:  $x = -4$   
Horiz. Asym:  $y = 1$   
X-intercepts: -2  
Domain:  
All reals except -4, 0

70)



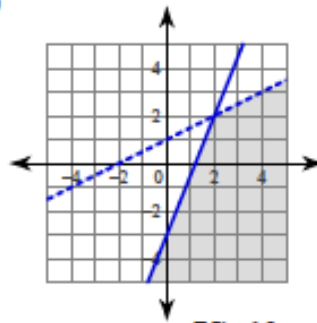
73) 8

77) -27

81)  $-6\sqrt[7]{6} + 9\sqrt[7]{3}$ 85)  $\frac{4m^3 - 8m^2 + 3m}{(m-1)^2}$ 89)  $\frac{b-8}{6}$ 

93) Infinitely many solutions

71)



74) -224

78) -6

82)  $\frac{6+5p^2-5p}{2p(p-1)}$ 86)  $\frac{2r^2}{r+7}$ 90)  $\frac{5(v-1)}{3(v+1)}; \{-1\}$ 

94) (6, -3, -2)

72) 21

75) 10

79) 3

83)  $\frac{21+5x}{3(x+3)}$ 87)  $-\frac{(x+7)}{2+x}$ 91)  $\frac{x-6}{x+8}; \{-2, -8\}$ 

76) -5

80)  $7\sqrt[3]{2} - 2\sqrt[3]{6}$ 84)  $\frac{19n+12-8n^2}{2n(n+4)(n-2)}$ 88)  $\frac{4(n+2)}{3}$ 

92) -3