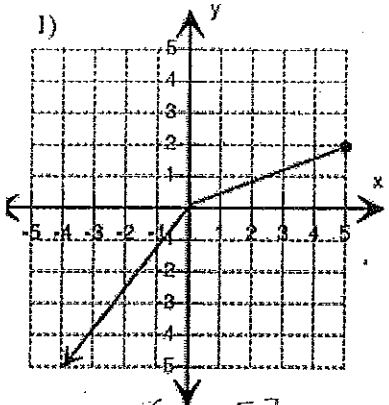
Algebra 3 Final Review

Find the domain and range for each graph and determine if it's a function.

1)

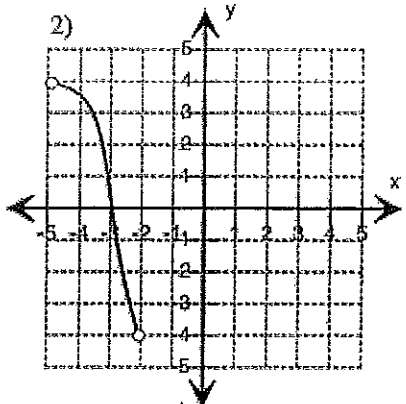


Domain: $(-\infty, 5]$

Range: $(-\infty, 2]$

yes

2)

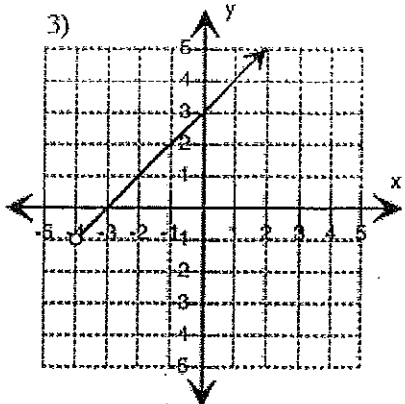


Domain: $(-5, -2)$

Range: $(-4, 4)$

yes

3)

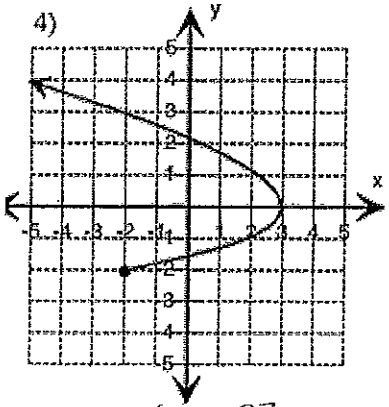


Domain: $(-4, \infty)$

Range: $(-1, \infty)$

yes

4)

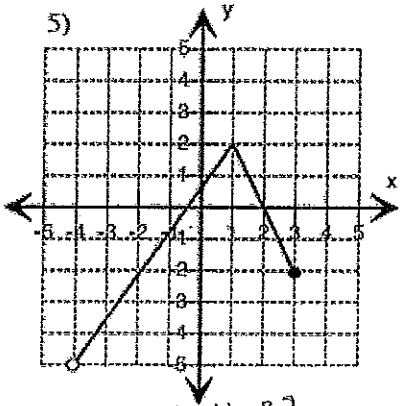


Domain: $(-\infty, 3]$

Range: $[-2, \infty)$

NO

5)

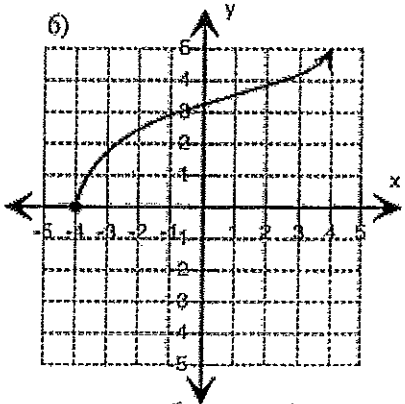


Domain: $(-4, 3]$

Range: $(-6, 2]$

yes

6)



Domain: $[-4, \infty)$

Range: $[0, \infty)$

yes

Write the equation of the line in slope intercept form:

7. through: $(-5, 5)$, perp. to $y = \frac{5}{9}x - 4$

$5 = -\frac{9}{5}(-5) + b$

$5 = 9 + b$

$-9 \quad -9$

$b = -4$

$y = -\frac{9}{5}x - 4$

8. through: $(-5, 5)$, parallel to $y = -3x + 3$

$5 = -3(-5) + b$

$5 = 15 + b$

$-15 \quad -15$

$b = -10$

$y = -3x - 10$

9. $f(n) = 2n$
$g(n) = -n - 4$
Find $(f \circ g)(n)$

$2(-n-4)$

$\boxed{-2n-8}$

10. $g(n) = 2n + 3$
$h(n) = n - 1$
Find $(g \circ h)(n)$

$2(n-1)+3$

$2n-2+3$

$\boxed{2n+1}$

11. $g(x) = -x^2 - 1 - 2x$
$f(x) = x + 5$
Find $(g - f)(x)$

$-x^2-1-2x-(x+5)$

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

$\boxed{-x^2-3x-6}$

12. $f(x) = 3x - 1$
$g(x) = x^2 - x$
Find $\left(\frac{f}{g}\right)(x)$

$\frac{3x-1}{x^2-x}$

13. Find the inverse of $h(x) = \sqrt[3]{x} - 3$.

$y = \sqrt[3]{x} - 3$

$x = \sqrt[3]{y} - 3$
$+3 \quad +3$

$x + 3 = \sqrt[3]{y}$

$\boxed{(x+3)^3 = y}$

14. Find the inverse of $g(x) = \frac{1}{x} - 2$.

$y = \frac{1}{x} - 2$

$x = \frac{1}{y} - 2$
$+2 \quad +2$

$y \cdot \frac{1}{y} = (x+2)y$

$1 = xy + 2y$

$\frac{y(x+2)}{x+2} = \frac{1}{x+2}$

$\boxed{y = \frac{1}{x+2}}$

15. Write the slope intercept for of the equation of the line perpendicular to $-x + 2y = 6$ and passing through (-6,3).

$+x \quad +x$

$\frac{2y}{2} = \frac{x+6}{2}$

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

$3 = -2(-6) + b$

$3 = 12 + b$
$-12 \quad -12$

$-9 = b$

$\boxed{y = -2x - 9}$

16. Write both the equation for the horizontal line and the vertical line passing through the point (6, -3) indicating which is horizontal and which is vertical. Also state the slope for both.

horizontal $y = -3$ (slope is zero)

vertical $x = 6$ (slope is undefined)

Use the following matrices for questions #17- 24

$$A=\begin{bmatrix}1 & 5 & 0\\ 7 & 6 & -6\end{bmatrix} \quad B=\begin{bmatrix}-2 & 8 & 7\\ -20 & 5 & 5\end{bmatrix} \quad C=\begin{bmatrix}9 & 8\\ 7 & 6\\ 5 & 4\end{bmatrix} \quad D=\begin{bmatrix}-1 & -2\\ -3 & 2\\ 6 & -4\end{bmatrix}$$

17. Find A + B

$\begin{bmatrix}-1 & 13 & 7\\ -13 & 11 & -1\end{bmatrix}$

18. Find A-B

$\begin{bmatrix}3 & -3 & -7\\ 27 & 1 & -11\end{bmatrix}$

19. Find AB

Not possible

20. Find B + D

Not possible

21. Find DC

Not possible

22. What are the resulting dimensions when you multiply A*C? 2×2

2×3 ✓ 3×2

23. Find the inverse of B.

$[B]^{-1}$ = Not possible

24. What is the determinant of D?

Not possible

25. Solve. $-8x-10y=24$ and $2(6x+5y=2)$

$-8x-10y=24$

$+\ 12x+10y=4$

$4x=28$

$x=7$

$6(7)+5y=2$

$42+5y=2$

$-42 \quad -42$

$5y=-40$

$y=-8$

$(7,-8)$

26. Solve. $3x-5y=17$, $y=-7$

$3x-5(-7)=17$

$3x+35=17$

$3x=-18$

$x=-6$

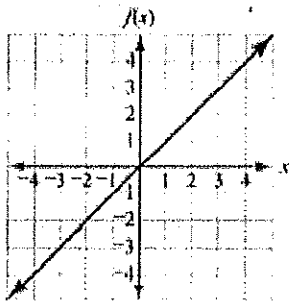
$(-6,-7)$

27. Solve.

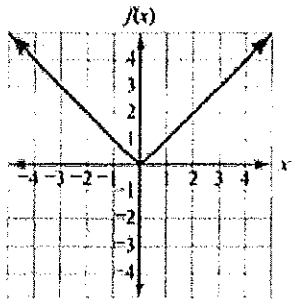
$$\begin{aligned} 4x+4y+z&=24\\ 2x-4y+z&=0\\ 5x-4y-5z&=12 \end{aligned}$$

$\begin{bmatrix} 4\\2\\0 \end{bmatrix}$ or $(4, 2, 0)$

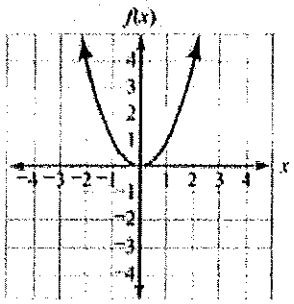
28. Name the type of parent function under each graph. (i.e. absolute value, linear, cubic, quadratic, etc.)



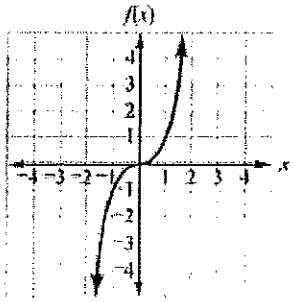
linear



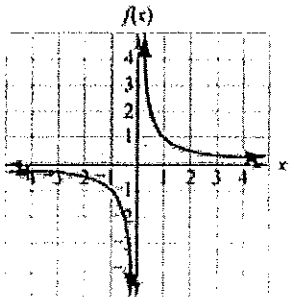
absolute value



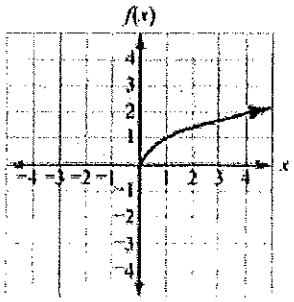
quadratic



cubic



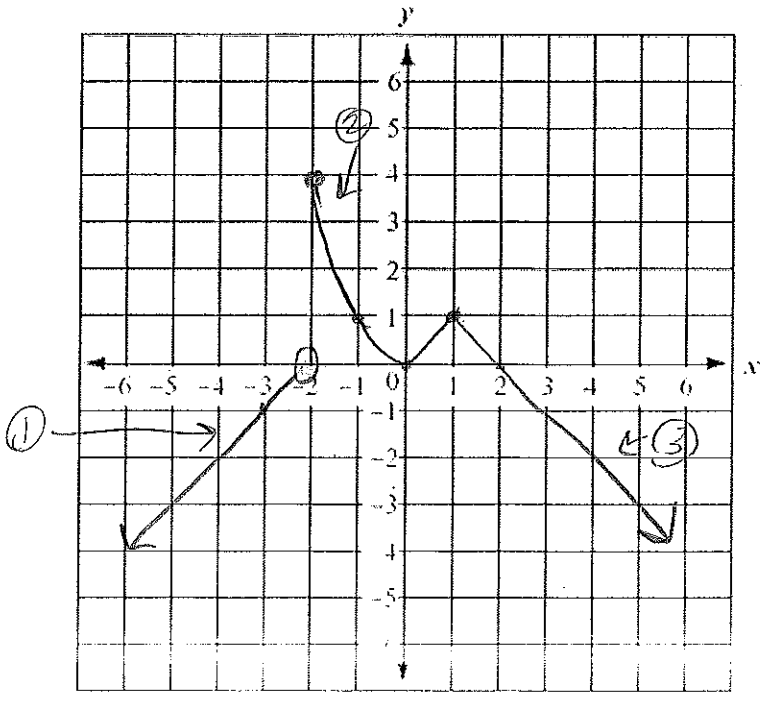
rational



square root

29. Graph.

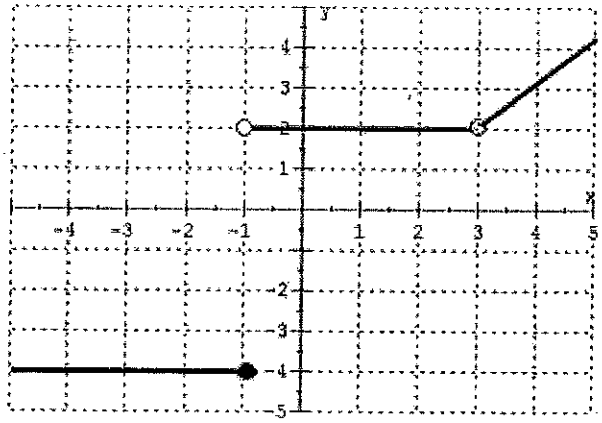
$$h(x)=\begin{cases} x+3 & \text{if } x<-2\\ x^2 & \text{if } -2\le x<1\\ -x+2 & \text{if } x\ge 1 \end{cases}$$



30. Describe the transformation from the it's parent function (i.e. how does it move and/or flip around the coordinate plane)? $y = -|x + 6| - 1$

flips down over x-axis, left 6, down 1

Use the following graph for questions #31-37



31. What is the domain? $(-\infty, 3) \cup (3, \infty)$
32. What is the range? $(-4] \cup [2, \infty)$
33. On what intervals is the function increasing, decreasing, and constant? increase $(3, \infty)$
decrease N/A
constant $(-\infty, 3)$
34. What are the zeros of the graph? none b/c no x-int.
35. What is the y- intercept? 2

36. When does f(x)=1? $\emptyset$

37. What is the value of f(-4)? $y = -4$

38. Solve $x^2 + 6x + 3 = 0$ by completing the square.

$\left(\frac{6}{2}\right)^3$

$-3 \quad -3$

$x^2 + 6x + \underline{9} = -3 + \underline{9}$

$(x+3)^2 = 6$

$x + 3 = \pm\sqrt{6}$

$-3 \quad -3$

$x = \pm\sqrt{6} - 3$

39. Solve $x^2 + 4x - 1$ by the quadratic formula.

$x = \frac{-4 \pm \sqrt{4^2 - 4(1)(-1)}}{2(1)} = \frac{-4 \pm \sqrt{16+4}}{2} = \frac{-4 \pm \sqrt{20}}{2} = \frac{-4 \pm 2\sqrt{5}}{2} = -2 \pm \sqrt{5}$

40. Solve. $\frac{25v^2}{25} = \frac{1}{25}$

$v^2 = \frac{1}{25}$

$v = \frac{\sqrt{1}}{\sqrt{25}} = \frac{1}{5}$

41. Solve. $(5n - 1)(n + 1) = 0$

$n = \frac{1}{5} \quad n = -1$

42. Solve. $7v^2 - 42 = -35v$

$+35v \quad +35v$

$7v^2 + 35v - 42 = 0$

$7(v^2 + 5v - 6) = 0$

$7(v+6)(v-1) = 0$ $\boxed{v=-6}$ $\boxed{v=1}$

Use the graph below to answer #43-50.

43. Even or odd degree? odd
44. + or – leading coefficient?
45. End behavior?
46. # relative max/min? 6
47. List the zeros and their multiplicity.

$x=-3$ m of 1
$x=-2$ m of 1
$x=-1$ m of 1
$x=0$ m of 1
$x=1$ m of 1
$x=2$ m of 1
$x=3$ m of 1

48. Possible function in factored form.
49. As $x \to \infty$, $f(x) \to \infty$
50. As $x \to -\infty$, $f(x) \to -\infty$

51. Factor the following completely:
$25x^2 - 81y^2$

A $(5x-9y)^2$
B $(25x-81y)(x+y)$
C $(5x-9)(5x+9)$
(D) $(5x-9y)(5x+9y)$

52. Solve for x: $10x^2 - 13x = 3$.

$10x^2 - 13x - 3 = 0$

$-15 \cdot 2 = -30$, $-15 + 2 = -13$

$10x^2 - 15x + 2x - 3 = 0$

$5x(2x-3) + 1(2x-3) = 0$

$(5x+1)(2x-3) = 0$

A $\frac{2}{3}, -5$
B $-\frac{3}{2}, \frac{1}{5}$
C $-1, \frac{3}{10}$
(D) $\frac{3}{2}, -\frac{1}{5}$

$x = -\frac{1}{5}$ or $\frac{3}{2}$

(48) $f(x) = (x+3)(x+2)(x+1) \times (x-1)(x-2)(x-3)$

53. Solve for x: $\sqrt{2x+7}-x=2$.

A -3
B 1
C -3, 1
D -1, 3

$\sqrt{2x+7} = x+2$

$2x+7 = (x+2)^2$

$2x+7 = x^2+4x+4$

$-2x \quad -7$

$0 = x^2+2x-3$

$0 = (x+3)(x-1)$

$x=-3 \quad x=1$

54. Solve for x: $\frac{1}{x-2}+\frac{3}{x+3}=\frac{4}{x^2+x-6}$.

A $-\frac{3}{4}$

B $\frac{4}{7}$

C $\frac{3}{4}$

D $\frac{7}{4}$

$\frac{1(x+3)}{(x-2)(x+3)} + \frac{3(x-2)}{(x-2)(x+3)} = \frac{4}{x^2+x-6}$

$\frac{x+3}{(x-2)(x+3)} + \frac{3x-6}{(x-2)(x+3)} = \frac{4}{x^2+x-6}$

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

$4x-3=4$

$+3 \quad +3$

$\frac{4x}{4} = \frac{7}{4}$

56. Solve the equation $2^{x+2} = 16^x$

a. $x = 0$
b. $x = 1$
c. $x = 2$
d. $x = 3$
e. $x = \frac{2}{3}$

$2^{x+2} = 2^{4(x)}$

$x+2 = 4x$

$-x \quad -x$

$\frac{2}{3} = \frac{3x}{3}$

57. Which of the following statements are true?

I. $(\ln x)^2 = 2\ln x$ ✓
II. $\log_4(3x^4) = 4\log_4(3x)$ ×
III. $\log(x-y) = \frac{\log x}{\log y}$ ✓
IV. $\log_3 \frac{9}{4} = 2 - \log_3 4$
V. $\ln(x^2) = 2\ln x$

a. I and II only
b. I, II, and III only
c. I and III only
d. IV and V only
e. I and IV only

58. Solve $log(x-1)+log(x+1)=0$

a. $x=\sqrt{2}$
b. $x=-1, x=1$
c. $x=1$
d. $x=-\sqrt{2}, x=\sqrt{2}$
e. $x=2$

$\log_{10}(x-1)(x+1) = 0$

$10^0 = (x-1)(x+1)$

$+1 \quad 1 = x^2 - 1 \quad +1$

$x^2 = 2$

$x = \pm\sqrt{2}$

56. Convert the equation $3^{-2} = \frac{1}{9}$ to logarithmic form

a. $\log_3(\frac{1}{9}) = -2$
b. $\log_3(-2) = \frac{1}{9}$
c. $\log_{-2}(\frac{1}{9}) = 3$
d. $\log_{\frac{1}{9}}(3) = -2$
e. $\log_{\frac{1}{9}}(-2) = 3$

$\log_3 \frac{1}{9} = -2$

59. What are all the possible rational roots of $f(x) = 6x^4 - x^3 - 4x^2 - x - 2$? $\frac{p}{q} = \frac{6: 1,2,3,6}{2 \quad 1,2}$

a. $\pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}$

b. $\pm 1, \pm 2, \pm \frac{1}{2}, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{1}{6}$

c. $-\frac{2}{3}, \frac{3}{2}$

d. $-1, \frac{3}{2}$

e. None of the above

$\pm 1, \pm \frac{1}{2}, \pm 2, \pm 3, \pm \frac{3}{2}, 6$

60. Find the oblique asymptote of

$$f(x) = \frac{x^2 + 1}{x - 1}$$

a. $y = 1$

b. $y = x - 1$

c. $y = x^2 + 1$

d. $y = x + 1$

e. $y = 0$

1 | 1 0 1
1 1
1 1 2

$x + 1$

61. The vertex of the parabola $f(x) = 2x^2 - 4x + 7$ is

a. $(-1, 13)$

b. $(1, 7)$

c. $(2, 5)$

d. $(-1, 5)$

e. $(1, 5)$

$x = \frac{-b}{2a} = \frac{4}{2(2)} = \frac{4}{4} = 1$

$2(1)^2 - 4(1) + 7$

$2(1) - 4 + 7$

$2 - 4 + 7$

$-2 + 7 = 5$

$(1, 5)$

62. Simplify the following expressions:

$(6x^3y^2)^3(3x)^{-3}$

A $2x^6y^6$

B $8x^3y^6$

C $8x^6y^6$

D $5832x^6y^6$

$6^3 x^9 y^6 \, 3^{-3} x^{-3}$

$\frac{6^3 x^9 y^6}{3^3 x^3} = \frac{216 x^6 y^6}{27}$

$= 8x^6y^6$

63. For $g(x) = 2x^3 - 8x^2 - 2x + 5$, find $g(-3)$.

A -115

B -19

C 115

D 125

$2(-3)^3 - 8(-3)^2 - 2(-3) + 5$

$2(-27) - 8(9) + 6 + 5$

64 If $f(x)=4-x^2$ and $g(x)=x+2$, find $f(g(x))$.

A $-x^2-4x$ $4-(x+2)^2$.
B $-x^3-2x^2+4x+8$ $4-(x^2+4x+4)$
C x^2+4x $-x^2-4x$
D x^3+2x^2-4x-8

65 Given $f(x)=3x^2+7x-2$ and $g(x)=4x+3$, find $(g-f)(x)$.

A $-3x^2-3x+5$ $4x+3-(3x^2+7x-2)$
B $3x^2+3x-5$ $-3x^2-3x+5$
C $-3x^2+11x+1$
D $3x^2-4x-5$

60 Find the domain of $f(x)=\dfrac{2x}{\sqrt{x+4}}$. what can't x be?

A $(-4,4)$ $\sqrt{x-4}=0$
B $(-4,\infty)$ $x-4=0^2$
C $[-4,\infty)$ $x=4$
D $(4,\infty)$
E $(-\infty,-4)\cup(-4,\infty)$

67 The graph of $y=(x-4)^2+5$ can be obtained by the transformation of $g(x)=x^2$. Which of the following transformations must be used?

I. Move 5 units down.
II. Move 5 units up.
III. Move 4 units down.
IV. Move 4 units left
V. Move 4 units right.

right 4 ur 5

a. V, then II
b. IV, then II
c. III, then I
d. II, then III
e. III, then II

68 Solve for x: $9^{5x}=243^{3x-2}$

A $\frac{2}{5}$ $3^{2(5x)}=3^{5(3x-2)}$
B $\frac{54}{76}$ $10x=15x-10$
C 2 $-15x \quad -15x$
D 27 $-5x=-10$
$x=2$

69 Solve for x: $\log(1-2x)-\log(x-1)=1$

A $\frac{1}{3}$ $\log_{10}\left(\frac{1-2x}{x-1}\right)=1$
B $\frac{2}{3}$ $\frac{10^1}{1}=\frac{1-2x}{x-1}$
C $\frac{11}{12}$ $10x-10=1-2x$
$+2x \quad +10 \quad +10 \quad +2x$
D no solution $\frac{12x}{12}=\frac{11}{12}$

70 Solve for x: $\log_4 x+\log_4(x+2)=\log_4(3x+56)$

A -54
B -7 $x(x+2)=3x+56$
C -7, 8 $x^2+2x=3x+54$
D 8 $-3x-56 \quad -3x \quad -56$

$x^2-x-56=0$

$(x-8)(x+7)=0$

$8 \quad -7$

71) Find the slope and y-intercept of the line that is parallel to $2x + 3y = 5$ and passes through the point $(1, -1)$

$3y = -2x + 5$

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

$-1 = -\frac{2}{3}(1) + b$

$-1 = -\frac{2}{3} + b$

$b = -\frac{1}{3}$

a. $Slope = \frac{2}{3}; y - intercept = \frac{5}{3}$

b. $Slope = -\frac{2}{3}; y - intercept = \frac{1}{3}$

c. $Slope = -\frac{2}{3}; y - intercept = -\frac{1}{3}$

d. $Slope = -\frac{2}{3}; y - intercept = \frac{5}{3}$

e. None of the above

72) Find the domain of the function $f(x) = \frac{1}{x^2+x-2}$ $(x-1)(x+2)$

$x \neq 1 \quad x \neq -2$

a. $(-\infty, \infty)$

b. $x \neq 1$

c. $x \neq -2$

d. $x \neq 2, -1$

e. $x \neq -2, 1$

73) Find the horizontal asymptote (HA) and vertical asymptote (VA) of

$$f(x) = \frac{x^2 - 4}{x(x+2)} \qquad \frac{(x-2)(x+2)}{x(x+2)} \quad \text{or} \quad \frac{x^2-4}{x^2+2x} \quad \text{same}$$

$x = 0$ $\qquad y = \frac{1}{1}$ $y = 1$

a. HA: $y = 1$ VA: $x = 0, x = -2$

b. HA: $y = 0$ VA: $x = 0, x = -2$

c. HA: $y = 1$ VA: $x = 0$

d. HA: $y = 0$ VA: $x = 0$

e. HA: None VA: $x = 0, x = -2$

74 Find the real zeros of the function: $f(x)=6x^4+11x^3+2x^2-5x-2$. graph to see it

A $-1,\frac{2}{3}$

B $-1,0,\frac{2}{3}$ $-\frac{1}{2}, -1, \frac{2}{3}$

C $-1,-\frac{1}{2},\frac{2}{3}$

D $-1,-\frac{2}{3},-\frac{1}{2},\frac{2}{3}$

75 Find all the zeros of the function: $f(x)=x^4-4x^3+8x^2-16x+16$.

A 2

B $-2,2$

C $2,\pm 2i$

D $\pm 2,\pm 2i$

2)

	1	-4	8	-16	16
		2	-4	8	16
	1	-2	4	-8	0

x^3-2x^2+4x-8

$x^2(x-2)\ 4(x-2)$

$(x^2+4)(x-2)$

$x^2+4=0$ $\quad x-2=0$

$x^2=-4$ $\quad x=2$

$x=\pm 2i$

76 Here are three statements about the graph of the equation $y=x^2-9x+18$: look in calc

I. $(6,0)$ is an x-intercept of the graph. ✓

II. $(-2,0)$ is an x-intercept of the graph. ✗

III. $(0,18)$ is the only y-intercept of the graph. ✓

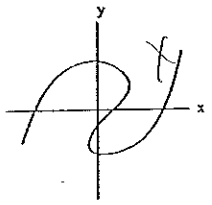
ch of the three statements are true?

(A) Only I (B) Only II (C) Only III

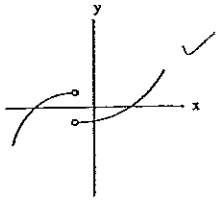
(D) Only I and II (E) Only I and III

77 Shown here are the graphs of three relations in x and y. For which of these relations is y a function of x?

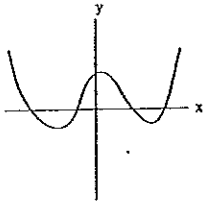
I.



II.



III.



(A) Only I (B) Only II (C) Only III

(D) Only I and III (E) Only II and III

(78) Describe the transformation of the graph of $f(x)=x^2$ for the graph of $g(x)=-\frac{3}{4}(x-8)^2+10$.

(A) Vertical Stretch. Reflects over the x-axis. Horizontal shift 8 units to the right. Vertical shift 10 units up.

B Vertical Shrink. Reflects over the x-axis. Horizontal shift 8 units to the left. Vertical shift 10 units up.

C Vertical Shrink. Horizontal shift 8 units to the right. Vertical shift 10 units up.

D Vertical Shrink. Reflects over the x-axis. Horizontal shift 8 units to the right. Vertical shift 10 units up.

up 10 r 8 reflect

(79) For each of the following functions determine if they are: even, odd, both or neither.

a. $f(x)=4x^2+8x-2$ neither

b. $f(x)=|x|+3$ even

c. $f(x)=x^3-2x$ odd

A Even

B Odd

C Both

D Neither

(80) Find the inverse of: $f(x)=2x-3$.

$y=2x-3$

$x=2y-3$

$+3 \quad +3$

$2y=x+3$

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

A $f^{-1}(x)=3x-2$

(B) $f^{-1}(x)=\frac{1}{2}x+\frac{3}{2}$

C $f^{-1}(x)=x+3$

D $f^{-1}(x)=\frac{x-2}{3}$

(81) Use synthetic division to divide: $(4x^3-3x+5)\div(x+1)$.

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

B $4x^2-7x+12$

(C) $4x^2-4x+1+\frac{4}{x+1}$

D $4x^2+4x+1+\frac{6}{x+1}$

-1 | $4 \quad 0 \quad -3 \quad 5$

$\quad\quad -4 \quad 4 \quad -1$

$4 \quad -4 \quad 1 \quad [4]$

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

(82) Find the horizontal or slant asymptote(s): $f(x)=\frac{x^2-x}{x+1}$ Slant

A $x=-1$

B $x=0,\ x=1$

(C) $y=x-2$

D $y=1$

-1 | $1 \quad -1 \quad 0$

$\quad\quad -1 \quad 2$

$1 \quad -2 \quad [2]$

$x-2$

(83) Find the vertical asymptote(s): $f(x)=\frac{x-6}{x^2-4}$. $\frac{x-6}{(x+2)(x-2)}$

(A) $x=\pm 2$

B $x=2$

C $x=6$

D $y=0$

$x^2-4=0$

$x=\pm 2$

84. Which of the following is the correct result of completing the square on the expression $x^2 + 16x - 10$?

(A) $(x+8)^2 - 54$ (B) $(x+4)^2 - 6$ (C) $(x-8)^2 - 54$

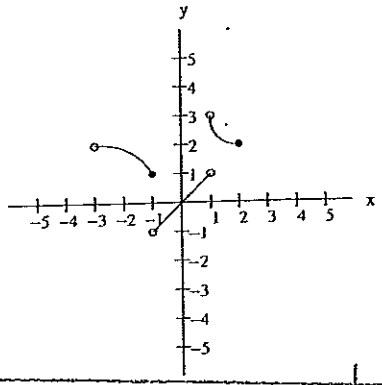
(D) $(x-4)^2 - 6$ (E) None of these are correct

85. What is the distance between the points (4, 0.5) and (5, 3.5) ? (Radical expressions have not been reduced).

(A) 8 (B) $\sqrt{10}$ (C) 6

(D) $\sqrt{6}$ (E) 10

86. The graph of the function $f(x)$ is shown here. What is its domain?



(A) $(-1, 3)$

(B) $(-3, -1) \cup (-1, 2)$

(C) $(-1, 1) \cup (1, 3)$

(D) $(-3, 1) \cup (1, 2]$

(E) $(-3, 2]$

87. Which of the these three equations have a graph that passes through the point $(-2, -1)$?

I. $y = -1$

II. $x^2 = x + 2y + 4$

III. $y = 3x + 5$

(A) Only I (B) Only II (C) Only III

(D) Only I and III (E) All three

88. How many x-intercepts does the graph of the parabola $y = -2x^2 + 2x - 5$ have?

(A) 0 (B) 1 (C) 2

(D) 3 (E) 4

(84) Find all real numbers that solve the equation $x^2 + 2x + 1 = -6$.

(A) -4 and -2

(B) $-1 + 2\sqrt{2}$ and $-1 - 2\sqrt{2}$

(C) $1 + 2\sqrt{2}$ and $1 - 2\sqrt{2}$

(D) $-1 + 2\sqrt{-2}$ and $-1 - 2\sqrt{-2}$

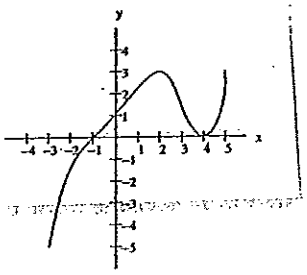
(E) There are no real number solutions

(90) Find the midpoint of the line segment between the points $(-3, -4)$ and $(7, 8)$.

(A) (5, 6.5) (B) (4, 5) (C) (2, 2)

(D) (2, 2.5) (E) (3, 2)

(91) The graph of $g(x)$ is shown here.
What are the zeros of $g(x)$?



(A) $-1, 0, 2, 4$

(B) $-1, 1, 4$

(C) $-1, 0$

(D) $-1, 4$

(E) -1

(92) Simplify: $\dfrac{x^{2/3} y^{3/2} x^{-3}}{(x^2 y^3)^2}$

(A) $x^{-20/3} y^{-9/2}$ (B) $x^{-5} y^{-7/2}$ (C) $x^{-14/3} y$

(D) $x^{-19/3} y^{-9/2}$ (E) $x^{8/3} y^{-15/2}$

(93) What type of function is $f(x) = -\dfrac{4}{x}$?

(A) exponential (B) logarithmic

(C) rational (D) linear

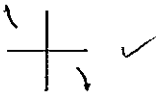
(E) quadratic

(94) Here are three statements about the polynomial $p(x) = -2x^5 + 7x^4 - 3x + 4$:

I. The degree of $p(x)$ is 4.

II. The leading coefficient of $p(x)$ is -2.

III. The graph of $p(x)$ has the end behavior pictured here:



How many of the statements are true?

(A) Only I (B) Only II (C) Only III

(D) Only I and II (E) Only II and III

(95) Perform the polynomial division:

$x^2 + 3 \overline{)\, x^4 + 2x^2 + 1}$

Give both the quotient $q(x)$ and the remainder $r(x)$:

(A) $q(x) = x^2 - 4x + 19$ and $r(x) = -75$

(B) $q(x) = x^2 + x + 2$ and $r(x) = x - 3$

(C) $q(x) = x^2 - 1$ and $r(x) = 4$

(D) $q(x) = x^2 - 4x + 19$ and $r(x) = -75x + 1$

(E) $q(x) = x^2 - 1$ and $r(x) = 5$

96

Perform the addition: $\dfrac{x-5}{x+2}+\dfrac{5}{x}$

$\dfrac{x^2-5x}{x(x+2)}+\dfrac{5x+10}{x(x+2)}=\dfrac{x^2+10}{x^2+2x}$

(A) $\dfrac{6x-5}{x^2-2x}$ (B) $\dfrac{x^2+10}{2x+2}$ (C) $\dfrac{6x-5}{2x-2}$

(D) $\dfrac{x^2+12x-4}{x^2-4x+1}$ (E) $\dfrac{x^2+10}{x^2+2x}$

97

Compute $\log_{\frac{1}{6}}\frac{1}{36}$ $\left(\frac{1}{6}\right)^x=\frac{1}{36}$

(A) -2 (B) $\frac{1}{2}$ (C) 2

(D) $-\frac{1}{2}$ (E) $\frac{1}{6}$

98

Find all x-values that solve the equation:

$$\frac{5}{x-2}+\frac{x}{x+2}=\frac{14}{x^2-4}$$

$\dfrac{5(x+2)}{x^2-4}+\dfrac{x^2-2x}{x^2-4}=\dfrac{14}{x^2-4}$

$5x+10+x^2-2x=14$

$x^2+3x+10=14$

$-14\quad -14$

$x^2+3x-4=0$ $-1\cdot 4=-4$, $-1+4=3$

$(x-1)(x+4)=0$

$x=1$ $x=-4$

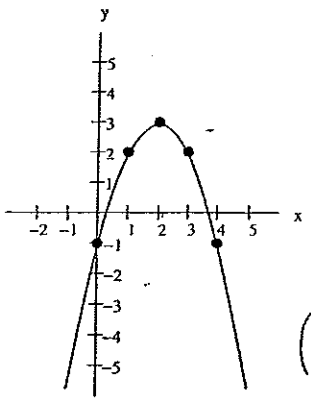
(A) $x=-4$ and $x=1$ (B) $x=-2$ and $x=2$

(C) $x=\frac{7}{3}$ (D) $x=0$ and $x=1$

(E) $x=\frac{4}{3}$

99

What is the equation of the parabola graphed here?



(A) $y=(x+2)^2+3$

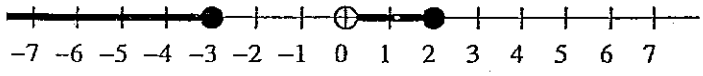
(B) $y=-(x+2)^2+3$

(C) $y=(x-2)^2+3$

(D) $y=-(x-2)^2+3$

(E) $y=-(x+2)^2-3$

100



The intervals shown on this number line can be expressed in interval notation as:

(A) $[-3,\infty)\cup(0,2]$

(B) $(-\infty,-3]\cap(0,2]$

(C) $(-\infty,-3]\cup(0,2]$

(D) $(-\infty,-3)\cup[0,2]$

(E) $(-\infty,-3]\cap(0,2]$