43. $f(x) = -x^2 + 10x - 2$ (5, 23) A

$x = -\frac{b}{2a}$ $x = \frac{-10}{-2} = 5$

$f(5) = -25 + 50 - 2$

$= 23$

44. $f(x) = x^2 + 14x + 35$

$a = 1$ $b = 14$ $c = 35$

$\frac{-14 \pm \sqrt{196 - (4)(1)(35)}}{2} \Rightarrow \frac{-14 \pm \sqrt{196 - 140}}{2} = \frac{-14 \pm \sqrt{56}}{2}$

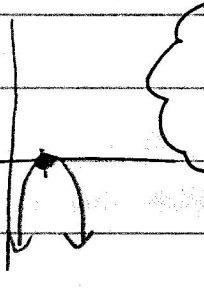
$\frac{-14 \pm 2\sqrt{14}}{2} = -7 \pm \sqrt{14} = x$ $(-7 \pm \sqrt{14}, 0)$ C

45. $f(x) = -x^2 + 2x + 3$

$f(0) = 0 + 0 + 3$

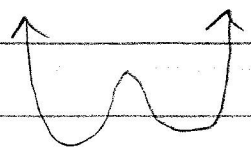
$f(0) = 3$ (0, 3) y-intercept B

46.



Domain $(-\infty, \infty)$
Range $(-\infty, 0]$ C

47.



x^4 = W-shaped

rises to the left
rises to the right C

48. $f(x) = x^3 - 5x^2 - 4x + 20$ Graph to find the first root

$-2 \mid 1 \quad -5 \quad -4 \quad 20$

$\quad\quad\downarrow \quad -2 \quad 14 \quad -20$

$\quad\quad 1 \quad -7 \quad 10 \quad \emptyset$

$x^2 - 7x + 10 = 0$

$(x-5)(x-2) = 0$

$x = 5 \quad x = 2$

$-2, 5, 2$ A

49. $f(x) = 3(x^2+1)(x-2)^2$

B $x = 2$ multiplicity 2 touches + turns around

50. $f(x) = 3x^3 - 32x^2 + 73x + 28$

$4 \mid 3 \quad -32 \quad 73 \quad 28$

$\quad\quad\downarrow \quad 12 \quad -80 \quad -28$

$\quad\quad 3 \quad -20 \quad -7 \quad \emptyset$

$3x^2 - 20x - 7 = 0$

$(3x^2 - 21x) + (1x - 7) = 0$

$3x(x-7) + 1(x-7) = 0$

$(3x+1)(x-7) = 0$

$x = -1/3 \quad x = 7$

$4, -1/3, 7$

D

51. $x^2 + 2x + 3 \overline{)\, x^4 + 3x^3 + 6x^2 + 5x + 9}$

$x^2 + x + 1 + \frac{6}{x^2+2x+3}$ A

$-x^4 - 2x^3 - 3x^2$

$x^3 + 3x^2 + 5x$

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

$x^2 + 2x + 9$

$-x^2 - 2x - 3$

6

52. -5 | -4 -16 18 -10

$\downarrow$ 20 -20 10

-4 4 -2 $\emptyset$

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

53. $(x+2)(x+(3-2i))(x+(3+2i))$ $(3+2i)(3-2i)$

$x^2+3x+2ix+3x-2ix+13$ $9+6i-6i+4$

$(x+2)(x^2+6x+13)$

$x^3+6x^2+13x+2x^2+12x+26$

$x^3+8x^2+25x+26$ A

54. $f(x)=x^7+x^6+x^2+x+2$ $f(-x)=-x^7+x^6+x^2-x+2$

no no no no yes no yes yes

C 0 positive 3 negative or 1 negative

55. Look @ graph Negative 1 from the left goes to $-\infty$

C

56. $g(x)=\frac{x}{x^2-25}$ $x^2-25=0$

$x^2=25$

$x=\pm 5$ C

57. $g(x)=\frac{4x^2-2x-8}{6x^2-7x+5}$

$y=\frac{4}{6}=\frac{2}{3}$ C

58. $f(x) = \frac{x^2+9x-3}{x-5}$

$5 \mid 1 \quad 9 \quad -3$

$\downarrow \quad 5 \quad 70$

$1 \quad 14 \mid 67$

C $y = x+14$

59. $\frac{n(n+2)!}{(n+3)!} = \frac{n(n+2)!}{(n+3)(n+2)!} = \frac{n}{n+3}$ B

60. $\sum_{i=1}^{45}(-2i-6)$ $S_n = \frac{45}{2}(-8-96)$

$S_{45} = -2340$ A

61. $\frac{a+1}{1} + \frac{a+2}{2} + \cdots \frac{a+5}{5}$ $\sum_{a=1}^{5} \frac{a+i}{i}$ A

62. $a_n = a_{n-1} + 4 \quad a_1 = -5$ $-5, -1, 3, 7, 11$ D

63. $a_{80} = -7 + (80-1)5$

$a_{80} = -7 + (79)(5)$ $a_{80} = 388$ B

64. $a_{11} = 4(-2)^{10}$ $a_{11} = 4096$ C

65. $A = 150\left[\frac{\left(1 + \frac{.065}{12}\right)^{12(5)} - 1}{\frac{.065}{12}}\right]$

$A = \$10601.10$ D