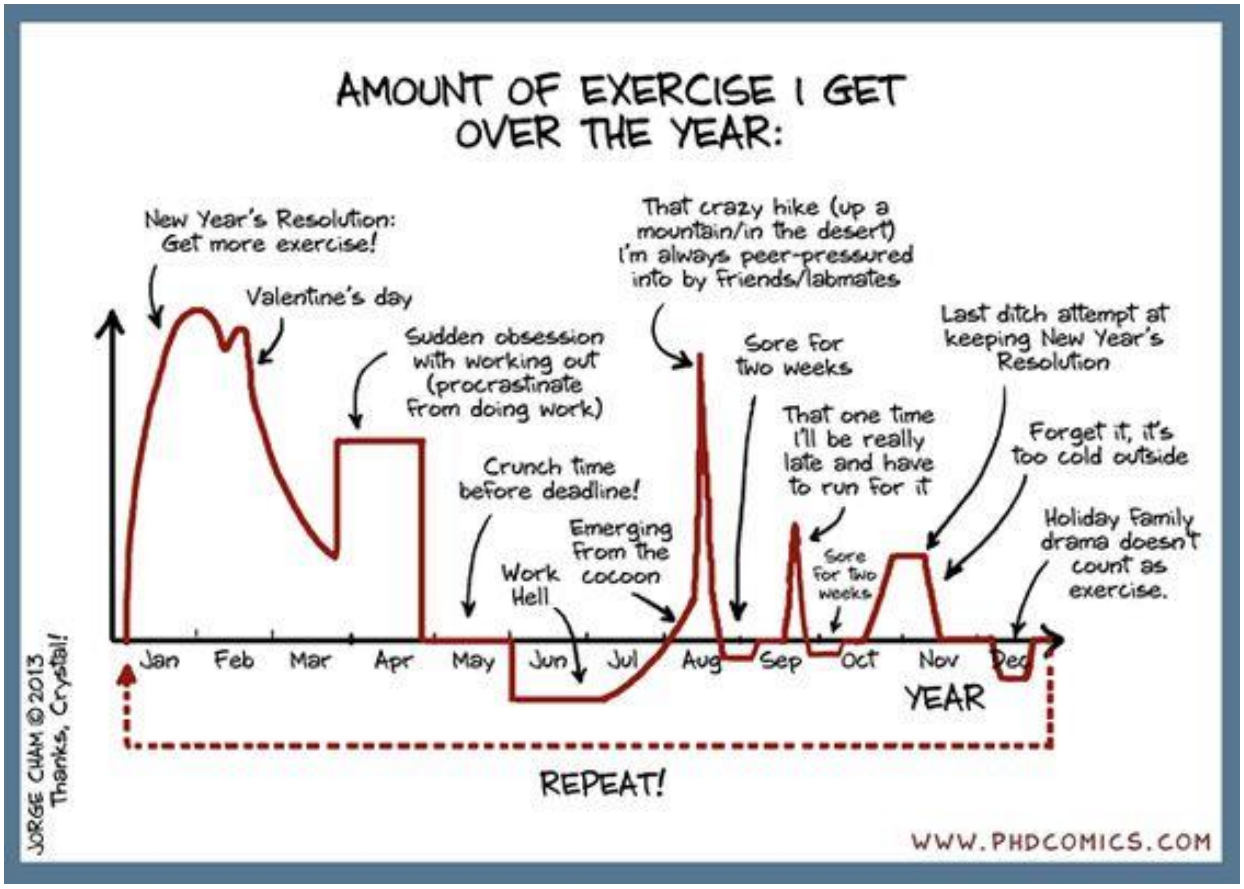
CLASS DISCUSSION: MATH 117 28 FEBRUARY 2019

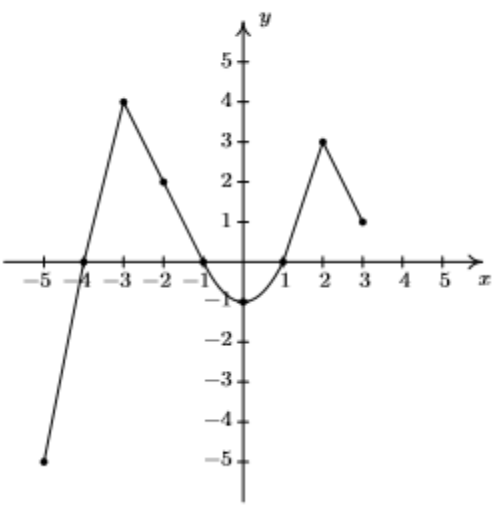
GRAPHS



In exercises 1 – 12, sketch the graph of the given function. Also state the domain of the function, identify any intercepts.

1. $f(x) = 2 - x$
2. $f(x) = \dfrac{x-2}{3}$
3. $f(x) = x^2 + 1$
4. $f(x) = 4 - x^2$
5. $f(x) = 2$
6. $f(x) = x^3$
7. $f(x) = x(x-1)(x+2)$
8. $f(x) = \sqrt{x-2}$
9. $f(x) = \sqrt{5-x}$
10. $f(x) = 3 - 2\sqrt{x+2}$
11. $f(x) = \sqrt[3]{x}$
12. $f(x) = \dfrac{1}{x^2+1}$

In Exercises 42 - 57, use the graph of $y = f(x)$ given below to answer the question.



42. Find the domain of f.

43. Find the range of f.

44. Determine $f(-2)$.

45. Solve $f(x) = 4$.

46. List the x-intercepts, if any exist.

47. List the y-intercepts, if any exist.

48. Find the zeros of f.

49. Solve $f(x) \geq 0$.

50. Find the number of solutions to $f(x) = 1$.

51. Does f appear to be even, odd, or neither?

52. List the intervals where f is increasing.

53. List the intervals where f is decreasing.

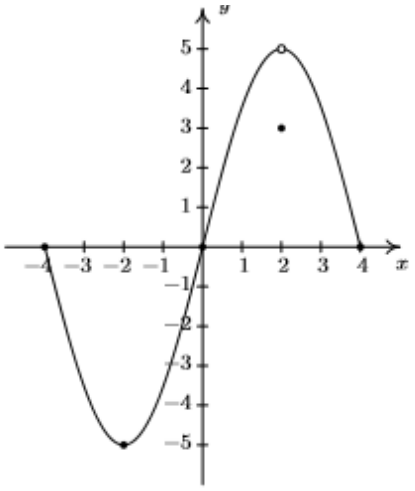
54. List the local maximums, if any exist.

55. List the local minimums, if any exist.

56. Find the maximum, if it exists.

57. Find the minimum, if it exists.

In the following exercises, use the graph of y = f(x) given below to answer the question.



58. Find the domain of f.

59. Find the range of f.

60. Determine $f(2)$.

61. Solve $f(x) = -5$.

62. List the x-intercepts, if any exist.

63. List the y-intercepts, if any exist.

64. Find the zeros of f.

65. Solve $f(x) \leq 0$.

66. Find the number of solutions to $f(x) = 3$.

67. Does f appear to be even, odd, or neither?

68. List the intervals where f is increasing.

69. List the intervals where f is decreasing.

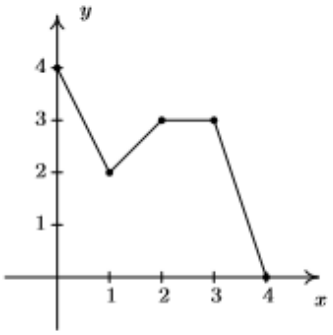
70. List the local maximums, if any exist.

71. List the local minimums, if any exist.

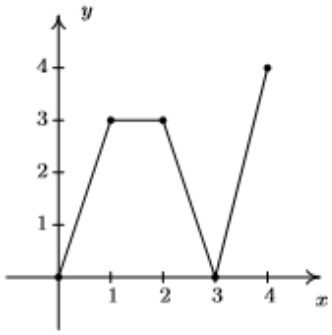
72. Find the global maximum, if it exists.

73. Find the global minimum, if it exists.

In Exercises 78 - 85, use the graphs of $y = f(x)$ and $y = g(x)$ below to find the function value.



$y = f(x)$



$y = g(x)$

78. $(f+g)(0)$

79. $(f+g)(1)$

80. $(f-g)(1)$

81. $(g-f)(2)$

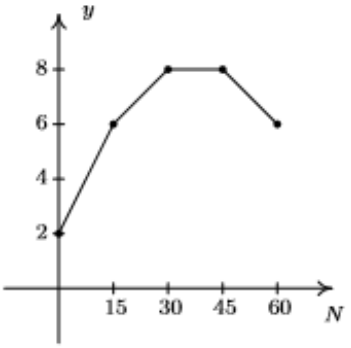
82. $(fg)(2)$

83. $(fg)(1)$

84. $\left(\frac{f}{g}\right)(4)$

85. $\left(\frac{g}{f}\right)(2)$

The graph below represents the height h of a Sasquatch (in feet) as a function of its age N in years. Use it to answer the questions in Exercises 86 - 90.



$y = h(N)$

86. Find and interpret $h(0)$.

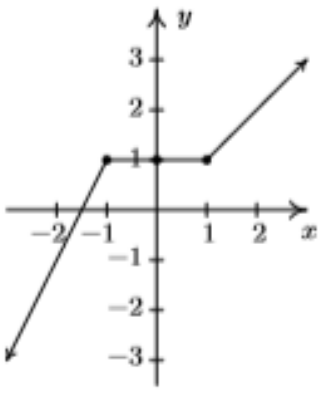
87. How tall is the Sasquatch when she is 15 years old?

88. Solve $h(N) = 6$ and interpret.

89. List the interval over which h is constant and interpret your answer.

90. List the interval over which h is decreasing and interpret your answer.

99. Consider the graph of the function f given below.



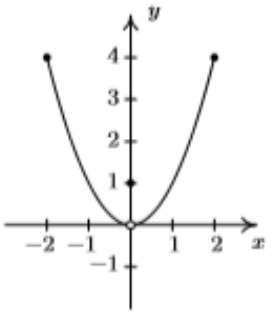
(a) Show that f has a local maximum but not a local minimum at the point $(-1, 1)$.

(b) Show that f has a local minimum but not a local maximum at the point $(1, 1)$.

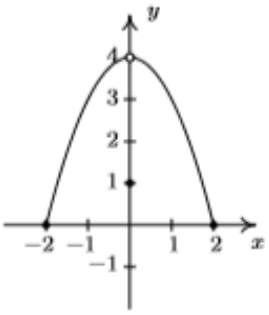
(c) Show that f has a local maximum AND a local minimum at the point $(0, 1)$.

(d) Show that f is constant on the interval $[-1, 1]$ and thus has both a local maximum AND a local minimum at every point $(x, f(x))$ where $-1 < x < 1$.

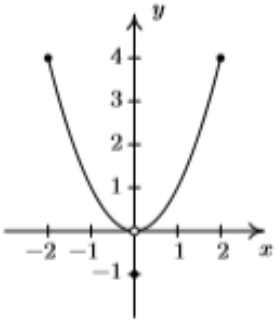
101. We said earlier in the section that it is not good enough to say local extrema exist where a function changes from increasing to decreasing or vice versa. As a previous exercise showed, we could have local extrema when a function is constant so now we need to examine some functions whose graphs do indeed change direction. Consider the functions graphed below. Notice that all four of them change direction at an open circle on the graph. Examine each for local extrema. What is the effect of placing the "dot" on the y-axis above or below the open circle? What could you say if no function value were assigned to $x = 0$?



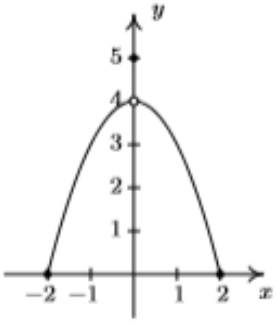
(a) Function I



(b) Function II



(c) Function III



(d) Function IV