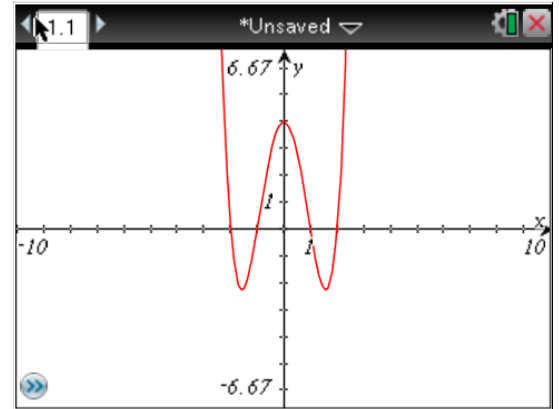


Key Concept 1: Functions**Non-Calculator**

1) Estimate the relative max and min values.



2) Find the domain and range of $f(x) = \sqrt{x-1} + 3$.

3) Find $(f + g)(x)$ if $f(x) = x^3 - 3x + 5$ and $g(x) = x^2 - 5x - 6$.

4) Find $(f \cdot g)(x)$ if $f(x) = (x + 3)^2$ and $g(x) = x - 3$.

5) Find $(f \circ g)(x)$ if $f(x) = x^2 - 7$ and $g(x) = \sqrt{x + 3}$.

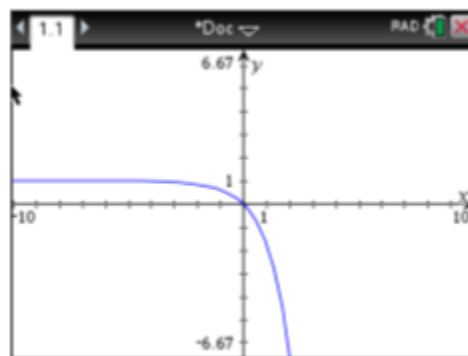
6) Find the inverse of $h(x) = (x - 3)^2 + 9$.

7) Sketch a graph of three parent functions that are NOT continuous over Real Numbers.

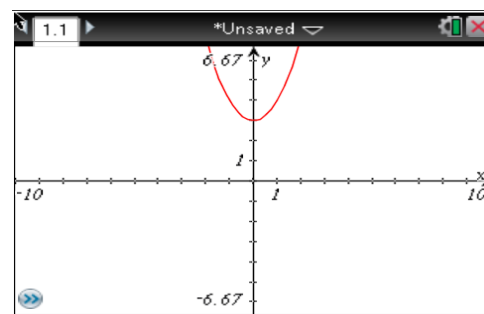
8) Sketch a graph of three parent functions that are decreasing on the interval $(-\infty, 0)$.

9) Sketch a graph of three parent functions that are bounded below.

10) Using your knowledge of parent functions and transformations, write the function that produces the graph on the right.



11) Using your knowledge of parent functions and transformations, write the function that produces the graph on the right.



Calculator

12) Find the zeroes of $f(x) = x^2 - 5x + 3$.

13) Determine the function $f(x)$ in standard form with zeroes at $x = \frac{2}{3}$, $x = 3$, and $x = 5$.

14) Using limit notation, write the end behavior of $f(x)$ in problem 13.

15) Determine to three decimal places the interval(s) on which the function in problem 13 is decreasing and increasing.

16) Reflect across the x -axis: $q(x) = (x - 3)^2 - 5$

17) In problem 16, what type of function does $q(x)$ describe?

18) What is the best fit regression curve given the data below? Write the regression model.

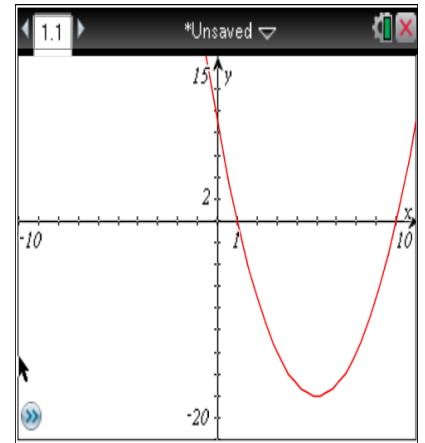
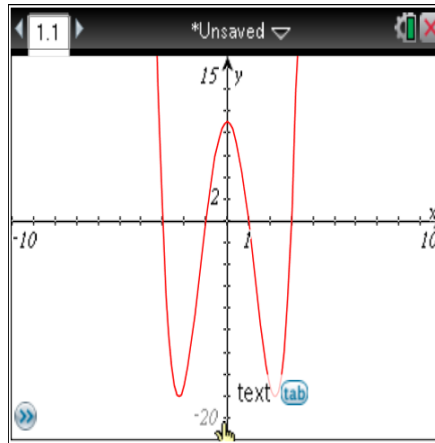
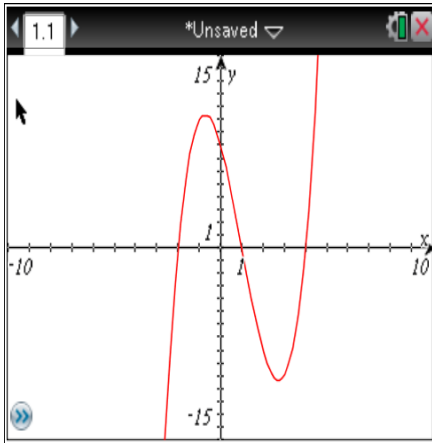
# of minutes	3	4	5	6	8
# of cars	8	15	24	35	63

19) Graphite Inc. makes tennis racquets. If each racquet costs \$53 to make with fixed overhead costs of \$567,000, what is the best fit regression curve? Write a function that models the cost of producing x rackets.

Key Concept 2: Polynomial and Rational Functions

Non-Calculator

20) Write a function that fits each graph below.

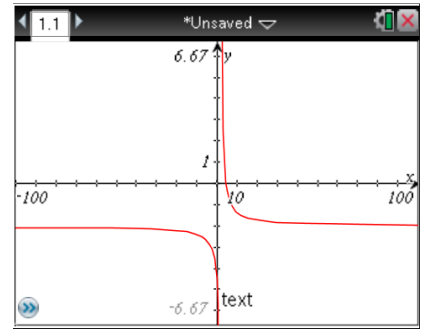


21) Given $x = 4$ is a root, find the rest of the zeros for $f(x) = x^3 + x^2 - 16x - 16$.

22) Determine the polynomial of least degree given the zeros $3 + i$ and -2 .

23) Determine how many complex zeros there are for $g(x) = 3x^4 - 6x^2 + 5x - 11$ and explain your reasoning.

24) Given the graph, determine the $\lim_{x \rightarrow -\infty} g(x)$.



Calculator

25) Solve for q : $2q^3 - 10q = 5$

26) Find the solutions of the following equation: $c^2 + 3 = c$

27) Find the vertical and horizontal asymptotes for:

a) $h(x) = \frac{x-5}{x+3}$

b) $k(x) = \frac{x+3}{x^2-5x-24}$

28) Determine all complex zeros for $w(x) = x^4 - 8x^2 - 9$.

29) How many real zeros are there for $b(x) = 2x^3 + 3x^2 + 3x + 9$? How many are imaginary?

30) Describe the end behavior of $m(x) = -2x^3 - x + 1$.

Key Concept 3: Exponential and Logarithmic Functions

Non-Calculator

31) Evaluate: $-7 \log 10^3 - 3$

32) Write $\frac{9}{8} = a^{-2}$ in logarithmic form.

33) Solve for m : $\log_{\frac{1}{5}}(\sqrt[3]{25})^5 = m$

34) Solve for q : $\frac{1}{16} = 2^{q-3}$

35) Condense the expression: $2 [5 \log(x + 2) + \log x] - \log(x + 4)$

36) Solve for w : $\log_5(2w - 3) = 2$

37) Solve for a : $-4 = \log_a \frac{1}{16}$

38) Find the domain, range, x - intercept, y - intercept, and any asymptotes of: $f(x) = 3^{x+2} - 1$

Calculator

39) Solve for x : $\ln(x + 4) + \ln(x - 3) = 2 \ln 3$

40) Find the domain and range of: $f(x) = e^x + 7$

41) Identify the domain, range, x -intercept, y -intercept, and any asymptotes for: $f(x) = -1 + \log_5(x + 3)$
Describe the transformation of $f(x)$.

42) The number of bacteria in a petri dish after t hours is $B = 100e^{kt}$, where $t = 0$ represents the time at 12 pm. At 6 am, the number of bacteria was 42.

a) Find k .

b) Using k , find the number of bacteria at 8 pm.

43) Given the formula $\text{pH} = -\log[\text{H}^+]$, find the pH if $[\text{H}^+]$ is 3.98×10^{-9} . Then, find $[\text{H}^+]$ if $\text{pH} = 2.0$.

Key Concept 4: Conic Sections

Non-Calculator

44) Find the focus for a parabola with vertex $(5, -2)$ and directrix $y = 3$.

45) Find the vertex for a parabola with focus $(-2, 5)$ and directrix $x = -6$.

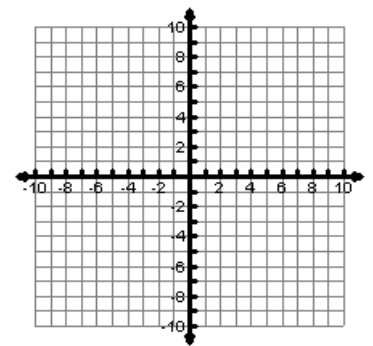
46) Find the directrix for a parabola with vertex $(-2, 4)$ and focus $(-7, 4)$.

47) Write the equation for a parabola with vertex $(3, 2)$ and directrix $x = -2$.

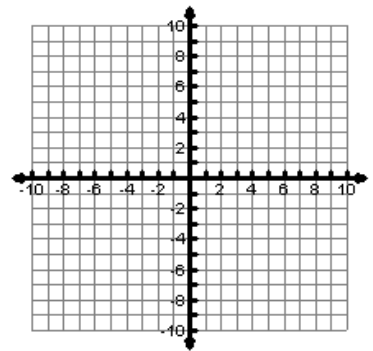
48) Find the vertices of an ellipse with foci $(1, 4)$, $(1, -4)$ and major axis of 13.

49) Write the equation for an ellipse with vertices $(13, 3)$, $(-13, 3)$ and foci $(12, 3)$, $(-12, 3)$.

50) Draw the graph and write the equation of an ellipse with a major axis of 12, minor axis of 10 & center at the origin.

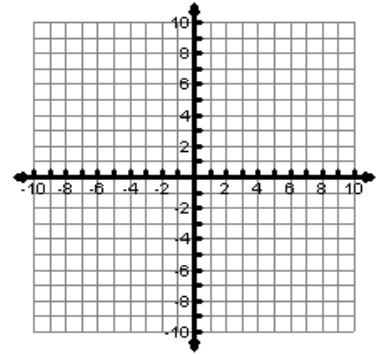


51) Draw and label the graph of $12x^2 + 6y^2 = 24$.



52) Find the eccentricity of the ellipse in #51.

53) Draw and label the graph of $25(x - 2)^2 - 16(y + 3)^2 = 400$.



54) Find the eccentricity of the hyperbola in #53.

55) Find the vertices and foci of $9y^2 - 6x^2 = 36$.

56) Write the equation for a hyperbola with foci $(10, 3)$, $(-10, 3)$ and vertices $(6, 3)$, $(-6, 3)$.

57) Find the equation of the asymptotes in #56.