PreCalc Test #4 Review

Please complete 4 problems from each section on your review (It will count as a quiz grade). Your review is due the day of the test, (**A day** November 30th, **B day** December 1st). You are responsible for this content whether or not you were in this class at the time. See **www.CalcChat.com** for worked-out solutions to odd numbered exercises.

2.6

Finding a Function's Domain and Asymptotes **In Exercises 125–136, (a) find the domain of the function, (b) decide whether the function is continuous, and (c) identify any horizontal and vertical asymptotes.**

125. $f(x) = \dfrac{2 - x}{x + 3}$

126. $f(x) = \dfrac{4x}{x - 8}$

127. $f(x) = \dfrac{2}{x^2 - 3x - 18}$

128. $f(x) = \dfrac{2x^2 + 3}{x^2 + x + 3}$

129. $f(x) = \dfrac{7 + x}{7 - x}$

130. $f(x) = \dfrac{6x}{x^2 - 1}$

131. $f(x) = \dfrac{4x^2}{2x^2 - 3}$

132. $f(x) = \dfrac{3x^2 - 11x - 4}{x^2 + 2}$

133. $f(x) = \dfrac{2x - 10}{x^2 - 2x - 15}$

134. $f(x) = \dfrac{x^3 - 4x^2}{x^2 + 3x + 2}$

135. $f(x) = \dfrac{x - 2}{|x| + 2}$

136. $f(x) = \dfrac{2x}{|2x - 1|}$

2.7

Finding Asymptotes and Holes **In Exercises 139–142, find all of the vertical, horizontal, and slant asymptotes, and any holes in the graph of the function. Then use a graphing utility to verify your result.**

139. $f(x) = \dfrac{x^2 - 5x + 4}{x^2 - 1}$

140. $f(x) = \dfrac{2x^2 - 7x + 3}{2x^2 - 3x - 9}$

141. $f(x) = \dfrac{3x^2 + 5x - 2}{x + 1}$

142. $f(x) = \dfrac{2x^2 + 5x + 3}{x - 2}$

Sketching the Graph of a Rational Function **In Exercises 143–152, sketch the graph of the rational function by hand. As sketching aids, check for intercepts, vertical asymptotes, horizontal asymptotes, slant asymptotes, and holes.**

143. $f(x) = \dfrac{2x - 1}{x - 5}$

144. $f(x) = \dfrac{x - 3}{x - 2}$

145. $f(x) = \dfrac{2x^2}{x^2 - 4}$

146. $f(x) = \dfrac{5x}{x^2 + 1}$

147. $f(x) = \dfrac{2}{(x + 1)^2}$

148. $f(x) = \dfrac{4}{(x - 1)^2}$

149. $f(x) = \dfrac{2x^3}{x^2 + 1}$

150. $f(x) = \dfrac{x^3}{3x^2 - 6}$

151. $f(x) = \dfrac{x^2 - x + 1}{x - 3}$

152. $f(x) = \dfrac{2x^2 + 7x + 3}{x + 1}$

3.1

Evaluating Exponential Functions **In Exercises 1–4, use a calculator to evaluate the function at the indicated value of x. Round your result to four decimal places.**

1. $f(x) = 1.45^x, \quad x = 2\pi$

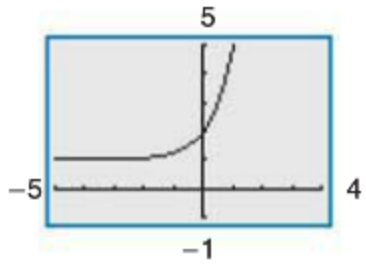
2. $f(x) = 7^x, \quad x = -\sqrt{11}$

3. $g(x) = 60^{2x}, \quad x = -1.1$

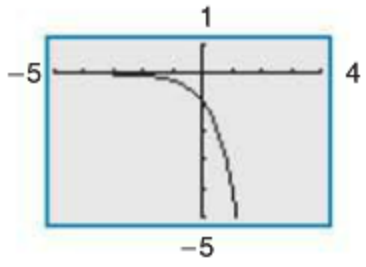
4. $g(x) = 25^{-3x}, \quad x = \frac{3}{2}$

Library of Parent Functions **In Exercises 5–8, match the function with its graph. [The graphs are labeled (a), (b), (c), and (d).]**

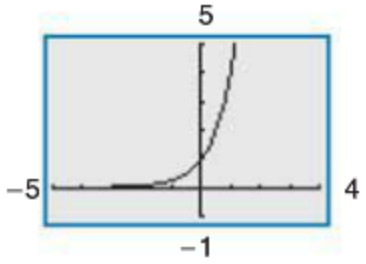
(a)



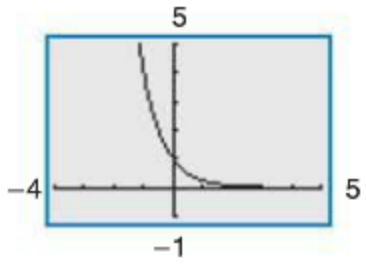
(b)



(c)



(d)



5. $f(x) = 4^x$

6. $f(x) = 4^{-x}$

7. $f(x) = -4^x$

8. $f(x) = 4^x + 1$

Graphs of $y = a^x$ and $y = a^{-x}$ **In Exercises 9–12, graph the exponential function by hand. Identify any asymptotes and intercepts and determine whether the graph of the function is increasing or decreasing.**

9. $f(x) = 6^x$

10. $f(x) = 0.3^x$

11. $g(x) = 6^{-x}$

12. $g(x) = 0.3^{-x}$

Graphing an Exponential Function **In Exercises 13–18, use a graphing utility to construct a table of values for the function. Then sketch the graph of the function. Identify any asymptotes of the graph.**

13. $h(x) = e^{x-1}$

14. $f(x) = e^{x+2}$

15. $h(x) = -e^{x}$

16. $f(x) = 3 - e^{-x}$

17. $f(x) = 4e^{-0.5x}$

18. $f(x) = 2 + e^{x+3}$

Finding the Balance for Compound Interest **In Exercises 19 and 20, complete the table to determine the balance A for \$10,000 invested at rate r for t years, compounded continuously.**

t	1	10	20	30	40	50
A						

19. $r = 8\%$

20. $r = 3\%$

21. Economics A new SUV costs \$32,000. The value V of the SUV after t years is modeled by $V(t) = 32{,}000\left(\frac{3}{4}\right)^{t}$.

(a) Use a graphing utility to graph the function.

(b) Find the value of the SUV after 2 years.

(c) According to the model, when does the SUV depreciate most rapidly? Is this realistic? Explain.

22. Radioactive Decay Let Q represent the mass, in grams, of a quantity of plutonium 241 (^{241}Pu), whose half-life is 14 years. The quantity of plutonium present after t years is given by $Q = 50\left(\frac{1}{2}\right)^{t/14}$.

(a) Determine the initial quantity (when $t = 0$).

(b) Determine the quantity present after 10 years.

(c) Use a graphing utility to graph the function over the interval $t = 0$ to $t = 50$.

End Behavior (Limit Notation)

Find the end behavior (in limit notation) for each of the following functions:

1. $f(x) = x^4 - 4x^2 + x$

2. $f(x) = 6x^3 + 1$

3. $f(x) = -x^4 + 1$

4. $f(x) = (x-1)(x-3)(x-5)$

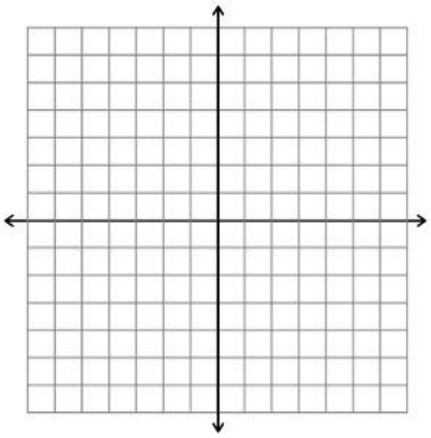
5. $f(x) = -(x-4)(x-3)(x-1)^2$

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

State the equations of the parent function, graph, and find the end behavior (using limit notation).

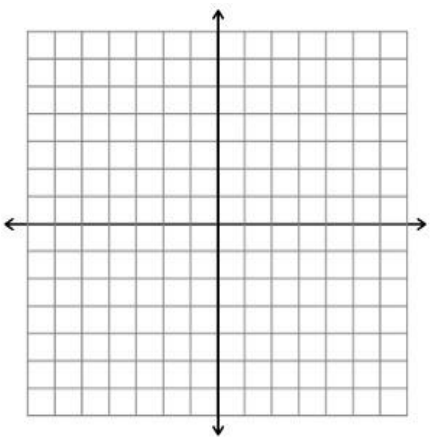
7. **Parent functions: Constant**
   Equation: _____
   End behavior:

   Domain
   Range:

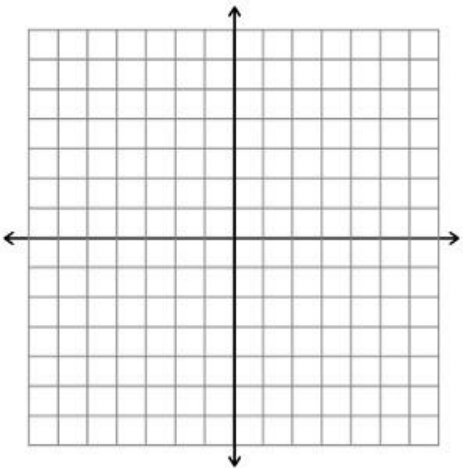


8. **Parent functions: Linear**
   Equation: _____
   End behavior:

   Domain:
   Range:

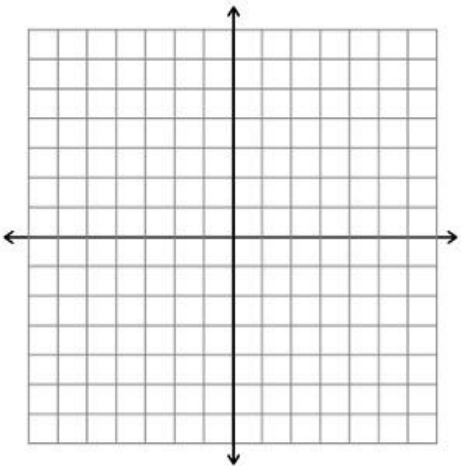


9. **Parent Function: Quadratic**
   Equation: _____
   End behavior:
   Domain:
   Range:



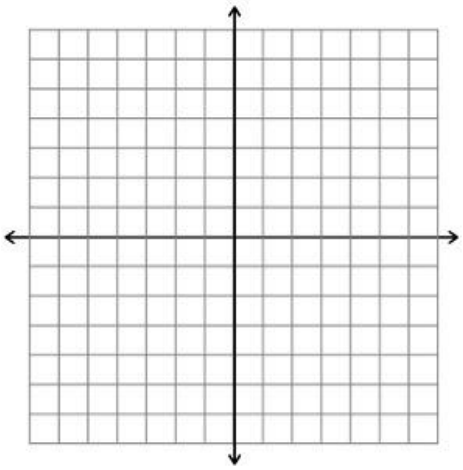
10. **Parent Function: Cubic**
    Equation: _____
    End behavior:

    Domain:
    Range:



11. **Parent Function: square root**
    Equation: _____
    End behavior:

    Domain:
    Range:



12. **Parent Function: Rational**
    Equation: _____
    End behavior:

    Domain:
    Range: