

Unit 3 Mid-chapter Practice Test

1. What type of polynomial functions have graphs that start above the x-axis and end below the x-axis?
2. Find a polynomial function with $h(5) = 0$, $h(-3) = 0$ and $h(0) = 10$
3. Sketch a graph of the polynomial function $y = -3(x-4)(x+1)(x+5)$. Do not use a calculator.

Use the equation $f(x) = x^3 - 4x^2 + 5x - 4$ to answer questions 5-7.

4. Expand $f(x) = x^3 - 4x^2 + 5x - 4$ in terms of $(x - 3)$.
5. Determine the equation of the tangent line at $(3, f(3))$ for the function $f(x)$ listed in number 4.

Calculate the limit of each function as indicated.

6. $\lim_{x \rightarrow \infty} \frac{3x - 4}{x^2 - 5x + 6}$

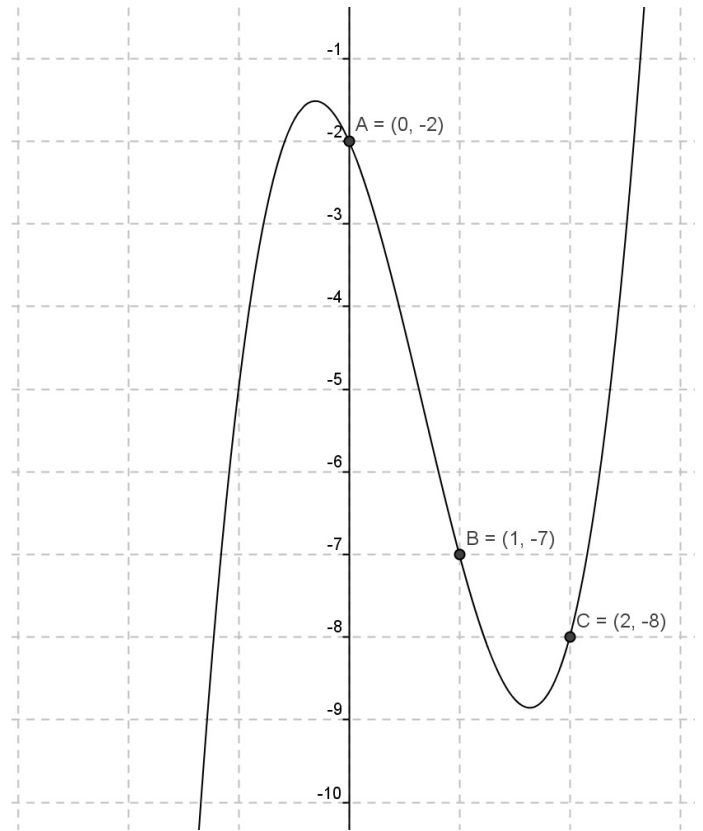
7. $\lim_{x \rightarrow \infty} \frac{x - 4}{3x + 6}$

Use the function $f(x) = 2x^3 - 4x^2 - 3x - 2$ and its graph below to answer questions 8-11

8. Determine the average rate of change between the points $(1, f(1))$ and $(0, f(0))$.

9. Draw the secant line between the points $(1, f(1))$ and $(0, f(0))$. Determine the equation of the secant line.

10. Plot an arbitrary point $(b, f(b))$ on the graph. Determine the slope of the secant line between $(b, f(b))$ and $(0, -2)$ in terms of b .



11. As b moves closer to 0, what value will the slope of the secant line approach? Determine your answer by finding the limit as $b \rightarrow 0$

Find the discontinuities of each of the following functions. Label them as infinite or point discontinuities. Also determine the equation of any horizontal or slant asymptotes if they exist.

12. $f(x) = \frac{x^2 - 6x + 9}{x^2 - x - 6}$

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

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

15. $f(x) = \frac{x^2 - 4}{x - 2}$