AP Calc AB Chapter 4 Retake Review

Calculator

1. $s(t) = 2t^3 - 15t^2 + 24t - 10$

   a. Describe Motion
   b. Find total distance travelled on (0, 3)

2. An object is dropped from a height of 256 feet. Find the speed of the object when it hits the ground. Given $s(t) = -16t^2 + v_0 t + s_0$

3. $f(x) = x^3 - 2x$ Find a value that satisfies the Mean Value Theorem on the interval (-1, 2)

4. Find the least value of x on the interval (0, 10) where the function $f(x) = 2x + \ln(3x) + 5sinx$ has a relative maximum point.

5. A cylindrical can is to hold 20π m^3 of liquid. The material for the top and bottom costs \$10/$m.^2$ and material for the side costs \$8/m^2 . Find the cost of the least expensive can you can make.

No Calculator:

6. $f(x) = \frac{x^5}{5} - \frac{5x^3}{3} - 36x$

   Find intervals where the function is increasing, decreasing, concave up, and concave down.
   Find the x-coordinates of all relative maximum and minimum points and inflection points.

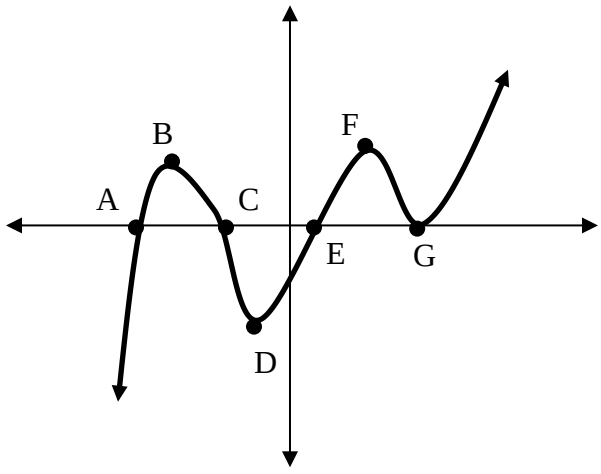
7. $\sin(xy) - 2y + x^2 = \ln(x^2 - 3)$ Find $\frac{dy}{dx}$

8. Given the graph of $f'(x)$ answer the questions following the graph.

   a) List all points that are relative maximum points of $f(x)$. Justify your answer.

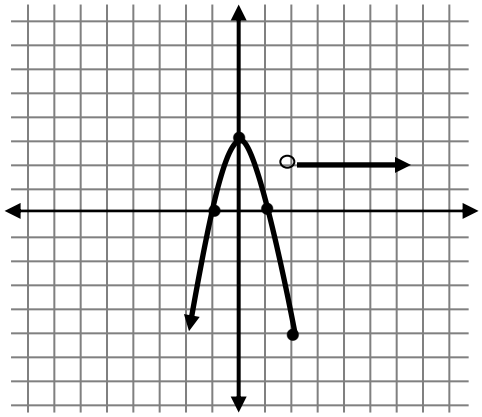
   b) List all points that are relative minimum points of $f(x)$. Justify your answer.

   c) List all points that are inflection points of $f(x)$.

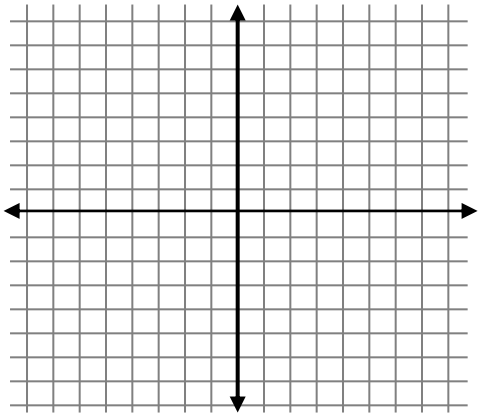


9. The following is a graph of $y = f'(x)$. Sketch a possible graph of $y = f(x)$

$y = f'(x)$



$y = f(x)$



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

Find each of the following:

a. x-coordinates of all critical points

b. x-coordinates of all stationary points

c. *x*-coordinates of relative maxima.

d. *x*-coordinates of relative minima

11. $f(x) = \sqrt{3}x - 2sinx$

Find the absolute maximum and minimum values on the interval $[0,\ \pi]$

Practice Calculator

12. We have 45 m^2 of material to build a box with a square base and no top. Determine the dimensions of the box that will maximize the enclosed volume

13. A tutor finds that if he charges $40 per hour for tutoring, then he will generate 120 hours of tutoring business per month. However for each $3 increase per hour, he will lost 5 hours of business. How much should he charge in order to maximize revenue?

14. An object is launched from the ground with an initial velocity of 352 feet per second. Find the maximum height of the object. (Given $s(t) = -16t^2 + v_0t + s_0$)

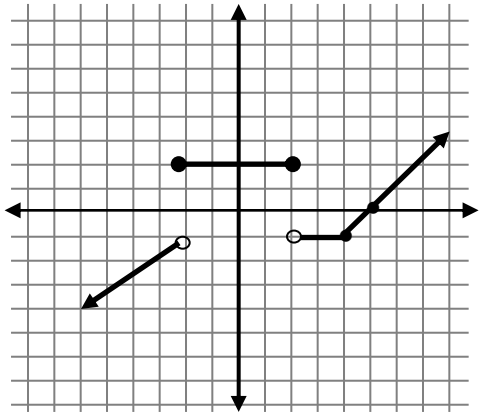
15. $f(x) = x^3 - 6x^2 - 15t + 4$ Find the absolute maximum and minimum values on [1, 6]

16. $f(x) = \sqrt{x+2}$ Find a value that satisfies the Mean Value Theorem on the interval (2, 7)

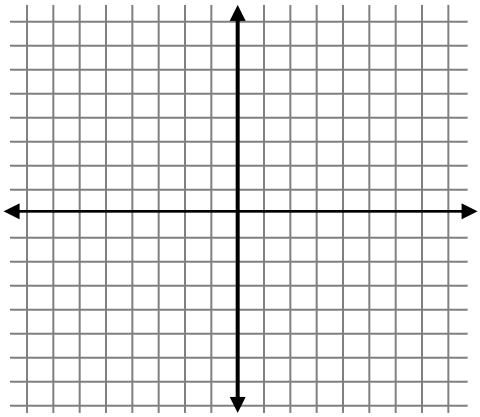
Practice No Calculator

17. The following is a graph of $y = f'(x)$. Sketch a possible graph of $y = f(x)$

$y = f'(x)$



$y = f(x)$



18. $s(t) = 2cost - t$ Find an interval on $(0, 2\pi)$ where the object is moving right and speeding up.

19. $e^{4x} - 3y^2 = cos^{-1}x$ Find $\frac{dy}{dx}$

20. $f'(x) = \frac{x+2}{x^2-3}$

a. List the x-coordinates of all critical points

b. List the x-coordinates of all stationary points

c. List the x-coordinates of all inflection points