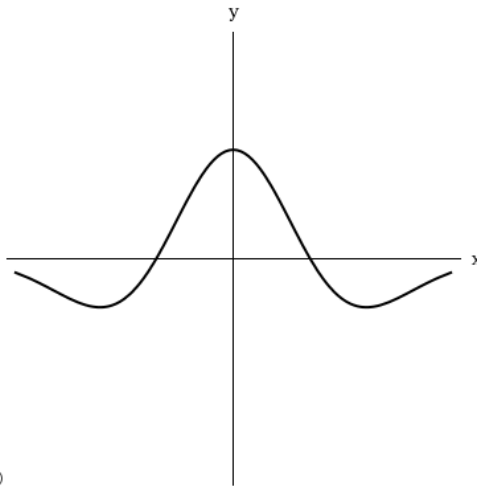
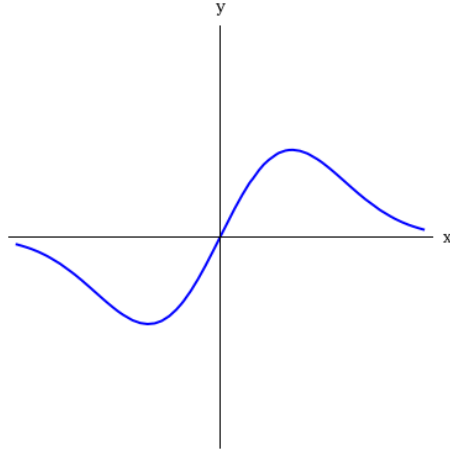


Q1

Monday, September 7, 2020

11:17 PM

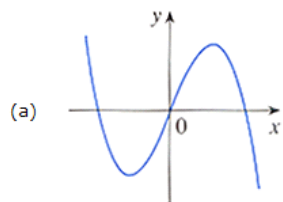
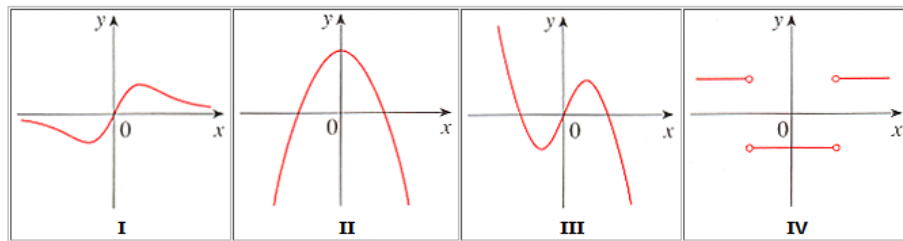
Use the given graph of $f(x)$ to sketch the graph of f' .



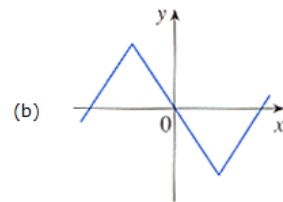
Q2

Tuesday, September 8, 2020 5:30 PM

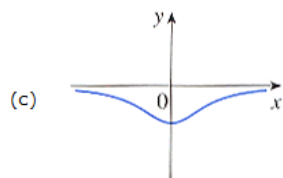
The graphs of four derivatives are given below. Match the graph of each function in (a)-(d) with the graph of its derivative in I-IV.



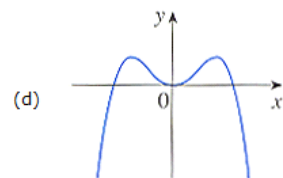
✓



✓



✓

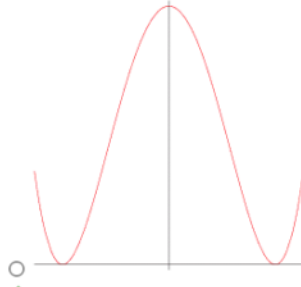
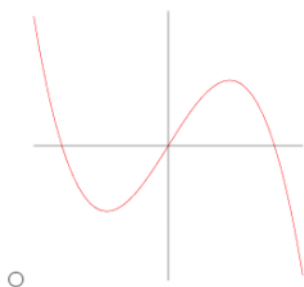
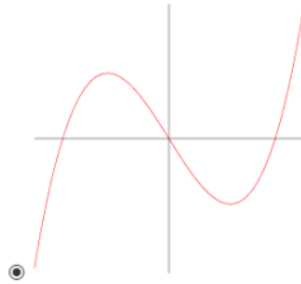
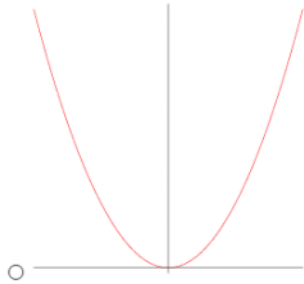
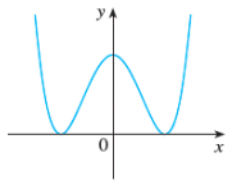


✓

Q3

Tuesday, September 8, 2020 5:31 PM

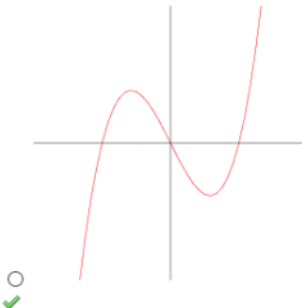
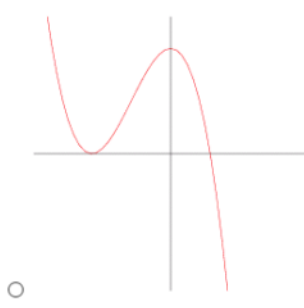
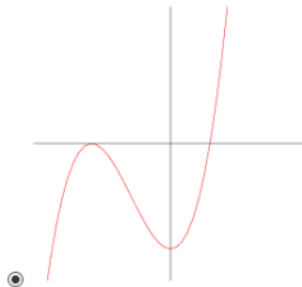
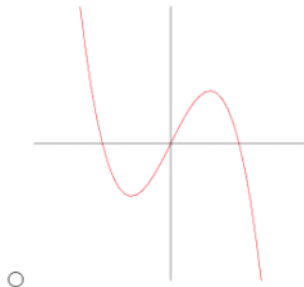
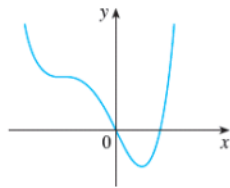
Trace or copy the graph of the given function f . (Assume that the axes have equal scales.) Then use the method of [this example](#) to sketch the graph of f' below it.



Q4

Tuesday, September 8, 2020 5:32 PM

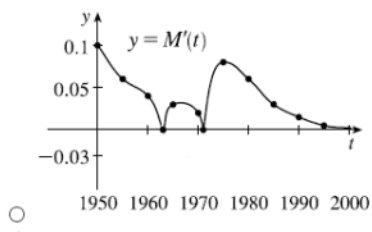
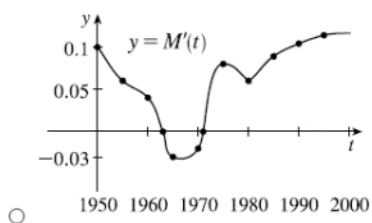
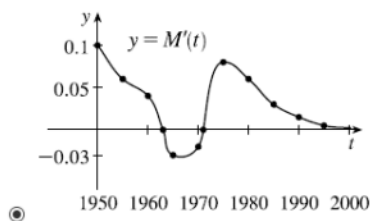
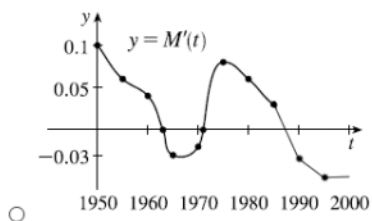
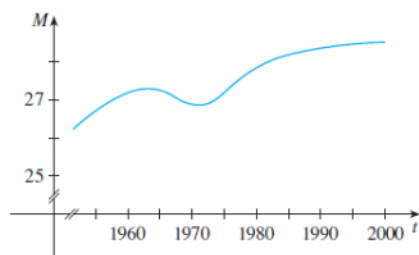
Trace or copy the graph of the given function f . (Assume that the axes have equal scales.) Then use the method of [this example](#) to sketch the graph of f' below it.



Q5

Tuesday, September 8, 2020 5:33 PM

The graph shows how the average age of first marriage of Japanese men varied in the last half of the 20th century. Sketch the graph of the derivative function $M'(t)$.



During which years was the derivative negative?

- ☐ 1950 to 2000
- ☐ 1950 to 1963 and 1971 to 2000
- ☒ 1963 to 1971
- ☐ 1963 to 1971 and 1987 to 2000
- ☐ none of these

Q6

Tuesday, September 8, 2020 5:34 PM

Find the derivative of the function using the definition of derivative.

$$f(x) = rx + q$$

$$f'(x) = \boxed{r}$$



State the domain of the function. (Enter your answer using interval notation.)

$$\boxed{(-\infty, \infty)}$$



State the domain of its derivative. (Enter your answer using interval notation.)

$$\boxed{(-\infty, \infty)}$$



$$f(x) = \boxed{r}x + q$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{(r(x+h) + q) - (rx + q)}{h} = \frac{\cancel{rx} + rh + \cancel{q} - \cancel{rx} - \cancel{q}}{h}$$

$$= \frac{rh}{h} = \boxed{r}$$

$$\lim_{h \rightarrow 0} r = \boxed{r}$$

$f(x)$ is a line and $f'(x)$ is a constant, therefore, Domain of $f(x) = \text{Domain of } f'(x)$.

Domain for both the function and derivative = \mathbb{R} or $(-\infty, \infty)$

Q7

Tuesday, September 8, 2020 6:02 PM

Find the derivative of the function using the definition of derivative.

$$g(t) = \frac{9}{\sqrt{t}}$$

$$g'(t) = -\frac{9}{2}t^{-\left(\frac{3}{2}\right)}$$

State the domain of the function. (Enter your answer using interval notation.)

$$(0, \infty)$$

State the domain of its derivative. (Enter your answer using interval notation.)

$$(0, \infty)$$

$$g(t) = \frac{9}{\sqrt{t}}$$

$$g'(t) = m = \lim_{x \rightarrow t} \frac{f(x) - f(t)}{x - t}$$

$$\begin{aligned} m &= \lim_{x \rightarrow t} \frac{\frac{9}{\sqrt{x}} - \frac{9}{\sqrt{t}}}{x - t} = \frac{\frac{9}{\sqrt{x}}(\frac{\sqrt{t}}{\sqrt{t}}) - \frac{9}{\sqrt{t}}(\frac{\sqrt{x}}{\sqrt{x}})}{x - t} = \frac{\frac{9\sqrt{t}}{\sqrt{x t}} - \frac{9\sqrt{x}}{\sqrt{x t}}}{x - t} \\ &= \frac{\frac{9\sqrt{t} - 9\sqrt{x}}{\sqrt{x t}}}{x - t} = \frac{9\sqrt{t} - 9\sqrt{x}}{\sqrt{x t}} \cdot \frac{1}{x - t} = \frac{9\sqrt{t} - 9\sqrt{x}}{\sqrt{x t}(x - t)} \\ &= \frac{9\sqrt{t} - 9\sqrt{x}}{\sqrt{x t}(x - t)} \cdot \frac{(9\sqrt{t} + 9\sqrt{x})}{(9\sqrt{t} + 9\sqrt{x})} = \frac{81t - 81x}{\sqrt{x t}(x - t)(9\sqrt{t} + 9\sqrt{x})} \\ &= \frac{81(-x + t)}{\sqrt{x t}(x - t) \cdot 9(\sqrt{t} + \sqrt{x})} = \frac{-81(x - t)}{\sqrt{x t}(x - t) \cdot 9(\sqrt{t} + \sqrt{x})} \\ &= \frac{-9}{\sqrt{x t}(\sqrt{t} + \sqrt{x})} \\ \lim_{x \rightarrow t} \frac{-9}{\sqrt{(t)t}(\sqrt{t} + \sqrt{t})} &= \frac{-9}{\sqrt{t^2}(2\sqrt{t})} \\ &= \frac{-9}{t(2\sqrt{t})} = \frac{-9}{2t^{\frac{3}{2}}} = -\frac{9}{2}t^{\frac{3}{2}} \end{aligned}$$

$$g'(t) = m = \frac{-9}{2t^{\frac{3}{2}}} \text{ or } -\frac{9}{2}t^{-\frac{3}{2}}$$

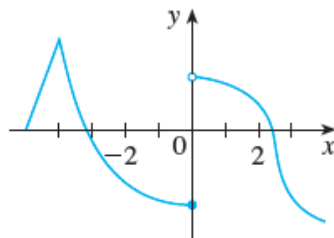
Q8

Tuesday, September 8, 2020 6:37 PM

The graph of f is given. State the numbers at which f is *not* differentiable.

$x =$ ✓ (smaller value)

$x =$ ✓ (larger value)



Q9

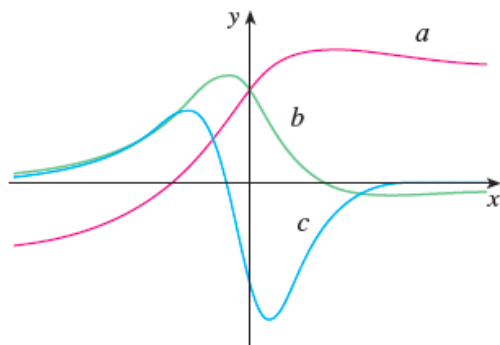
Tuesday, September 8, 2020 6:38 PM

The figure shows the graphs of f , f' , and f'' . Identify each curve.

f ✓

f' ✓

f'' ✓



Q10

Tuesday, September 8, 2020 6:40 PM

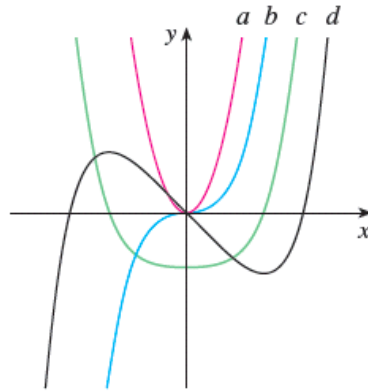
The figure shows graphs of f , f' , f'' , and f''' . Identify each curve.

f ✓

f' ✓

f'' ✓

f''' ✓



Q11

Tuesday, September 8, 2020 6:45 PM

The figure shows the graphs of three functions. One is the position function of a car, one is the velocity of the car, and one is its acceleration. Identify each curve.

position ✓

velocity ✓

acceleration ✓

