Derivative Practice (12015270)

Due: Fri, May 31, 2019 12:00 AM MST

Question 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

1. Question Details SCalc8 2.1.003. [3391662]

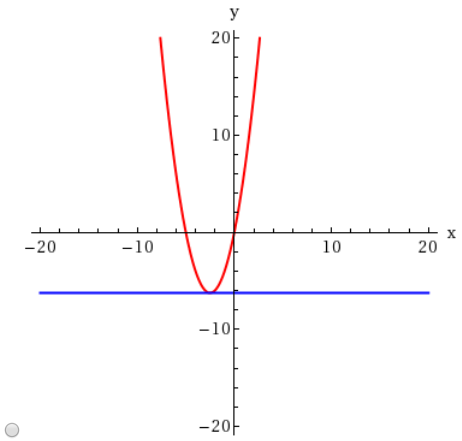
Consider the parabola $y = 5x - x^2$.

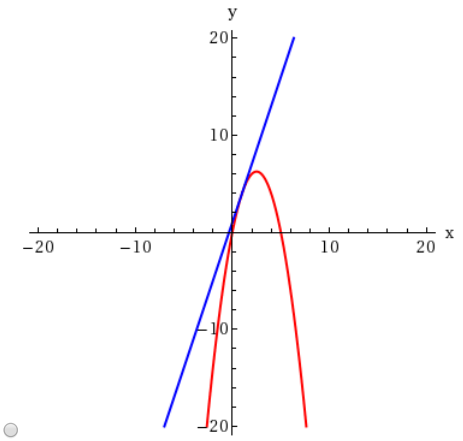
(a) Find the slope of the tangent line to the parabola at the point (1, 4).

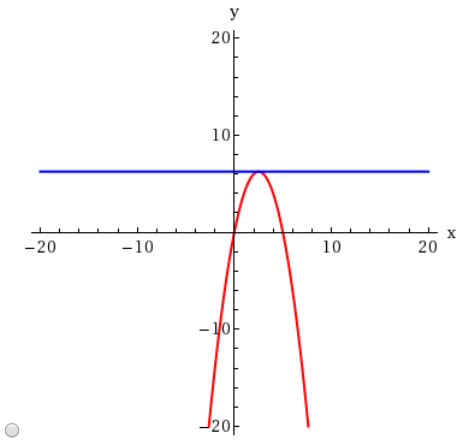
(b) Find an equation of the tangent line in part (a).

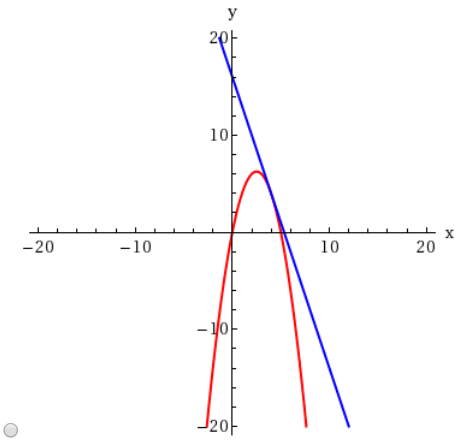
$y =$

(c) Graph the parabola and the tangent line.



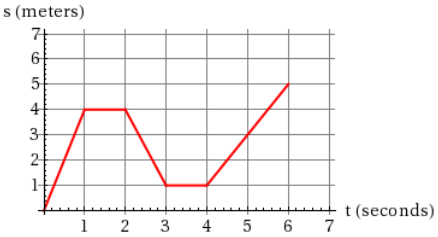






2. Question Details SCalc8 2.1.011. [3425289]

(a) A particle starts by moving to the right along a horizontal line; the graph of its position function is shown in the figure.



For which of the following time intervals is the particle moving to the right? (Select all that apply.)

- ☐ (0, 1)
- ☐ (1, 2)
- ☐ (2, 3)
- ☐ (3, 4)
- ☐ (4, 6)

For which of the following time intervals is the particle moving to the left? (Select all that apply.)

- ☐ (0, 1)
- ☐ (1, 2)
- ☐ (2, 3)
- ☐ (3, 4)
- ☐ (4, 6)

For which of the following time intervals is the particle standing still? (Select all that apply.)

- ☐ (0, 1)
- ☐ (1, 2)
- ☐ (2, 3)
- ☐ (3, 4)
- ☐ (4, 6)

(b) Draw a graph of the velocity function.

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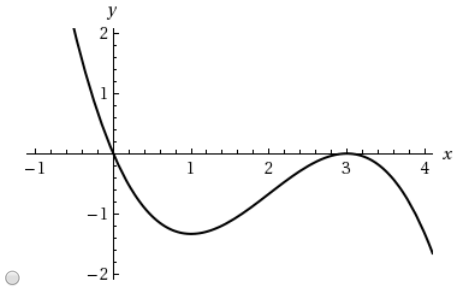
3. Question Details SCalc8 2.1.013.MI. [3354522]

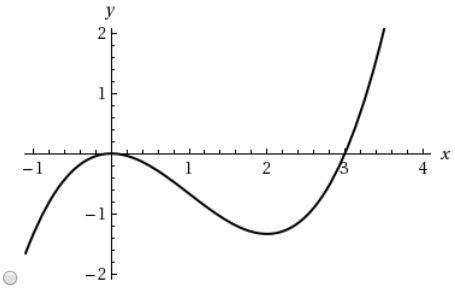
If a ball is thrown into the air with a velocity of 39 ft/s, its height (in feet) after t seconds is given by $y = 39t - 16t^2$. Find the velocity when $t = 1$.

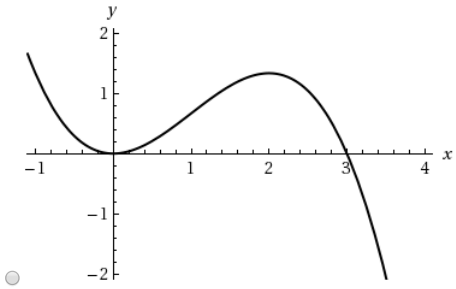
☐ ft/s

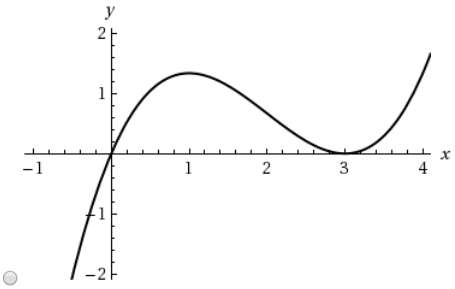
4. Question Details SCalc8 2.1.023. [3354437]

Sketch the graph of a function f for which $f(0) = 0$, $f'(0) = 3$, $f'(1) = 0$, and $f'(2) = -1$.









5. Question Details SCalc8 2.1.051. [3391775]

The cost (in dollars) of producing x units of a certain commodity is $C(x) = 6000 + 7x + 0.05x^2$.

(a) Find the average rate of change of C with respect to x when the production level is changed from $x = 100$ to the given value. (Round your answers to the nearest cent.)

(i) $x = 104$

$ [ ] per unit

(ii) $x = 101$

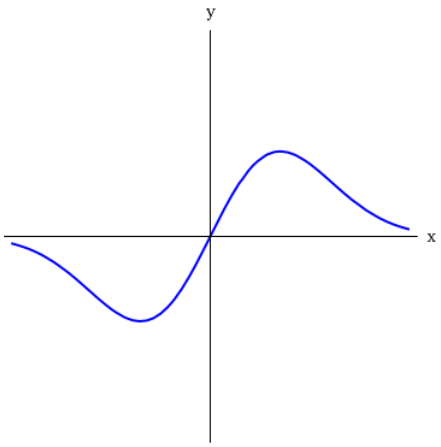
$ [ ] per unit

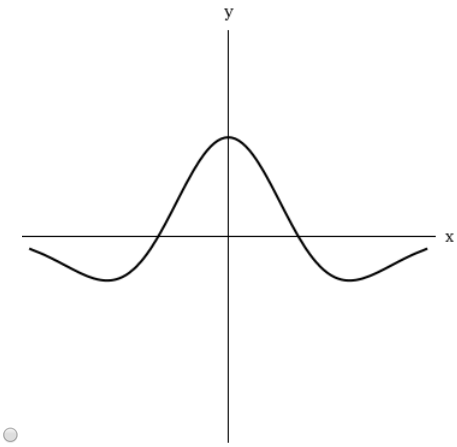
(b) Find the instantaneous rate of change of C with respect to x when $x = 100$. (This is called the *marginal cost*.)

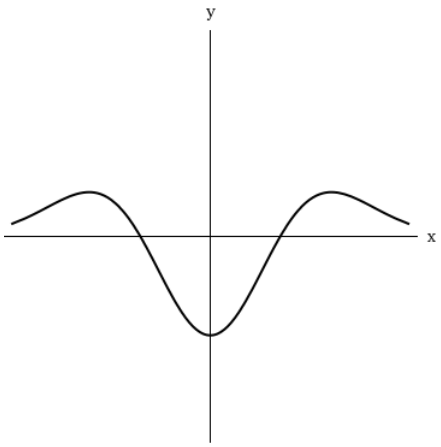
$ [ ] per unit

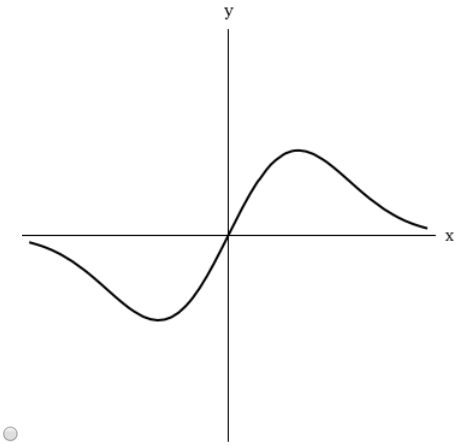
6. Question Details SCalc8 2.2.001. [3354424]

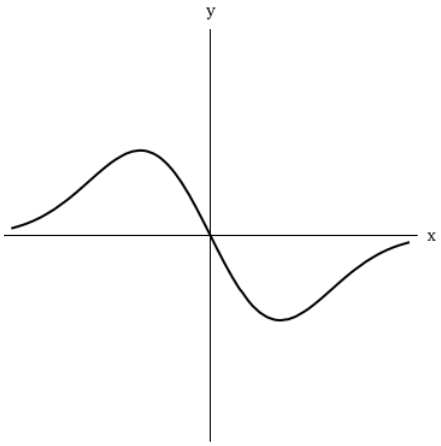
Use the given graph of $f(x)$ to sketch the graph of f'.





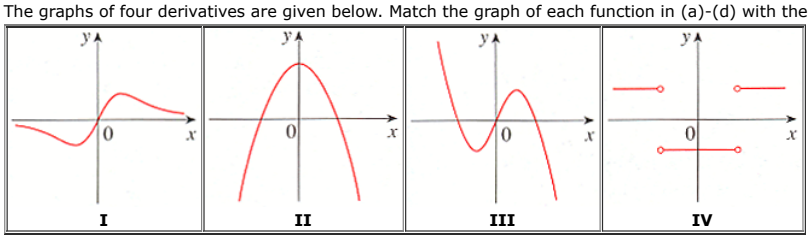


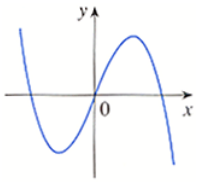
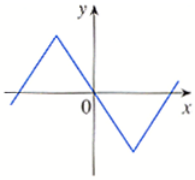


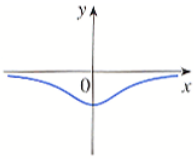
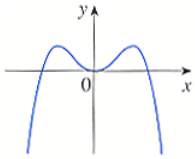


7. Question Details SCalc8 2.2.003.MI. [3354543]

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.



(a)  ? ▾ (b)  ? ▾

(c)  ? ▾ (d)  ? ▾

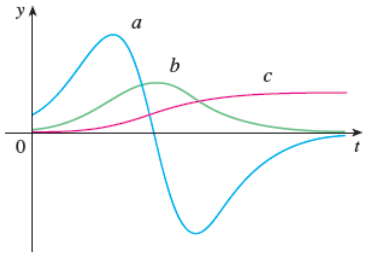
8. Question Details SCalc8 2.2.049. [3354375]

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 ? ▾



9. Question Details SCalc8 2.2.051. [3354471]

Use the definition of a derivative to find $f'(x)$ and $f''(x)$.

$f(x) = 3x^2 + 4x + 1$

$f'(x) =$

$f''(x) =$

Graph f, f', and f'' on a common screen and check to see if your answers are reasonable.

We see from the graph that our answers ---Select--- ▾ reasonable because the graph of f' is that of ---Select--- ▾ function and the graph of f'' is that of a ---Select--- ▾ function.

10. Question Details SCalc8 2.3.001. [3354261]

Differentiate the function.

$f(x) = 2^{40}$

$f'(x) =$

11. Question Details SCalc8 2.3.003. [3354352]

Differentiate the function.

$f(x) = 5.6x + 2.3$

$f'(x) =$

12. Question Details SCalc8 2.3.004. [3354176]

Differentiate the function.

$g(x) = \frac{3}{4}x^2 - 3x + 15$

$g'(x) =$

13. Question Details SCalc8 2.3.009. [3354288]

Differentiate the function.

$g(t) = 2t^{-3/4}$

$g'(t) =$

14. Question Details SCalc8 2.3.011. [3354092]

Differentiate the function.

$F(r) = \frac{3}{r^3}$

$F'(r) =$

15. Question Details SCalc8 2.3.052. [3354131]

Find an equation of the tangent line to the curve at the given point.

$y = 2x^3 - x^2 + 6, \ (2, 18)$

$y =$

16. Question Details SCalc8 2.3.069. [3354369]

Suppose that $f(5) = 1$, $f'(5) = 4$, $g(5) = -8$, and $g'(5) = 3$. Find the following values.

(a) $(fg)'(5)$

(b) $(f/g)'(5)$

(c) $(g/f)'(5)$

17. Question Details SCalc8 2.3.072. [3354489]

If $h(2) = 8$ and $h'(2) = -7$, find

$$\frac{d}{dx}\left(\frac{h(x)}{x}\right)\Big|_{x = 2.}$$

18. Question Details SCalc8 2.4.001. [3354356]

Differentiate.

$f(x) = x^2 \sin(x)$

$f'(x) =$

19. Question Details SCalc8 2.4.007. [3354528]

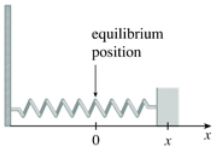
Differentiate with respect to t.

$y = d\cos(t) + t^2 \sin(t)$

$y' =$

20. Question Details SCalc8 2.4.035.MI. [3354388]

A mass on a spring vibrates horizontally on a smooth level surface (see the figure). Its equation of motion is $x(t) = 8\cos(t)$, where t is in seconds and x is in centimeters.



(a) Find the velocity and acceleration at time t.

$v(t) =$

$a(t) =$

(b) Find the position, velocity, and acceleration of the mass at time $t = 5\pi/6$.

$x\left(\frac{5\pi}{6}\right) =$

$v\left(\frac{5\pi}{6}\right) =$

$a\left(\frac{5\pi}{6}\right) =$

In what direction is it moving at that time?

Since $v\left(\frac{5\pi}{6}\right)$ [?] 0, the particle is moving to the [---Select---].

21. Question Details SCalc8 2.5.007. [3354312]

Find the derivative of the function.

$F(x) = (7x^6 + 8x^3)^4$

$F'(x) =$

22. Question Details SCalc8 2.5.009. [3354104]

Find the derivative of the function.

$f(x) = \sqrt{5x + 3}$

$f'(x) =$

23. Question Details SCalc8 2.5.013. [3354468]

Find the derivative of the function.

$f(\theta) = \cos(\theta^2)$

$f'(\theta) =$

24. Question Details SCalc8 2.5.016. [3354230]

Find the derivative of the function.

$f(t) = 2t \sin(\pi t)$

$f'(t) =$

25. Question Details SCalc8 2.5.017. [3354193]

Find the derivative of the function.

$f(x) = (2x - 9)^4(x^2 + x + 1)^5$

$f'(x) =$

26. Question Details SCalc8 2.5.061. [3354449]

If $F(x) = f(g(x))$, where $f(-2) = 6$, $f'(-2) = 2$, $f'(4) = 2$, $g(4) = -2$, and $g'(4) = 7$, find $F'(4)$.

$F'(4) =$

27. Question Details SCalc8 2.5.063. [3354284]

A table of values for f, g, f', and g' is given.

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
1	3	2	4	6
2	1	8	5	7
3	7	2	7	9

(a) If $h(x) = f(g(x))$, find $h'(1)$.

$h'(1) =$

(b) If $H(x) = g(f(x))$, find $H'(1)$.

$H'(1) =$

28. Question Details SCalc8 2.5.075. [3354535]

The displacement of a particle on a vibrating string is given by the equation $s(t) = 13 + \frac{1}{5}\sin(13\pi t)$ where s is measured in centimeters and t in seconds. Find the velocity of the particle after t seconds.

$v(t) =$ cm/s

Assignment Details

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