

NUMERIC RESPONSE

1. The point $P(4, 2)$ lies on the curve $y = \sqrt{x}$. If is the point $Q(x, \sqrt{x})$, use your calculator to find the slope of the secant line PQ (correct to six decimal places) for the value $x = 3.99$.

ANS: 0.250156

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.1

2. The position of a car is given by the values in the following table.

$t(\text{seconds})$	0	1	2	3	4	5
$s(\text{feet})$	0	19	33	74	114	178

Estimate the instantaneous velocity when $t = 2$ by averaging the velocities for the periods $[1, 2]$ and $[2, 3]$.

ANS: 27.5

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.1

3. If a rock is thrown upward on the planet Mars with a velocity of 10 m/s, its height in meters t seconds later is given by $y = 10t - 1.86t^2$. Find the average velocity over the time interval $[1, 2]$.

ANS: 4.42 m/s

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.1

4. Find the limit.

$$\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2 - 9}}{2x - 6}$$

ANS: $-\frac{1}{2}$

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.3

5. Find an equation of the tangent line to the curve $y = 5x^3$ at the point $(-3, -135)$.

ANS: $y = 135x + 270$

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.7

6. Use the graph of the function to state the value of $\lim_{x \rightarrow 0} f(x)$, if it exists.

$$f(x) = \frac{x^2 + x}{2\sqrt{x^3 + x^2}}$$

ANS: does not exist

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.2

7. Find the derivative of the function.

$$f(x) = 14 - 3x + 5x^2$$

ANS: $10x - 3$

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.7

8. If $1 \leq f(x) \leq x^2 + 2x + 2$, for all x find the limit.

$$\lim_{x \rightarrow -1} f(x)$$

ANS: 1

PTS: 1 DIF: Medium MSC: Numerical Response

NOT: Section 2.3

9. If an equation of the tangent line to the curve $y = f(x)$ at the point where $x = 2$ is $y = 4x - 5$, find $f(2)$ and $f'(2)$.

$$f(2) = 3$$

$$\text{ANS: } f'(2) = 4$$

PTS: 1

DIF: Medium

MSC: Numerical Response

NOT: Section 2.7

10. How close to 2 do we have to take x so that $5x + 3$ is within a distance of 0.01 from 13?

$$\text{ANS: } |x - 2| < 0.002$$

PTS: 1

DIF: Medium

MSC: Numerical Response

NOT: Section 2.6

11. Find the vertical asymptotes of the function.

$$y = \frac{2x^2 + 1}{3x - 2x^2}$$

$$\text{ANS: } x = 0, x = \frac{3}{2}$$

PTS: 1

DIF: Medium

MSC: Numerical Response

NOT: Section 2.6

12. If $g(x) = \sqrt{3 - 5x}$, find the domain of $g'(x)$.

$$\text{ANS: } \left(-\infty, \frac{3}{5}\right)$$

PTS: 1

DIF: Medium

MSC: Numerical Response

NOT: Section 2.2

13. Estimate the value of

$$\lim_{x \rightarrow 0} \frac{2 \sin x}{\sin \pi x}$$

by graphing the function $f(x) = \frac{(2 \sin x)}{(\sin \pi x)}$. State your answer correct to two decimal places.

ANS: 0.64

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.2

14. Evaluate the limit, if it exists.

$$\lim_{h \rightarrow 0} \frac{(x-h)^3 - x^3}{h}$$

ANS: $-3x^2$

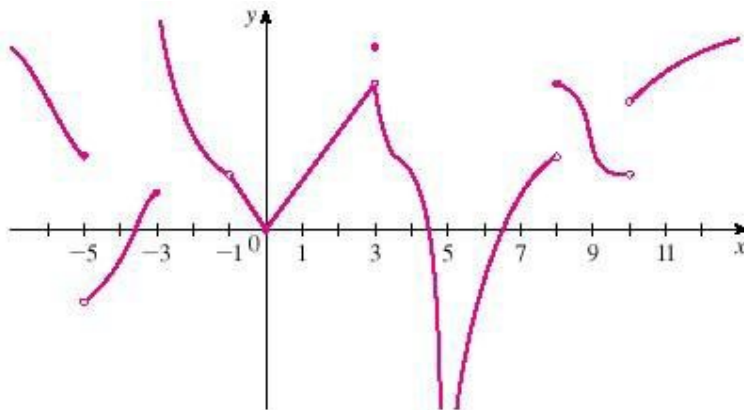
PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.3

15. A machinist is required to manufacture a circular metal disk with area 1000 cm^2 . If the machinist is allowed an error tolerance of $\pm 7 \text{ cm}^2$ in the area of the disk, how close to the ideal radius must the machinist control the radius?

ANS: 0.06234

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.4

16. For $x = 5$ determine whether f is continuous from the right, from the left, or neither.



ANS: neither

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.5

17. Find the point at which the given function is discontinuous.

$$f(x) = \begin{cases} \frac{1}{x-4}, & x \neq 4 \\ 4, & x = 4 \end{cases}$$

ANS: 4

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.5

18. By graphing the function $f(x) = \frac{(\cos x - \cos 2x)}{x^2}$ and zooming in toward the point where the graph crosses the y -axis, estimate the value of $\lim_{x \rightarrow 0} f(x)$.

ANS: 1.5

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.5

19. Use the definition of the derivative to find $f'(2)$, where $f(x) = x^3 - 2x$.

ANS: 10

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.7

20. How would you define $f(3)$ in order to make f continuous at 3?

$$f(x) = \frac{x^2 - 2x - 3}{x - 3}$$

ANS: $f(3) = 4$

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 2.5