Stewart_Essential Calc_2e ch02sec01

MULTIPLE CHOICE

1. Find an equation of the tangent line to the parabola $y = 5x^3$ at the point $(-5, -145)$.

   a. $y = 395x - 1730$
   b. $y = 375x + 1730$
   c. $y = 395x + 1730$
   d. $y = 395x - 1730$
   e. $y = 375x - 1730$

   ANS: B PTS: 1 DIF: Medium REF: 2.1.3
   MSC: Bimodal NOT: Section 2.1

2. Find an equation of the tangent line to the curve $y = x^3 - 2x$ at the point $(2, 6)$.

   a. $y = x - 6$
   b. $y = 2 + 2x$
   c. $y = 2 - 2x$
   d. $y = 6 + 2x$
   e. None of these

   ANS: E PTS: 1 DIF: Medium REF: 2.1.4
   MSC: Bimodal NOT: Section 2.1

3. Find the slope of the tangent line to the curve $y = 5x^2$ at the point $(-4, 22)$.

   a. 40
   b. -40
   c. 25
   d. 4
   e. -4

   ANS: B PTS: 1 DIF: Medium REF: 2.1.5
   MSC: Bimodal NOT: Section 2.1

4. If an equation of the tangent line to the curve $y = f(x)$ at the point where $a = 3$ is $y = 4x - 9$, find $f(3)$ and $f'(3)$.

   a. $f(2) = 9$

      $f'(2) = 4$

   b. $f(2) = -3$

      $f'(2) = 3$

c. $f(2) = 3$

$f'(2) = 3$

d. $f(2) = 3$

$f'(2) = 4$

e. None of these

ANS: D PTS: 1 DIF: Medium REF: 2.1.17
MSC: Bimodal NOT: Section 2.1

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

a. 25
b. 27
c. -25
d. 18
e. does not exist

ANS: A PTS: 1 DIF: Medium REF: 2.1.25
MSC: Bimodal NOT: Section 2.1

6. The cost (in dollars) of producing *x* units of a certain commodity is

$C(x) = 4,571 + 17x + 0.02x^2$.

Find the instantaneous rate of change with respect to *x* when $x = 103$. (This is called the *marginal cost*.)

a. 21.12
b. 19.06
c. 23.18
d. 19.06
e. 4.12

ANS: A PTS: 1 DIF: Medium REF: 2.1.26
MSC: Bimodal NOT: Section 2.1

NUMERIC RESPONSE

1. Find the derivative of the function.

$f(x) = 14 - 4x + 5x^2$

ANS: $10x - 4$

PTS: 1 DIF: Medium REF: 2.1.41a
MSC: Numerical Response NOT: Section 2.1

2. The cost (in dollars) of producing x units of a certain commodity is

   $C(x) = 4,336 + 12x + 0.07x^2$.

   Find the average rate of change with respect to x when the production level is changed from $x = 105$ to $x = 107$.

   ANS: 26.84

   PTS: 1 DIF: Medium REF: 2.1.41b
   MSC: Numerical Response NOT: Section 2.1

3. If a cylindrical tank holds 10000 gallons of water, which can be drained from the bottom of the tank in an hour, then Torricelli's Law gives the volume of water remaining in the tank after t minutes as

   $$V(t) = 10000\left(1 - \frac{1}{60}t\right)^2, 0 \le t \le 60$$

   Find the rate at which the water is flowing out of the tank (the instantaneous rate of change of V with respect to t) as a function of t.

   ANS: $V'(t) = \dfrac{-1000}{3} + \dfrac{50t}{9}$

   PTS: 1 DIF: Medium REF: 2.1.42
   MSC: Numerical Response NOT: Section 2.1