1. Find $\lim_{x \to 0} \dfrac{x^2 - 2x}{x}$

(a) -2 _____ (correct)
(b) -1
(c) 1
(d) 2
(e) 3

28 / 10.1

2. A candy company produces two varieties of candy, A and B, for which the constant average costs of production are 60 and 70 (cents per lb), respectively. The demand functions for A and B are given by

$$q_A = 5(p_B - p_A) \qquad \textit{and} \qquad q_B = 500 + 5(p_A - 2p_B)$$

Find the selling prices p_A and p_B that maximize the company's profit.

(a) $p_A = 80$ and $p_B = 85$ _____ (correct)
(b) $p_A = 70$ and $p_B = 80$
(c) $p_A = 79$ and $p_B = 87$
(d) $p_A = 90$ and $p_B = 95$
(e) $p_A = 92$ and $p_B = 90$

23/17.6

3. If $F(x) = \dfrac{4x^2+3}{2x-1}$, find $F'(1)$

(a) -6 _____ (correct)
(b) 4
(c) -8
(d) 2
(e) 8

Exampl5/11.4

4. If $y = 2u^2 - 3u - 2$, $u = x^2 + 4$, find $\dfrac{dy}{dx}$ when $x = 1$.

(a) 34 _____ (correct)
(b) 50
(c) 4
(d) 64
(e) 12

Example1/11.5

5. Find an equation of the tangent line to the curve $f(x) = \ln(x^2 + 2x + 1)$ when $x = 0$?

(a) $y = 2\ x$ _____ (correct)

(b) $y = 2\ x + 1$

(c) $y = e\ x + 1$

(d) $y = (\ln 2)x + 1$

(e) $y = 2e\ x + 1$

16/12.1

6. Let $f(x, y) = x^2 + y^2 - xy + x^3$. Then f has

(a) one relative minimum and one saddle point. _____ (correct)

(b) only one relative maximum

(c) one relative maximum and one saddle point.

(d) two relative minimum

(e) two relative maximum

14/17.6

7. For the cost function $c = q^3 - 40\ q^2$, the average-cost function is increasing when

(a) $q > 20$ _____ (correct)
(b) $q < 20$
(c) $q < 10$
(d) $q > 10$
(e) $q < 40$

Similar to 68/13.3

8. Which of the following statements is **FALSE** for the graph of

$$f(x) = \frac{2x^3 + 1}{3x(2x-1)(4x-3)}?$$

(a) The graph has no horizontal asymptote _____ (correct)
(b) The line $x = \frac{1}{2}$ is a vertical asymptote
(c) The line $x = \frac{3}{4}$ is a vertical asymptote
(d) The y-axis is a vertical asymptote
(e) The line $y = \frac{1}{12}$ is a horizontal asymptote

14/13.5

9. If the marginal revenue functions is $\frac{dr}{dq} = 2000 - 20q - 6q^2$, find the demand function.

(a) $p = 2000 - 10q - 2q^2$ _____ (correct)
(b) $p = 2000 - q - q^2$
(c) $p = 200 - q^2$
(d) $p = 1000 - q - q^2$
(e) $p = 1000 - 10q - q^2$

Similar to Example4/14.3

10. Find $\int 2xe^{x^2} dx$

(a) $e^{x^2} + c$ _____ (correct)
(b) $2xe^{x^2} + c$
(c) $x^2e^{x^2} + c$
(d) $2x + c$
(e) $2x^2 + e^{x^2} + c$

Example5/14.4

11. Find $\int \frac{3s^2}{s^3+5}\,ds$

(a) $\ln|s^3+5|+c$ _____ (correct)

(b) $\ln|3s^2|+c$

(c) $\ln(s^3+5)-\ln|2s+1|+c$

(d) $\frac{s^2}{3}+5s+c$

(e) $\ln\left|\frac{3s}{s^2+5}\right|+c$

Similar to 33/14.4

12. Find $\int \frac{9x^2+5}{3x}\,dx$

(a) $\frac{3}{2}x^2+\frac{5}{3}\ln|x|+c$ _____ (correct)

(b) $3x+5+c$

(c) $3x^3+5x+c$

(d) $3x^2+5\ln|x|+c$

(e) $\frac{3}{2}x^3+5\ln|x|+c$

2/14.5

13. If $\dfrac{dr}{dq} = \dfrac{200}{(q+2)^2}$ is a margina-revenue function, then find the demand function

(a) $p = \dfrac{100}{q+2}$ (correct)

(b) $p = \dfrac{300}{(q+2)^2}$

(c) $p = \dfrac{200}{(q+2)^2}$

(d) $p = \dfrac{-100}{(q+2)^2}$

(e) $p = \dfrac{300}{q(q+2)}$

57/14.5

14. $\displaystyle\int_{-1}^{3} (3x^2 - 2x + 6)\, dx =$

(a) 44 (correct)

(b) 34

(c) -8

(d) 49

(e) 58

Similar to Example1 /14.7

15. $\int_2^{92} \frac{x}{\ln e^x}\, dx$

(a) 90 (correct)
(b) 92
(c) 2
(d) 94
(e) e

40 /14.7

16. Find the area of the region bounded by the curve $y = x^2$ and $y = 2x$.

(a) $\frac{4}{3}$ (correct)
(b) $\frac{1}{2}$
(c) 2
(d) $\frac{2}{3}$
(e) $\frac{3}{8}$

41/14.9

17. Find $\int_0^1 x^2\, e^x\, dx$

(a) $e-2$ (correct)
(b) e^2
(c) e^2+1
(d) e^2-1
(e) $e+1$

23/15.1

18. Find $\int_1^e x \ln x\, dx$ by using integration by parts.

(a) $\frac{1}{4}\, e^2 + \frac{1}{4}$ (correct)
(b) $\frac{1}{2}\, e + \frac{1}{2}$
(c) e^2
(d) $-4\, e^2$
(e) $-2\, e$

Example2 / 15.1

19. Let $f(x,y) = x^3y^2 + x^2y - x^2y^2$ then $f_{xxy}(2,3) =$

(a) 62 (correct)
(b) 6
(c) 2
(d) 72
(e) 24

14/17.4

20. Use the following formula $\int \frac{du}{u^2\sqrt{a^2-u^2}} = -\frac{\sqrt{a^2-u^2}}{a^2u} + c,$ to find the integral $\int \frac{dx}{x^2\sqrt{4-9x^2}} =$

(a) $-\frac{\sqrt{4-9x^2}}{4x} + c$ (correct)
(b) $-\frac{\sqrt{9-4x^2}}{2x} + c$
(c) $-\sqrt{\frac{4-9x^2}{6x}} + c$
(d) $-\sqrt{\frac{4-9x^2}{3x}} + c$
(e) $-\sqrt{\frac{4-9x^2}{9x}} + c$

Similar to Example4/15.3

21. Let $g(x,y,z) = 2x^3y^2 + 2xy^3z + 4z^2$ then $g_y(1,2,1) =$

(a) 32 _____ (correct)
(b) 34
(c) 8
(d) 4
(e) 16

23/sec17.1

22. If $g(x,y,z) = e^x\sqrt{y+2z}$, find $g_z(0,8,4)$.

(a) $\frac{1}{4}$ _____ (correct)
(b) $\frac{1}{8}$
(c) $\frac{1}{2}$
(d) e
(e) 1

29/17.1

23. If $f(x,y) = e^x cos(y)$, find $f_{xyy}(0,0)$

(a) -1 _____ (correct)
(b) e
(c) $-e$
(d) π
(e) $e\,\pi$

Handout

24. Let $f(x,y) = \frac{x^3}{3} + y^2 - 2x + 2y - 2xy$. Then f has

(a) a saddle point at $(0,-1)$ _____ (correct)
(b) a relative maximum at $(0,-1)$
(c) a relative minimum at $(0,-1)$
(d) a relative maximum at $(2,1)$
(e) a saddle point at $(2,1)$

12/17.6

25. Let $f(x,y) = xy - 5x + y$. If f has a critical point at (c,d), then $c+d =$

(a) 4 (correct)
(b) 5
(c) 1
(d) -5
(e) 2

4/sec17.6

26. If $xy - y - 11x = 5$, find $\dfrac{dy}{dx}$ by implicit differentiable

(a) $\dfrac{11-y}{x-1}$ (correct)
(b) $\dfrac{11x+5}{y-x}$
(c) $\dfrac{y+11x}{5-x}$
(d) $\dfrac{y-11x}{5+x}$
(e) $\dfrac{y-x}{5+x}$

11/12.4

27. If $f(x) = \tan(\pi\ e^x)$, then find $f'(0)$.

(a) π _____ (correct)
(b) e
(c) 1
(d) 0
(e) e^π

8/Handout

28. If $f(x) = -3 + 12x - x^3$, then $f(x)$ has relative maximum at

(a) 2 _____ (correct)
(b) 3
(c) -2
(d) 12
(e) -3

13.1/16