

**APPENDIX**  
**CALCULATOR-ACTIVE QUESTIONS**

1. If  $f(x) = \sqrt[3]{x^3 - x}$ , then  $f'(2)$  is approximately

(A) 0.101

(B) 0.809

(C) 1.110

(D) 1.817

(E) 12.107

Answer

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2. Of the following, which best approximates the  $\lim_{h \rightarrow 0} \frac{\cos 2(2+h) - \cos 4}{h}$  ?

(A) -0.140

(B) -0.070

(C) 0.757

(D) 1.307

(E) 1.514

Answer

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3. If  $f(x) = 1.7x^5 - 5.3x^2 + 9.8$  and if  $r$  is the only real number such that  $f(r) = 0$ , then  $r$  is between

(A) -1.4 and -1.3

(B) -1.3 and -1.2

(C) -1.2 and -1.1

(D) -1.1 and -1.0

(E) -1.0 and -0.9

Answer

4. Let  $f$  be the function given by  $f(x) = \ln x$ . If the number  $c$  satisfies the conclusion of the Mean Value Theorem for  $f$  on the closed interval  $[2, 7]$ , then  $c$ , correct to three decimal places, is

(A) 1.876

(B) 2.791

(C) 3.107

(D) 3.991

(E) 4.784

Answer

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5. The rate of growth of a population is proportional to the population and increases by 23% every 12 years. What is the constant of proportionality, correct to three decimal places?

(A) 0.017

(B) 0.019

(C) 0.057

(D) 0.122

(E) 0.403

Answer

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6.  $\int_{\frac{1}{4}}^1 \cot 2x \, dx$  is approximately

(A) -0.009

(B) 0.039

(C) 0.155

(D) 0.281

(E) 0.346

Answer

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APPENDIX

7. If  $y = 6^{(2x^2-1)}$ , then  $\frac{dy}{dx}$  at  $x = 0.2$  is approximately

(A) -0.177

(B) 0.154

(C) 0.276

(D) 0.631

(E) 1.002

Answer

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8. Let  $F(x) = \int_0^x \sqrt{\tan t} dt$ . Of the following, which best approximates  $F'(0.5)$  ?

(A) 0.089

(B) 0.093

(C) 0.546

(D) 0.739

(E) 1.139

Answer

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9. If  $f(x) = x \ln(x + e^2)$  and  $g(x) = x + e^2$ , then  $f(g(2))$  is closest to the integer

(A) 26

(B) 23

(C) 15

(D) 12

(E) 6

Answer

10. The function  $f$  given by  $f(x) = 2x^3 - 5x^2 - x + 7$  has a relative minimum when  $x$ , correct to three decimal places, is

(A) -0.272      (B) -0.095      (C) 0.095      (D) 1.560      (E) 1.761

Answer

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11. The present price of a new car is \$14,500. The price of a new car is changing at a rate of  $120 + 180\sqrt{t}$  dollars per year. To the nearest ten dollars, how much will a new car cost 5 years from now?

(A) \$15,020      (B) \$15,300      (C) \$16,440      (D) \$18,120      (E) \$22,600

Answer

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12. Let  $f(x) = x^5$ . If  $g$  is the inverse function of  $f$ , then  $g'(1.25)$ , correct to three decimal places, is

(A) 0.016      (B) 0.082      (C) 0.167      (D) 0.239      (E) 0.410

Answer

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APPENDIX

13. The slope of the tangent line to the curve  $y = \ln \sqrt{x^2 + 4}$  at the point  $x = e$  is approximately
- (A) 0.239      (B) 0.805      (C) 1.216      (D) 1.611      (E) 4.368

Answer

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14. A missile rises vertically from a point on the ground 75,000 feet from a radar station. If the missile is rising at the rate of 16,500 feet per minute at the instant when it is 38,000 feet high, what is the approximate rate of change, in radians per minute, of the missile's angle of elevation from the radar station at this instant?
- (A) 0.175      (B) 0.219      (C) 0.227      (D) 0.469      (E) 0.507

Answer

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15.  $\int_{-1.4}^{1.2} \frac{dx}{\sqrt{4-x^2}}$  is approximately

(A) 0.343      (B) 0.604      (C) 0.710      (D) 1.209      (E) 1.419

Answer

16. If four equal subdivisions of  $[0, 2]$  are used, then the trapezoidal approximation of  $\int_0^2 e^{-x^2} dx$ , correct to three decimal places, is

(A) 0.485      (B) 0.568      (C) 0.881      (D) 0.969      (E) 1.761

Answer

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17.  $\int_0^1 (\cos x)e^{-\sin x} dx$  is approximately

(A) 0.017      (B) 0.417      (C) 0.431      (D) 0.569      (E) 0.583

Answer

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18. The area of the region entirely enclosed by the graphs of  $y = \sin x$  and  $y = x^2 - \pi x$  is closest to the integer

(A) 5      (B) 7      (C) 11      (D) 17      (E) 24

Answer

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APPENDIX

19. The average rate of change of  $x - \sqrt{x}$  on  $[2, 5]$  is approximately

- (A) 0.043      (B) 0.561      (C) 0.726      (D) 2.178      (E) 2.569

Answer

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20. The absolute minimum of  $f(x) = 6x - \ln(\sin x)$  on the closed interval  $[0.1, 0.8]$ , correct to three decimal places, is

- (A) 2.796      (B) 2.822      (C) 2.904      (D) 2.924      (E) 6.951

Answer

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21. A particle moves along the  $x$ -axis so that at any time  $t$  its position is given by  $x(t) = t^4 - 2t^3 - 1.44t^2 + 2$ . At the instant when the acceleration first becomes zero, the velocity of the particle is approximately

- (A) -12.096      (B) -1.856      (C) 0.304      (D) 0.784      (E) 1.960

Answer

22. Let  $f$  be the function given by  $f(x) = \begin{cases} e^{kx} - 2, & x > 1 \\ 9x - 5k, & x \leq 1 \end{cases}$

The value of  $k$ , to the nearest tenth, such that  $f$  is continuous at  $x = 1$  is

- (A) 0.6                      (B) 1.1                      (C) 1.2                      (D) 1.4                      (E) 1.8

Answer

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23. The volume of the solid generated by revolving about the  $x$ -axis the region bounded by  $y = \frac{1}{\sqrt{x}}$  and the  $x$ -axis between  $x = 1$  and  $x = 4$  is approximately

- (A) 1.386                      (B) 3.451                      (C) 4.355                      (D) 8.710                      (E) 16.755

Answer

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24. The  $\lim_{x \rightarrow \pi} \frac{e^x - e^\pi}{x^e - \pi^e}$  is approximately

- (A) 0.018                      (B) 0.397                      (C) 1.030                      (D) 1.155                      (E) 1.191

Answer

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APPENDIX



25. Let  $R$  be the region in the first quadrant enclosed by the graphs of  $y = \cos x$ ,  $y = x$ , and the  $y$  axis. Of the following, which best approximates the area of region  $R$ ?

(A) 0.168

(B) 0.341

(C) 0.400

(D) 0.483

(E) 1.947

Answer

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26. The slope of the line normal to the curve  $y = xe^{\sin x}$  at  $x = 2.438$  is approximately

(A) -1.641

(B) -0.279

(C) -0.152

(D) 0.610

(E) 3.585

Answer

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27. The approximate average value of the function  $f(x) = x \ln x$  over the closed interval  $[1, 3]$  is

(A) 2.914

(B) 1.472

(C) 1.222

(D) 1.048

(E) 0.236

Answer

28. A company manufactures  $x$  calculators weekly that can be sold for  $75 - 0.01x$  dollars each, at a cost of  $1850 + 28x - x^2 + 0.001x^3$  dollars for manufacturing  $x$  calculators. The number of calculators the company should manufacture weekly in order to maximize its weekly profit is closest to

(A) 611

(B) 652

(C) 683

(D) 749

(E) 754

Answer

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29. If  $x^2 \frac{dy}{dx} + y = 0$  and if  $y = 3$  when  $x = 2$ , what is the approximate value of  $y$  when  $x = 4$ ?

(A) 2.635

(B) 2.336

(C) 2.031

(D) 1.883

(E) 1.417

Answer

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30. If  $y = x^{(2x)}$ , then  $\frac{dy}{dx}$  at  $x = 1.4$  is approximately

(A) 6.857

(B) 5.131

(C) 4.383

(D) 3.726

(E) 2.673

Answer

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