REVIEW, FINAL: MATH 1B
ADDITIONAL PROBLEMS

Problem 15. *The integral*

$$\int_a^b f(x)\,dx$$

was approximated using the Trapezoidal rule and $n = 10$. *Using the error bound it was found that* $|E_T| \leq 1$. *For what value of* n *will* $|E_T| \leq 10^{-6}$*?*

(a) 999
(b) 10074
(c) 1053
(d) 60
(e) *The answer cannot be determined from the information given.*

Problem 16. *Find the area of the region bounded by the curve*

$$y = \sin^{-1} x$$

and $y = 0$, $x = 1/2$.

REVIEW, FINAL: MATH 1B
ADDITIONAL PROBLEMS

Problem 17. *Let z_1, z_2 be the solutions to the equation $z^2 - z + 7 = 0$. What is the value of $z_1 + z_2 + 7/(z_1 z_2)$?*

(a) 0
(b) 2
(c) $1 + i$
(d) -1
(e) *None of the above.*

Problem 18. *Solve the differential equation*

$$y'' - 2y' + y = x.$$

REVIEW, FINAL: MATH 1B
ADDITIONAL PROBLEMS

Problem 19. *Determine if the series*

$$\sum_{n=3}^{\infty} \frac{1}{n(\ln n)^3}$$

is convergent or divergent.

Problem 20. *Use Euler's method with step size* $1/2$ *to estimate* $y(1)$ *where* $y(x)$ *is the solution to the intial-value problem* $y' = x + 2y^2$, $y(0) = 0$.

REVIEW, FINAL: MATH 1B
ADDITIONAL PROBLEMS

Problem 21. *What is the value of*

$$\sum_{n=1}^{\infty} \frac{(-1)^n \pi^{2n}}{2^{2n+1}(2n+1)!}?$$

(a) 0
(b) -1
(c) $1/\pi - \pi/2$
(d) $1/\pi + \pi/2$
(e) $(2-\pi)/2\pi$.

Problem 22. *Evaluate the limit*

$$\lim_{x \to 0} \frac{(\sin 2x - 2x)^2}{x^2(e^x - 1)^3}.$$

REVIEW, FINAL: MATH 1B
ADDITIONAL PROBLEMS

Problem 23. *Consider the series*

$$\sum_{n=0}^{\infty}(-1)^n \frac{n-1}{n}\sin^2 n.$$

Which of the following statements is true?

(a) *The series is absolutely convergent by the integral test.*
(b) *The series is convergent by the alternating series test.*
(c) *The series is divergent by the test for divergence.*
(d) *The series is convergent by the comparison test.*
(e) *None of the above.*

Problem 24. *Evaluate*

$$\int \frac{dx}{\sqrt{x^2-2x}}.$$

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ADDITIONAL PROBLEMS

Problem 25. *Consider the sequence defined by*

$$a_n = \frac{ne^{1/n}}{3n-1}.$$

What is

$$\lim_{n\to\infty} a_n?$$

(a) 0
(b) ∞
(c) 1/3
(d) 1
(e) *The sequence does not have a limit.*

Problem 26. *Evaluate*

$$\int_0^\pi \sec x \, dx.$$

REVIEW, FINAL: MATH 1B
ADDITIONAL PROBLEMS

Problem 27. *Find the area of the surface obtained by rotating the parabola* $y = x^2$ *from* $x = 0$ *to* $x = 1$ *around the* y*-axis.*

Problem 28. *Find the particular solution of*

$$y' + y = x + e^x$$

satisfying $y(0) = 0$.

REVIEW, FINAL: MATH 1B
ADDITIONAL PROBLEMS

Problem 29. *Find the twelfth derivative of* $(x+1)^3 e^x$ *at* $x = -1$.

Problem 30. *Determine if the series*

$$\sum_{n=1}^{\infty} \frac{\cos(1/n)}{n}$$

is convergent or divergent.