

<ol> <li>The invention of calculus         <ul> <li>a. Newton and Leibniz</li> <li>d. Bernoulli and Euler</li> </ul> </li> </ol>	is usually attributed to <b>b.</b> Maclaurin <b>e.</b> Mersenne	n and Taylor	<b>c.</b> Lagrange and Lapl	lace	
2. The mathematician largel	y responsible for the a	doption of the symbol	Is $e, i$ , and $\pi$ is		
a. Newton	<b>b.</b> Maclaurin	c. Taylor	d. Lagrange	e. Euler	
<b>3.</b> If l'Hopital's rule were proved called	roperly named for the r	nathematician who ac	ctually discovered it in	1694, it would be	
<b>a.</b> Fermat's rule	<b>b.</b> Raphson's rule	<b>c.</b> Bernoulli's rule	<b>d.</b> Barrow's rule	e. Leibniz's rule	
<b>4.</b> The symbol invented by	Wallis is				
<b>a.</b> $\infty$ (infinity)	<b>b.</b> $\sum$ (sum	nation)	<b>c.</b> $\int_{b}^{a}$ (definite integration)	gral)	
<b>d.</b> $\oint$ (line integral)	<b>e.</b> <i>e</i> (base of	natural logarithms)			
<b>5.</b> The differential equation	dy/dx = A(x) + B(x)	$y + C(x)y^2$ is normal	ally attributed to		
<b>a.</b> Roberval	b. Riccati	c. Rahn	d. Rolle	e. Rheticus	
6. The French mathematician who in 1821 introduced an improved definition of limit in his <i>Cours d'analyse de l'Ecole Polytechnique</i> is					
a. Cauchy	<b>b.</b> Descartes	c. Lacroix	d. Lagrange	e. Laplace	
7. The validity of calculus was questioned in its early development mainly because					
<ul> <li>a. there was a dispute over whether a definite integral was really the sum of all the values of a magnitude or the limit of a certain characteristic sum</li> <li>b. the notation used in England was different from that used on the continent</li> <li>c. fractional exponents were not accepted by most mathematicians</li> <li>d. there was not a precise meaning of the term <i>infinitesimal</i></li> </ul>					

- e. definitions of the term *limit* involving  $\delta$  and  $\varepsilon$  were poorly understood
- **8.** Newton made important discoveries in calculus after he returned home to Lincolnshire in the summer of 1665 when Trinity College was forced to close. Why did it close?
  - a. The British government cut funding because of a dispute over curriculum.
  - **b.** An outbreak of the plague occurred.
  - c. Extensive remodeling of many of the campus buildings was mandated for safety reasons.
  - **d.** Enrollment dropped below 1,000 students.
  - e. The expertise of staff and students was needed elsewhere after the Great Fire of London.
- 9. From 1700 until his death, Newton held the title of
  - **a.** Chancellor of the Exchequer **b.** Secretary of State for the Northern Department
  - c. Master of the Rolls d. Master of the Mint e. Leader of the House of Commons



<b>10.</b> Before he introduced the integral symbol $\int$		in 1675, Leibniz used in its place the abbreviation			
<b>a.</b> ubi.	<b>b.</b> exe.	<b>c.</b> int.	<b>d.</b> opr.	e. omn.	

- **11.** Around 1675 Newton wrote a letter to Leibniz in which he concealed a mathematical principle by writing it in the form of an anagram. Translated from Latin to English, it could best be written
  - **a.** Given an equation involving any number of fluent quantities, to find the fluxions, and conversely.
  - **b.** The General Method, which I had derived some considerable time ago, for measuring the quantity of curves, by means of series, infinite in the number of terms.
  - **c.** Fluxions of quantities are in the first ratio of their nascent parts or, what is exactly the same, in the last ratio of those parts as they vanish by defluxion.
  - d. For fluxions are finite quantities but moments here are infinitely little.
  - **e.** x + y and an exponent which is not whole, they are a series without termination.
- 12. Although we might not accept his claim today, Leibniz argued that the sum of the infinite series 1 1 + 1 1 + 1 ... is equal to
  - **a.** 1 **b.** 0 **c.**  $\frac{1}{2}$  **d.** 2 **e.** -1
- **13.** Barrow gave a method of tangents to a curve where the tangent is given as the limit of a chord as the points approach each other. It is usually referred to as Barrow's

<b>a.</b> differential triangle <b>b</b>	. pursuit curve	<b>c.</b> quadratrix	<b>d.</b> v	vanishing triangle $\epsilon$	apothem
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14. The English word calculus is derived from the Latin word calculus, which means

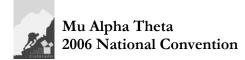
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a. calculate b. bone c. sliding d. slave e. pebble
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- **15.** The modern system of vector analysis is largely due to *Elements of Vector Analysis*, which was published in 1881. It was written by the person who earned the first doctorate in engineering awarded in the United States. His name is
  - a. Heaviside b. Gibbs c. Adams d. Wiener e. Sylvester
- **16.** Leibniz coined the words

<b>a.</b> function and transcendental	<b>b.</b> fluxion and fluent	c. integral and radian
<b>d.</b> apothem and logarithm	e. series and sequence	

17. The series first published in 1668 by Nicolaus Mercator, and thus known as Mercator's series, is

**a.** 
$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$$
  
**b.**  $\arctan(x) = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots$   
**c.**  $\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots$   
**d.**  $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$   
**e.**  $(1+x)^s = \sum_{n=0}^{\infty} \left(\frac{s}{n}\right) x^n$ 



- **18.** In 1734 the philosopher George Berkeley published a devastating criticism attacking the lack of rigor in the calculus and disputing the logic on which it was based. The title of his tract is normally shortened to
  - a. The Analyst b. The Iconoclast c. The Heretic d. The Nemesis e. The Skeptic
- **19.** Before 1665, these three men knew that, at least for positive integral values of *n* and in modern notation,

$$\int_{0}^{a} x^{n} dx = \frac{a^{n+1}}{n+1}$$

- a. Fibonacci, Oresme, Bradwardine
- **c.** Heron, Eratosthenes, Eudoxus
- e. Zeno, Hippias, Democritus
- **20.** A theorem which gives the approximation of a differentiable function near a point by a polynomial whose coefficients depend only on the derivatives of the function at that point is named for a British mathematician. His name, which appears on the F3 menu of a TI-89 calculator, is

b. Regiomontanus, Chuquet, Stifel

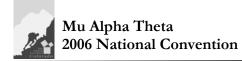
d. Cavalieri, Torricelli, Roberval

- a. Taylor b. Wallis c. Raphson d. Sylvester e. Wiles
- **21.** One of the earliest problems posed in the calculus of variations was the *brachistochrone* problem, which involved finding
  - **a.** the orbit of a planet with more than two moons
  - **b.** the curve traced by a point, acted on only by gravity, in the shortest time
  - c. the approximate number of prime numbers less than some large number n
  - d. the maximum value of a certain type of power series
  - **e.** the perimeter of an ellipse
- 22. Newton's greatest work is known, in shortened form, as

a. The Analyst b. The Introductio c. The Integral d. The Descriptio e. The Principia

- **23.** Simpson's Rule is named for Thomas Simpson. An interesting claim made in his biography *Thomas Simpson and His Times* is
  - **a.** He noticed that he was sleeping every day 15 minutes more than on the previous day. When the arithmetic progression reached 24 hours, he slipped into eternal sleep.
  - **b.** He was best known in his lifetime as the author of a Protestant theological work that probed the prophecies of the Apocalypse to prove the Pope was the Antichrist.
  - **c.** He had twelve toes.
  - **d.** He had to flee to Derby in 1733 after he or his assistant had frightened a girl by dressing up as a devil during an astrology session.
  - e. Although almost every mathematical theorem is named for the wrong person, Simpson's Rule was really discovered by Simpson.
- 24. An example of a nondifferentiable continuous function was given

<b>a.</b> in 1660 by Barrow	<b>b.</b> in 1667 by Newton	<b>c.</b> in 1700 by Bernoulli
<b>d.</b> in 1732 by Euler	e. in 1834 by Bolzano	



	ntician who is believed to l				3	
	he sum of an infinite serie					
a. Archimede	es <b>b.</b> Abel	c. Alcuin	d. Al-H	Khowarizmi	e. Abelard	
<b>26.</b> Leibniz publis	shed the first account of th	e differential calculus in	n 1684 in a	a paper titled (ir	n translation)	
<ul> <li>b. Analysis of</li> <li>c. A New Me</li> <li>Quantities</li> <li>d. Elements of</li> </ul>	<ul> <li>a. On the Analysis of Equations Unlimited in the Number of Their Terms</li> <li>b. Analysis of Infinitesimals for Understanding Curved Lines</li> <li>c. A New Method for Maxima and Minima, and also for Tangents, which is not Obstructed by Irrational Quantities</li> <li>d. Elements of the Study of Functions</li> <li>e. A New Method of the Volume of Wine Casks</li> </ul>					
<b>27.</b> The first calcu	lus textbook to be publish	ned was				
<b>a.</b> by Fibona <b>d.</b> by Todhur		<ul> <li>by Oresme, in about 1</li> <li>by Dolciani, in 1958</li> </ul>	1380	<b>c.</b> by l'Hopita	al, in 1696	
<b>28.</b> The first publ	lished volume devoted exp	pressly to the history of a	<i>calculus</i> w	/as		
<b>b.</b> A History <b>c.</b> The Histor	of the Calculus and its Co of the Differential and Inte y of Fluxions by Raphson ry of the Method of Fluxio	egral Calculus by Aldrid	• •			

e. The Development of the Calculus by Leibniz

**29.** Whom did Lagrange, Laplace, and Fourier all describe as the true inventor of the calculus?

a. Fermat	<b>b.</b> Oresme	c. Torricelli	d. Cavalieri	e. Descartes
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**30.** The number sometimes called Euler's constant, calculated to 16 digits by Euler in 1781, is approximately

<b>a.</b> 0.16 <b>b.</b> 0.5772 <b>c.</b> 1.618 <b>d.</b> 3.14159 <b>e.</b> 0.693147	<b>a.</b> 0.16	<b>b.</b> 0.5772	<b>c.</b> 1.618	<b>d.</b> 3.14159	<b>e.</b> 0.693147
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