Practice Test 1 (Pearson) Key

Practice Examinations Calculus AB—Exam 1

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Part	A-	-No	Ca.	CII	lai	tor

Part A—No Calculator		lator
Problem	Answer	Mean Value Theorem of Calculus Derivative with Chain Rule Wey Concept Graph analysis for extrema Definite integral Implicit differentiation Derivative graph analysis for extrema Critical values Continuity/Differentiation Definite integral Exponential Theorem of Calculus Critical values Continuity/Differentiability Fundamental Theorem of Calculus Trapezoidal Rule Volume by cross section Tangent line Fundamental Theorem of Calculus Fundamental Theorem of Calculus Wean Value Theorem/Intermediate Value Theorem Mean Value Theorem/Intermediate Value Theorem Area under curve
1.	(A)	Differentiability
2.	(B)	Graph analysis for extrema
3.	(D)	Definite integral . R
4.	(C)	Continuity/Differentiability $\Xi \Xi \Xi$
5.	(C)	Wed Continuity/Differentiability Fundamental Theorem of Calculus Fundamental Theorem Of Calcul
6.	(B)	Implicit differentiation
7.	(A)	Implicit differentiation Wed Key Concept Graph analysis Numerical derivative with calc Derivative graph analysis for e Critical values Continuity/Differentiability Fundamental Theorem of Calc Limit Exponential growth derivative Trapezoidal Rule Volume by cross section Tangent line Fundamental Theorem of Calc Welocity/Acceleration Mean Value Theorem of Calc Mean Value Theorem/Interme
8.	(B)	Definite integral Slobe field Numerical derivative with compet the Continuity/Differentiability Sundamental Theorem of Climit Exponential growth derivation Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section Tangent line Fundamental Theorem of Column by cross section
9.	(D)	Slobe field Thospital's Rule Instantaneous rate of change Relationships of derivative al Theorem al Theorem celeration celeration Theorem/Ir
10.	(D)	Key Concept Graph analysis Numerical derivative Derivative graph analysis Continuity/Differenti Exponential growth d Irapezoidal Rule Volume by cross secti Iangent line Fundamental Theore Velocity/Acceleration Mean Value Theorem Mean Value Theorem Mean Value Theorem
11.	(A)	Wed State of Concept Caraph analysis Some Continuity of Continuity (Continuity) (Co
12.	(D)	wed Key Concept Graph analysis Numerical derip Graph analysis Numerical derip Derivative grap Critical values Continuity/Dif Exponential gr Trapezoidal Ru Volume by cro Tangent line Fundamental J Velocity/Accele Mean Value T Area under cu
13.	(B)	Wed Continuity Continuity Fundamental Limit Exponential Fundamental Continuity/ Fundamental Continuity/ Fundamental Continuity/ Fundamental Continuity/ Continuity/ Fundamental Continuity/ Continuity/ Exponential Volume by cr Trapezoidal I Volume by cr Tangent line Fundamental Velocity/Acce Mean Value Area under c
14.	(B)	Velocity/Position
15.	(D)	Enndamental Theorem of Calculus Nume Occuping Continue Continu
16.	(B)	Derivative with Chain Rule Area approximations Tangent line Points of inflection Integration rules Exponential growth derivative Graph analysis for points of inflection Area Area
17.	(C)	Area approximations
18.	(D)	Tangent line
19.	(C)	Points of inflection
20.	(B)	Integration rules
21.	(B)	Integration rules Exponential growth derivative Graph analysis for points of inflection
22.	(D)	Graph analysis for points of inflection 👸 🧧
23.	(C)	Velocity/Acceleration optimization
24.	(A)	Derivative graph Area between curves
25.	(D)	Area between curves
26.	(A)	Analysis of derivative data
27.	(D)	Average value
28.	(C)	Analysis of derivative data Average value Numerical derivative Analysis of derivative data Average value Very part of the properties
29.	(A)	Rate of change
30.	(A)	Graph analysis for Positon/Velocity

Calculus AB-Exam 1: Section II, Part A

- 1. f(x) = g(x) at x = 0, x = 1.8109294, and x = 3.7724666. Let A = 1.8109294 and B = 3.7724666
 - (a) Area = $\int_0^A [f(x) g(x)] dx + \int_A^B [g(x) f(x)] dx = 9.931$
 - (b) Volume = $\pi \int_0^A [(f(x))^2 (g(x))^2] dx = 64.325$
 - (c) Volume = $\int_{A}^{B} (g(x) f(x))^{2} dx = 31.790$
- 2. (a) $v(2.4) \approx -1.452 < 0$ and $a(2.4) \approx 0.884 > 0$. Since the velocity and acceleration have opposite signs, the speed is decreasing at t = 2.4.
 - (b) Average velocity = $\frac{1}{4} \int_0^4 v(t) dt = 1.158$
 - (c) Total Distance = $\int_0^4 |v(t)| dt = 7.309$
 - (d) The particle changes from moving left to moving right when the velocity changes from negative to positive.

$$x(2.865) = 2.7 + \int_0^{2.865} v(t)dt = 3.967$$

- 3. (a) $h'(3.5) \approx \frac{h(4) h(3)}{4 3} = \frac{13.5 11}{1} = 2.5 \text{ cm/day}$
 - (b) $\frac{1}{6} \int_0^6 h(t)dt$ is the average length of a leaf in centimeters during the first six days of the data collection.

$$\frac{1}{6} \int_0^6 h(t)dt \approx \frac{1}{6} \left[1(6.8) + 2(11) + 1(13.5) + 2(20.1) \right] = \frac{82.5}{6} = 13.75 \text{ cm}$$

- (c) Since the graph of h(t) is strictly increasing on [0, 6], the right Riemann sum is an overestimate, and therefore greater than the true area.
- (d) $\int_0^6 h'(t)dt = h(6) h(0) = 20.1 5.1 = 15$. The leaf grew a total of 15 cm in the first six days

Calculus AB—Exam 1: Section II, Part B

- 4. (a) f'(x) = 0 at x = -2, x = 0, and x = 3. x = 0 is the only critical point where f' changes from negative to positive. Therefore, f has a relative minimum at x = 0.
 - (b) f is concave up when f'' is positive, which is where f' is increasing f is increasing where f' is positive. Therefore, f is both concave up and increasing on 0 < x < 1.4 because f' is both increasing and positive on this interval.
 - (c) The graph of f has inflection points at x = -0.8, where f' changes from decreasing to increasing and at x = 1.4, where f' changes from increasing to decreasing.

(d)
$$f(x) = 9 + \int_0^x f'(t)dt$$

 $f(-2) = 9 + \int_0^{-2} f'(t)dt = 9 + 2 = 11$
 $f(3) = 9 + \int_0^3 f'(t)dt = 9 + 7 = 16$

5. (a)
$$\frac{dy}{dx}\Big|_{(1,1)} = \frac{3-2}{6-3} = \frac{1}{3} \Rightarrow y-1 = \frac{1}{3}(x-1)$$

(b)
$$6y - 3x = 0 \Rightarrow 2y = x$$

 $(2y)^2 + 3y^2 = 1 + 3(2y)y$
 $4y^2 + 3y^2 = 1 + 6y^2$
 $y^2 = 1$
 $y = \pm 1 \Rightarrow x = \pm 2$
 $(-2, -1)$ and $(2, 1)$

(c)
$$\frac{d^2y}{dx^2} = \frac{dy}{dx} \left(\frac{3y - 2x}{6y - 3x} \right) = \frac{(6y - 3x) \left(3\frac{dy}{dx} - 2 \right) - (3y - 2x) \left(6\frac{dy}{dx} - 3 \right)}{(6y - 3x)^2}$$
$$\frac{d^2y}{dx^2} \Big|_{(1,1)} = \frac{(6 - 3) \left(3 \cdot \frac{1}{3} - 2 \right) - (3 - 2) \left(6 \cdot \frac{1}{3} - 3 \right)}{(6 - 3)^2} = \frac{3(-1) - 1(-1)}{9} = -\frac{2}{9}$$

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6. (a)



(b) Slopes are positive for points where $x \neq 0$ and $y > -\frac{1}{2}$.

$$(c) \int \frac{dy}{2y+1} = \int x^2 dx$$

$$\frac{1}{2} \int \frac{2dy}{2y+1} = \int x^2 dx$$

$$\frac{1}{2}\ln|2y+1| = \frac{1}{3}x^3 + C$$

$$\ln \left| 2y + 1 \right| = \frac{2}{3} x^3 + C$$

$$|2y + 1| = e^{\frac{2}{3}x^3 + C}$$

$$|2y+1|=Ce^{\frac{2}{3}x^3}$$

$$|2(5) + 1| = Ce^0$$

$$11 = C$$

$$2y + 1 = 11e^{\frac{2}{3}x^3}$$

$$2y = 11e^{\frac{2}{3}x^3} - 1$$

$$y = \frac{1}{2} \left(11e^{\frac{2}{3}x^3} - 1 \right)$$