AB Calculus - Clue Card

Directions: As you solve each problem, place the problem set number in the space provided to the right. When you solve all 29 sets of problems, the numbers which are blank represent the solution to the mystery. If you have duplicate answers, you know which problems to check.

Suspects	Set#	Locations	Set#	Treasures	Set#
1. Barack Obama		1. Pearl Harbor		1. Carbon Fiber Toilet Seat	
2. Peyton Manning		2. Eiffel Tower		2. Crop Circles	
3. Ellen DeGeneres		3. Mt. McKinley		3. Star Wars Light Saber	
4. Oprah		4. Times Square		4. Health Care Reform	
5. LeBron James		5. Hogwarts		5. Ten Commandments	
6. Tiger Woods		6. White House		6. Declaration of Independence	
7. Britney Spears		7. Egyptian Pyramids		7. Mona Lisa	
8. Kobe Bryant		8. Pentagon		8. Hope Diamond	
9. House		9. Independence Hall		9. Hover Board	
10. Meryl Streep		10. Old Faithful		10. Olympic God Medal	
11. Martha Stewart		11. Mt. St. Helens		11. Harry Potter's Wand	
12. Dave Letterman		12. Ground Zero		12. 1st Place on American Idol	
13. Pythagoras		13. Lincoln Memorial		13. Proof of Fermat's Last Theorem	
14. Steve Jobs		14. Fort Knox		14. Anti-Gravity Device	
15. Tom Hanks		15. Disneyworld		15. Cure for cancer	
16. Lance Armstrong		16. Grand Canyon		16. 50 inch 3D TV	
17. Bill Gates		17. Yankee Stadium		17. Hydrogen base car	
18. Jessica Simpson		18. French Quarter		18. Rosetta Stone	
19. Sarah Palin		19. Appalachian Trail		19. A Worm Hole	
20. Angelina Jolie		20. Cape Canaveral		20. The Ring of Power	
21. Hillary Clinton		21. The Alamo		21. Dorothy's ruby slippers	
22. George W. Bush		22. St. Louis Arch		22. Crown Jewels of London	
23. Harry Potter		23. Hoover Dam		23. Google Stock	
24. Hannah Montana		24. Walmart		24. Waterless Washing Machine	
25. Darth Vader		25. Alcatraz		25. Aladdin's Lamp	
26. Leonardo DiCaprio		26. Statue of Liberty		26. Master's Green Jacket	
27. James Bond		27. Golden Gate Bridge		27. Noah's Ark	
28. Spider Man		28. Area 51		28. Plasma Scalpel	
29. Beyonce		29. Mount Rushmore		29. Water-Powered Battery	
30. Puff Diddy		30. Niagara Falls		30. The Golden Goose	

 Stu Schwartz

AB Clue Problem Set # 1

Suspect Problem: Find the derivative of $f(x) = 2\ln x^4 + 4x$ at $x = 0.35$. Round to the nearest integer.

The answer is: _____. Cross out that suspect number on your clue card and write # 1 as your set.

Location Problem: Find the volume if the region enclosing $y = |3x - 2|$, $x = 0$, and $x = 2$ is rotated about the x-axis. Round to the nearest integer.

The answer is: _____. Cross out that location number on your clue card and write # 1 as your set.

Treasure Problem: Find $\int_0^4 \frac{15}{\sqrt{2x+1}} dx$

The answer is: _____. Cross out that treasure number on your clue card and write # 1 as your set.

AB Clue Problem Set # 2

Suspect Problem: The acceleration of an object is given by $a(t) = 6\sin t$ with initial velocity of -9.5. Find the distance the object travels on the interval $[0,\pi]$ to the nearest integer.

The answer is: _____. Cross out that suspect number on your clue card and write # 2 as your set.

Location Problem: Find the slope of the line normal to $y^2 + 2x = 2y + x^3y + 440$ at $x = 0$ when $y > 0$.

The answer is: _____. Cross out that location number on your clue card and write # 2 as your set.

Treasure Problem: An aquarium is built with a 1.58 foot radius circle as a base with center at the origin. The aquarium is built with equilateral triangles as cross sections perpendicular to the x-axis. Find the volume of the aquarium to the nearest foot.

The answer is: _____. Cross out that location number on your clue card and write # 2 as your set.

AB Clue Problem Set # 3

Suspect Problem: If $F(x) = \int \frac{-12\sin x}{\cos^2 x}\,dx + C$ and $F(0) = -4$, find C.

The answer is: _____. Cross out that suspect number on your clue card and write # 3 as your set.

Location Problem: Find $\lim_{x\to 3} \frac{2x^3 - 5x^2 + 7}{3\sin\left(\frac{\pi x}{6}\right) - \cos(\pi x)}$

The answer is: _____. Cross out that location number on your clue card and write # 3 as your set.

Treasure Problem: Given $f(x) = x^2 - 27x - 28$, find the largest integer in which f is decreasing.

The answer is: _____. Cross out that treasure number on your clue card and write # 3 as your set.

AB Clue Problem Set # 4

Suspect Problem: Find the value of a that makes the function continuous.

$$f(x)=\begin{cases}\ln x + a, x > e \\ \dfrac{2x}{e}, x \le e\end{cases}$$

The answer is: _____. Cross out that suspect number on your clue card and write # 4 as your set.

Location Problem: Find the derivative of $\int_{x}^{\pi/4}(3t+2)\,dt$ at $x=-\dfrac{20}{3}$.

The answer is: _____. Cross out that location number on your clue card and write # 4 as your set.

Treasure Problem: The velocity of a particle is given by $v(t)=14e^{-t}+t$. Find the total distance traveled by the particle from $t=1$ to $t=5$ to the nearest integer.

The answer is: _____. Cross out that treasure number on your clue card and write # 4 as your set.

AB Clue Problem Set # 5

Suspect Problem: Two trains are traveling at approximately 164 mph towards a station. Train A is traveling south and is 240 miles from the station while train B is traveling west and is 320 miles from the station. To the nearest integer, how fast is the distance between the two trains changing at this time? *Reduce your answer by a factor of 10.*

The answer is: _____. Cross out that suspect number on your clue card and write # 5 as your set.

Location Problem: Find the smallest positive integer in the domain of $f(x) = \dfrac{\sin^2 x}{\sqrt{x^2 - 28x - 29}}$.

The answer is: _____. Cross out that location number on your clue card and write # 5 as your set.

Treasure Problem: Find to the nearest integer the value of C that satisfies $(y-6)\,dy = \dfrac{(x+4)}{y-3}dx$, $y\left(\dfrac{-1}{12}\right) = 2$.

The answer is: _____. Cross out that treasure number on your clue card and write # 5 as your set.

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AB Clue Problem Set # 6

Suspect Problem: Find $\lim_{x\to 4}\left(\frac{2x^3-9x^2+x+12}{x-4}\right)$

The answer is: _____. Cross out that suspect number on your clue card and write # 6 as your set.

Location Problem: Using the trapezoid method, approximate the area under $f(x)$ on [0,8] to the nearest integer given the following:

x	0	1	2	3	5	7	8
$f(x)$	3.4	2.7	6.2	5.3	1.3	2.1	4.8

The answer is: _____. Cross out that location number on your clue card and write # 6 as your set.

Treasure Problem: The drop in blood pressure of a typical patient who is given a certain medication is given by $D(x) = .028x^2(19-x)$ where x is the amount of medication in cubic centimeters. What is the maximum drop in blood pressure for this patient to the nearest integer?

The answer is: _____. Cross out that treasure number on your clue card and write # 6 as your set.

AB Clue Problem Set # 7

Suspect Problem: To the nearest integer, find $\int_0^1 \left(4x^{9/5} + 15x^{4/3} + 13x^{2/3} + 14\sin x\right) dx$

The answer is: _____. Cross out that suspect number on your clue card and write # 7 as your set.

Location Problem: Given the following piecewise function, find the value of *b* that makes the function differentiable.

$$f(x) = \begin{cases} ax^2 + 10, & x \geq 2 \\ x^2 - 6x + b, & x < 2 \end{cases}$$

The answer is: ____. Cross out that location number on your clue card and write # 7 as your set.

Treasure Problem: Find the average value of $f(x) = \frac{3\pi}{2}\cos x$ on the interval $\left[0, \frac{\pi}{2}\right]$

The answer is: ____. Cross out that treasure number on your clue card and write # 7 as your set.

AB Clue Problem Set # 8

Suspect Problem: Given the following points, find the right Riemann sum rounded to the nearest integer.

x	-1.447	-.7196	.0078	.7352	1.4626	2.19
$f(x)$	0	10.538	13.5	3.195	5.993	0

The answer is: _____. Cross out that suspect number on your clue card and write # 8 as your set.

Location Problem: Given $f(x) = x^2 + a$ where a is an integer, find the value of c that satisfies the result of the mean value theorem on [0, 38].

The answer is: _____. Cross out that location number on your clue card and write # 8 as your set.

Treasure Problem: $f(x) = \dfrac{\sqrt{19x - x^2 - 34}}{e^x}$ has a domain of $[a,b]$. Find $b - a$

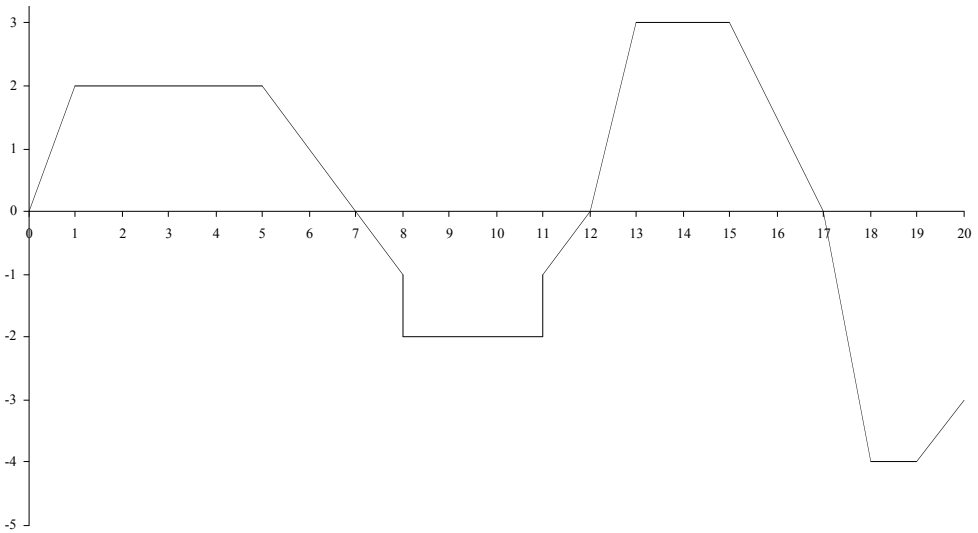
The answer is: _____. Cross out that treasure number on your clue card and write # 8 as your set.

AB Clue Problem Set # 9

Suspect Problem: Find $\lim_{x\to\infty}\dfrac{54x^3-5x^2+7x}{\sqrt{9x^6+16x^4+9}}$

The answer is: _____. Cross out that suspect number on your clue card and write # 9 as your set.

Location Problem:



The above graph is $f(x)$

Let $F(x)=\int_1^x f(t)\,dt$ where $f(x)$ is the graph above. Find the value of x such that $F(x)=10.5$.

The answer is: _____. Cross out that location number on your clue card and write # 9 as your set.

Treasure Problem: A particle is moving along a horizontal line with an acceleration function $a(t)=6t-16$. What is the position *s* of the particle when it reaches a velocity of 24 given $v(5)=7$ and $s(5)=4$?

The answer is: _____. Cross out that treasure number on your clue card and write # 9 as your set.

AB Clue Problem Set # 10

Suspect Problem: A circle has a radius of $\frac{10}{\pi - 1}$ which is the same value as the side of a square. Both the radius of the circle and side of the square are growing at 1 in/sec. Find the difference between the rates of change of their areas in in/sec.

The answer is: _____. Cross out that suspect number on your clue card and write # 10 as your set.

Location Problem: Find the area bounded by $y = x^2 - 4x + 3$ and $y = x + 4$ to the nearest integer.

The answer is: _____. Cross out that location number on your clue card and write # 10 as your set.

Treasure Problem: If $f(x) = \int (3x^2 + 2x + 4)\, dx$, find C if $f(1) = 10$.

The answer is: _____. Cross out that treasure number on your clue card and write # 10 as your set.

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AB Clue Problem Set # 11

Suspect Problem: Let $f(x) = \dfrac{17x}{e^{3x}}$. Find the slope of the tangent line to f at $x = 0$.

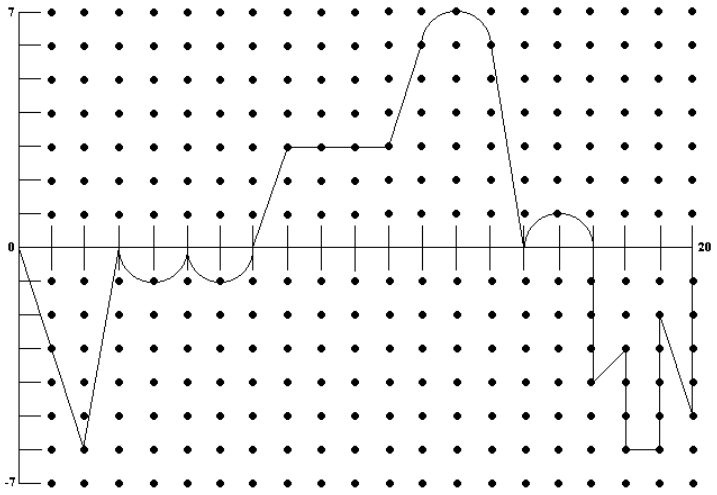
The answer is: _____. Cross out that suspect number on your clue card and write # 11 as your set.

Location Problem: Find the value of b such that the average value of $f(x) = 3x^2 - 6x - 12$ on $[0, b]$ is -12.

The answer is: _____. Cross out that location number on your clue card and write # 11 as your set.

Treasure Problem:

Let $F(x) = \int_0^x f(t)\,dt$ where f is graphed to the right (consisting of lines and semicircles). Find $F(20)$.



The answer is: _____. Cross out that treasure number on your clue card and write # 11 as your set.

AB Clue Problem Set # 12

Suspect Problem: People are entering a zoo at the rate of $100e^t + 75t$ people per hour where t is the amount of time the zoo has been open on that day measured in hours. If the doors are open at 9:00 AM, how many hundreds of people have entered the zoo at 11:40 AM? (nearest integer).

The answer is: _____. Cross out that suspect number on your clue card and write # 12 as your set.

Location Problem: Find $\lim_{x \to 0} \frac{7x}{\sqrt{x+4}-2}$

The answer is: _____. Cross out that location number on your clue card and write # 12 as your set.

Treasure Problem: Find the average value of $f(x)$ in the interval [-1, 3] when $f'(x) = 3x^2 - 6x$ and $f(2) = 0$.

The answer is: _____. Cross out that treasure number on your clue card and write # 12 as your set.

AB Clue Problem Set # 13

Suspect Problem: Find the value of c in the interval [1, 5] for which Rolle's Theorem can be applied to $f(x) = 3x^2 - 18x + 15$

The answer is: _____. Cross out that suspect number on your clue card and write # 13 as your set.

Location Problem: Three months after it stopped advertising. a computer company noticed that its sales proceeds had dropped from $39 million per month to $27.89 million per month. If the sales prices follow an exponential pattern of decline, what will be the proceeds in another three months to the nearest million.

The answer is: _____. Cross out that location number on your clue card and write # 13 as your set.

Treasure Problem: Find the value of k to the nearest integer such that the line $x = k$ divides the area under $f(x) = \frac{x^3}{36} - x + 15$ on $[0,20]$ into two equal areas.

The answer is: _____. Cross out that treasure number on your clue card and write # 13 as your set.

AB Clue Problem Set # 14

Suspect Problem: Find the larger of two numbers whose sum is 30 for which the sum of their squares is a minimum.

The answer is: _____. Cross out that suspect number on your clue card and write # 14 as your set.

Location Problem: Find the only value not included in the range of $y = 14 - \frac{1}{x}$.

The answer is: _____. Cross out that suspect number on your clue card and write # 14 as your set.

Treasure Problem: How many inflection points are in the graph of $f(x) = \frac{x^7}{42} - \frac{3x^6}{10} + \frac{6x^5}{5} - \frac{4x^4}{3}$?

The answer is: _____. Cross out that suspect number on your clue card and write # 14 as your set.

AB Clue Problem Set # 15

Suspect Problem: Find $\lim_{x \to -2} \dfrac{60x + 120}{2x^3 + 6x^2 + 2x - 4}$

The answer is: _____. Cross out that suspect number on your clue card and write # 15 as your set.

Location Problem: Snow falls intermittently accumulating on the ground at a rate (inches/hour) given by the equation $f(t) = t^2 \sin t^3 + 2.5$ where t is the number of hours that storm is overhead. To the nearest inch, how much snow will accumulate in the first two hours of the storm?

The answer is: _____. Cross out that location number on your clue card and write # 15 as your set.

Treasure Problem: A particle moves along the x-axis with a velocity given by $v(t) = \dfrac{-1}{3}t^3 + 2t^2 + 18t$. What is the maximum acceleration of the particle on the interval $[0, 4]$?

The answer is: _____. Cross out that treasure number on your clue card and write # 15 as your set.

AB Clue Problem Set # 16

Suspect Problem: The acceleration of an object is given by the function $a(t) = \frac{-t}{2} + \frac{9}{4}$. Also, at time $t = 0$, the velocity of the object is -2. Find the difference between the distance and the displacement traveled by the object to the nearest integer from $t = 0$ to $t = 10$.

The answer is: _____. Cross out that suspect number on your clue card and write # 16 as your set.

Location Problem: $f(x) = \begin{cases} ax^2 + 1, x \geq 1 \\ bx - 3, x < 1 \end{cases}$ If $f(x)$ is differentiable, find the value of $\frac{b}{2a}$.

The answer is: _____. Cross out that location number on your clue card and write # 16 as your set.

Treasure Problem: Given that $f(x) = x^2 - 5$ on the interval [0, 50.2], find the value of c to the nearest integer guaranteed by the mean value theorem for integrals.

The answer is: _____. Cross out that treasure number on your clue card and write # 16 as your set.

AB Clue Problem Set # 17

Suspect Problem: A particle is moving along a straight line with position function $s(t) = \tan^{-1} t - \ln t$. To the nearest integer, what is the particle's acceleration at $t = 0.387$?

The answer is: _____. Cross out that suspect number on your clue card and write # 17 as your set.

Location Problem: What is the maximum value of $f(x) = x^4 + x^3 - \frac{17}{4}x^2 + \frac{1}{2}x$ on the interval [-2, 2] ?

The answer is: _____. Cross out that location number on your clue card and write # 17 as your set.

Treasure Problem: Find the sum of the x-values of the inflection points of $f(x) = \frac{x^4}{12} - x^3 + \frac{5x^2}{2} + x\sqrt{7} + 9$.

The answer is: _____. Cross out that treasure number on your clue card and write # 17 as your set.

AB Clue Problem Set # 18

Suspect Problem: Find the derivative of $y = \sin^{-1}(20x) + \cos^{-1}(9x) + \tan^{-1}(2x)$ at $x = 0$.

The answer is: _____. Cross out that suspect number on your clue card and write # 18 as your set.

Location Problem: The temperature of a city for the 24 hour period starting at 12 noon is given by the equation $T(t) = 19 + 15\sin\left(\frac{\pi x}{12}\right)$ where *t* is the number of hours after 12 noon. Find the average temperature of the city to the nearest integer from 12 noon until 6 AM the next morning.

The answer is: _____. Cross out that location number on your clue card and write # 18 as your set.

Treasure Problem: The graph of $f(x) = \int_0^x \left(15t^2 - 2t^3 + 24\right)\,dt$ is concave up on (a,b). Find b - a.

The answer is: _____. Cross out that treasure number on your clue card and write # 18 as your set.

AB Clue Problem Set # 19

Suspect Problem: Let $f(x)=\begin{cases} ax^2+\frac{1}{3}, x\geq 1 \\ bx-\frac{10}{3}, x<1 \end{cases}$. If the function is differentiable, find the sum of $a + b$.

The answer is: _____. Cross out that suspect number on your clue card and write # 19 as your set.

Location Problem: The rate of change of atmospheric pressure P with respect to the altitude h is proportional to P provided that the temperature is constant. At 15º C, the pressure is 101.3 pounds per square inch (psi) at sea level and 87.1 psi at height $h = 1000$ m. Find the pressure in psi at the top of a mountain with an altitude of 8,200 meters. Round to the nearest integer.

The answer is: _____. Cross out that location number on your clue card and write # 19 as your set.

Treasure Problem: Find the area of the region bounded by the two functions $y = x^3$ and $y = 3x - 2$. Round to the nearest integer.

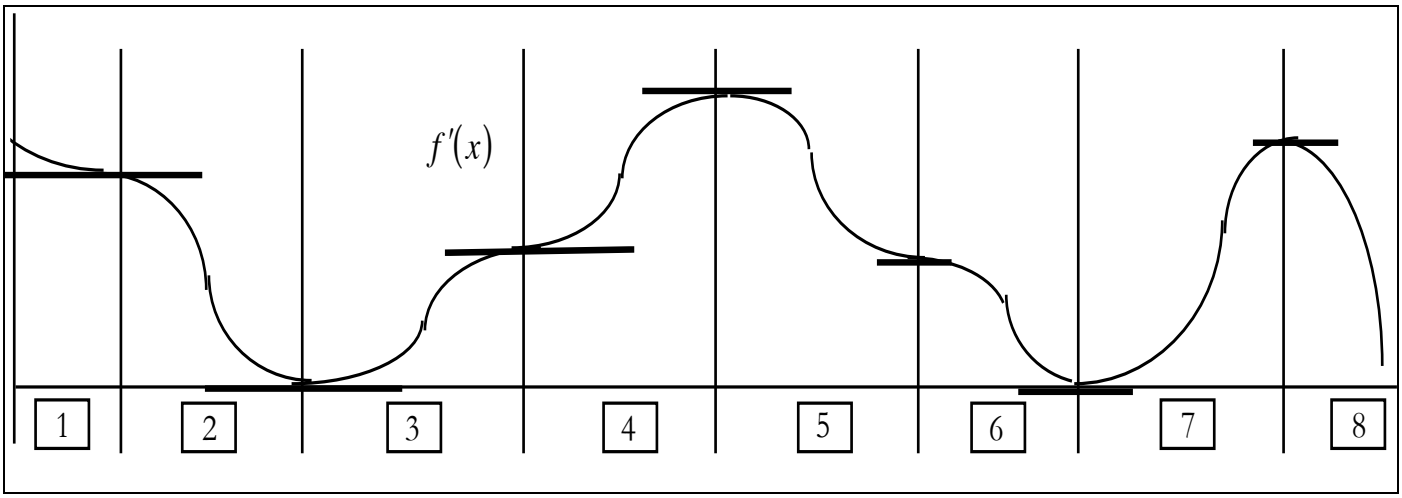
The answer is: _____. Cross out that treasure number on your clue card and write # 19 as your set.

AB Clue Problem Set # 20

Suspect Problem: Find $f'(-2)$ if $f(x) = (x+2)(x+3)(x+4)^2$

The answer is: _____. Cross out that suspect number on your clue card and write # 20 as your set.

Location Problem: Below is a graph of $f'(x)$ (locations where the graph has horizontal tangents are indicated in bold). The graph has been divided into 8 partitions. If *U* represents the number of partitions $f(x)$ is concave up, *D* represents the number of partitions $f(x)$ is concave down, and *I* represents the number of inflection points of $f(x)$, find the value of $I + D - U$.



The answer is: _____. Cross out that location number on your clue card and write # 20 as your set.

Treasure Problem: Find the volume if the graph of $y = \sqrt{\frac{20}{\pi}}\, e^{\frac{x}{2}}$ is rotated about the *x*-axis from $x = \ln\left(\frac{1}{2}\right)$ to $x = 0$.

The answer is: _____. Cross out that treasure number on your clue card and write # 20 as your set.

AB Clue Problem Set # 21

Suspect Problem: If $f(x)=\left[e^{x}+\ln(2x)\right]^{2}$, find $f'(0.8)$ to the nearest integer.

The answer is: _____. Cross out that suspect number on your clue card and write # 21 as your set.

Location Problem: If $f(x)=\begin{cases}9-x, x>\dfrac{41}{3}\\ \dfrac{x-a}{2}, x\le\dfrac{41}{3}\end{cases}$, what value of a allows $f(x)$ to be continuous?

The answer is: _____. Cross out that location number on your clue card and write # 21 as your set.

Treasure Problem: If $f(x)=17x+x\sin^{-1}x+\sqrt{1-x^{2}}$, find $f'(0.85)$ to the nearest integer.

The answer is: _____. Cross out that treasure number on your clue card and write # 21 as your set.

AB Clue Problem Set # 22

Suspect Problem: Given $f(x) = 2x^2 + x - 3$, find $\lim_{\Delta x \to 0} \dfrac{f(5+\Delta x) - f(5)}{\Delta x}$

The answer is: _____. Cross out that suspect number on your clue card and write # 22 as your set.

Location Problem: Let R be the region bounded by $y = \dfrac{x\sqrt{5}}{5}$, $x = 15.12$, and the x-axis . R is rotated about the x-axis. To the nearest integer, find the value of k such that the line $x = k$ divides R into two equal volumes.

The answer is: _____. Cross out that location number on your clue card and write # 22 as your set.

Treasure Problem: Find $\int_0^1 \dfrac{90}{2+9x^2}\,dx$ to the nearest integer.

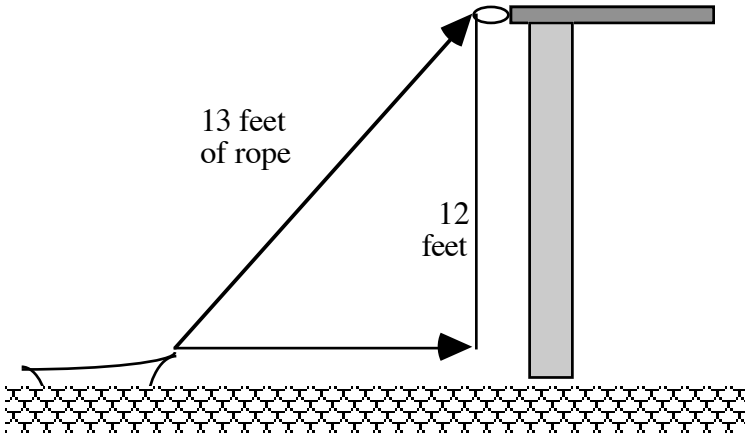
The answer is: _____. Cross out that treasure number on your clue card and write # 22 as your set.

AB Clue Problem Set # 23

Suspect Problem: The function $f(x) = 5x^4 - 10x^3 + \frac{4}{x^2} + 45$ has a tangent line at $x = 2$ in the form of $y = ax + b$. Find the value of $a + b$.

The answer is: _____. Cross out that suspect number on your clue card and write # 23 as your set.

Location Problem: A rowboat is pulled toward a dock from the bow through a ring on the dock 12 feet above the bow. If the rope is hauled in at $\frac{10}{13}$ ft/sec, how fast is the boat approaching the dock when 13 feet of rope are out?



The answer is: _____. Cross out that location number on your clue card and write # 23 as your set.

Treasure Problem: Find $\int_e^{e^7} \frac{16}{x\ln(4x)}\,dx$ to the nearest integer.

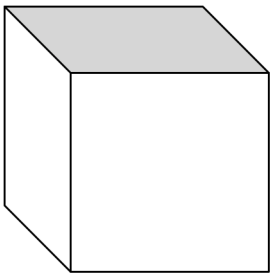
The answer is: _____. Cross out that treasure number on your clue card and write # 23 as your set.

AB Clue Problem Set # 24

Suspect Problem: Given $f(x) = (2x^2 - 3x + 4)^2$, find $|f'(.05) + f'(.45)|$ and round to the nearest integer.

The answer is: _____. Cross out that suspect number on your clue card and write # 24 as your set.

Location Problem: An open box with a square base has to be constructed with surface area of 500 square inches. To the nearest integer, find the length of the base of the box with maximum volume.



The answer is: _____. Cross out that location number on your clue card and write # 24 as your set.

Treasure Problem: Use the trapezoid method to find the area to the nearest integer under the function $f(x) = 2\sqrt{x} + 4.25$ on [0, 4] using 4 trapezoids.

The answer is: _____. Cross out that treasure number on your clue card and write # 24 as your set.

AB Clue Problem Set # 25

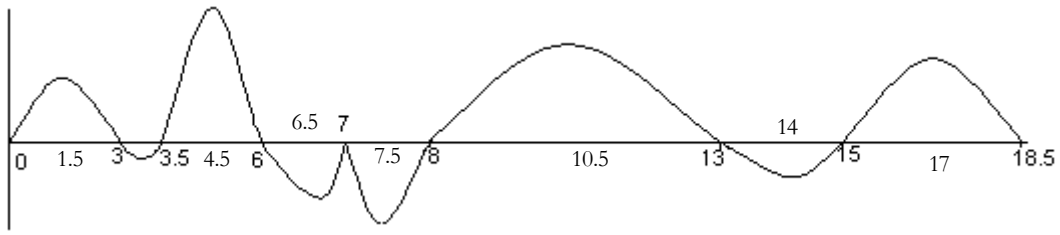
Suspect Problem: Given $f(x) = x^3 + 2x - 1$, find $\dfrac{1}{\left[f^{-1}\right]'(2)}$. ... that is, find the reciprocal of the derivative of $f^{-1}(x)$ at $x = 2$

The answer is: _____. Cross out that suspect number on your clue card and write # 25 as your set.

Location Problem: Given $x^2 + y^3 + y = 402$, find $\dfrac{dy}{dx}$ at $x = -20$.

The answer is: _____. Cross out that location number on your clue card and write # 25 as your set.

Treasure Problem: An ant is moving up and down a wall with position function $P(x)$. The graph of $P'(x)$ is shown below with x measured in minutes. Calculate the total time the ant is moving upwards.



$P'(x)$

The answer is: _____. Cross out that treasure number on your clue card and write # 25 as your set.

AB Clue Problem Set # 26

Suspect Problem: If $f(x) = \dfrac{x^3 + 2x + 6}{5x + 3}$, find $f'(30)$ to the nearest integer.

The answer is: _____. Cross out that suspect number on your clue card and write # 26 as your set.

Location Problem: The velocity function $v(t)$ given by $\dfrac{t^4}{12} - \dfrac{13t^3}{6} + 20t^2 + 4t - 2$. The change of velocity is decreasing on the interval (a,b). Find the value of $3a - b$.

The answer is: _____. Cross out that location number on your clue card and write # 26 as your set.

Treasure Problem: If $F(x) = \displaystyle\int \frac{dx}{\sqrt{5 - 2x^2}}$ and $F(0) = 10$, Find $F\left(\sqrt{2}\right)$ to the nearest integer.

The answer is: _____. Cross out that treasure number on your clue card and write # 26 as your set.

AB Clue Problem Set # 27

Suspect Problem: Find $\int_0^{\frac{e-1}{2}} \frac{4}{2x+1}\,dx$

The answer is: _____. Cross out that suspect number on your clue card and write # 27 as your set.

Location Problem: Find the slope of the normal line to $y = \ln(15 - x)$ at $x = 4$.

The answer is: _____. Cross out that location number on your clue card and write # 27 as your set.

Treasure Problem: Let $P(t)$ equal to number of students in a school (population 492) who have bought their lunch after t weeks. P is increasing at a rate proportional to 600 - P. If 300 students buy their lunch initially and 400 buy their lunch after 10 weeks, after how many weeks (nearest integer) will the entire student body buy lunch?

The answer is: _____. Cross out that treasure number on your clue card and write # 27 as your set.

AB Clue Problem Set # 28

Suspect Problem: The graph of $x^2 + 4y^2 - 4x - 12y + 4 = 0$ has two points of horizontal tangency, (x_1, y_1) and (x_2, y_2). Find the value of $(x_1 + y_1 + x_2 + y_2)(x_1, +x_2)$.

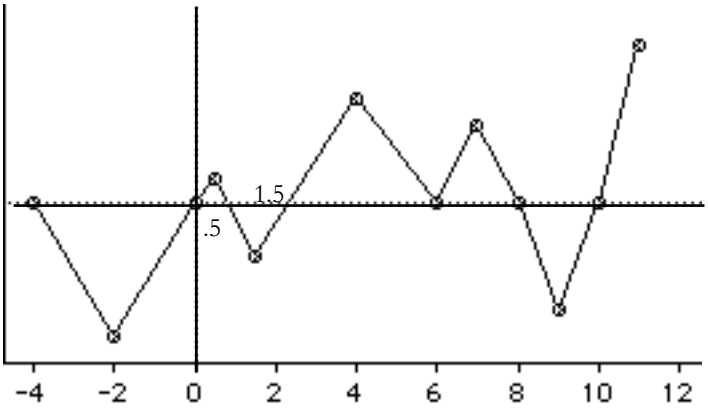
The answer is: _____. Cross out that suspect number on your clue card and write # 28 as your set.

Location Problem: Given the following chart, find the derivative of $\frac{g(x)}{f(x)} - f[g(x)]$ at $x = 3$.

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
3	1	9	-3	2
6	3	-2	4	5
9	-1	3	6	8

The answer is: _____. Cross out that location number on your clue card and write # 28 as your set.

Treasure Problem: Given the graph of $f'(x)$ below, find the sum of all the x-coordinates where the graph of f changes concavity.



The answer is: _____. Cross out that treasure number on your clue card and write # 28 as your set.

AB Clue Problem Set # 29

Suspect Problem: Given $f(x) = 2\sin(x^3)\cos(x^2)$, find $f'(4.585)$ to the nearest integer .

The answer is: _____. Cross out that suspect number on your clue card and write # 29 as your set.

Location Problem: Find the minimum *y*-value where the graph of $y = \dfrac{x^2 - 36}{x^2 - 4}$ is concave up.

The answer is: _____. Cross out that location number on your clue card and write # 29 as your set.

Treasure Problem: Below is a table for $f(x)$. Find the positive difference in calculating $\int_1^{13} f(x)\,dx$ by using 6 left rectangles and 6 trapezoids.

x	1	2	3	4	5	6	7	8	9	10	11	12	13
$f(x)$	0	3	5	6	7	8	10	12	16	18	20	21	23

The answer is: _____. Cross out that treasure number on your clue card and write # 29 as your set.

 Stu Schwartz