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$$\Rightarrow \frac{\pi}{6} = \frac{\sqrt{3}}{3} \sum_{n=0}^{\infty} (-1)^n \left(\frac{3}{9}\right)^n \frac{1}{2n+1}$$

$$\Rightarrow \pi = 2\sqrt{3} \sum_{n=0}^{\infty} (-1)^n \frac{1}{(2n+1)3^n}$$

This gives a series approximation for π .

AP[®] CALCULUS BC
2003 SCORING GUIDELINES

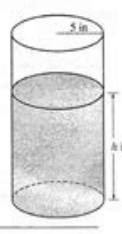
Question 5

A coliseum has the shape of a cylinder with radius 5 inches, as shown in the figure above. Let h be the depth of the water in the pit, measured in inches, where h is a function of time t , measured in seconds. The volume V of water in the pit is changing at the rate of $-5\pi\sqrt{h}$ cubic inches per second. (The volume V of a cylinder with radius r and height h is $V = \pi r^2 h$.)

(a) Show that $\frac{dh}{dt} = -\frac{\sqrt{h}}{5}$.

(b) Given that $h = 17$ at time $t = 0$, solve the differential equation $\frac{dh}{dt} = -\frac{\sqrt{h}}{5}$ for h as a function of t .

(c) At what time t is the coliseum empty?



1 : $\frac{dV}{dt} = -5\pi\sqrt{h}$
3 : 1 : compute $\frac{dV}{dt}$
1 : shows result

5 : 1 : separate variables
1 : antiderivatives
1 : constant of integration
5 : 1 : use initial condition $h = 17$ when $t = 0$
1 : solves for h

Note: max 2/5 [0-1.0-0.0] if no constant of integration
Note: 0/5 if no separation of variables

1 : answer

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Examination V

x	0	4	6	8	16
$g(x)$	28	27	24	19	12
$g'(x)$	0	-1	-2	-3	-4

5. Let $g(x)$ be a differentiable function defined on the interval $0 \leq x \leq 16$. Some values of $g(x)$ and its derivative $g'(x)$ are given in the table above. Which of the following is the x -intercept of the line tangent to the graph of $g(x)$ and parallel to the segment connecting the endpoints of $g(x)$?

(A) (23,0)
(B) (31,0)
(C) (-23,0)
(D) (-31,0)

6. What is xy'' if $\sin y = y + 5x^2$?

(A) $\frac{5}{-1 + \cos y}$ (B) $\frac{5 \sin y}{(-1 + \cos y)^2}$ (C) $\frac{25 \cos y}{(1 + \cos y)^2}$ (D) $\frac{25 \sin y}{(-1 + \cos y)^2}$

Answer

Answer

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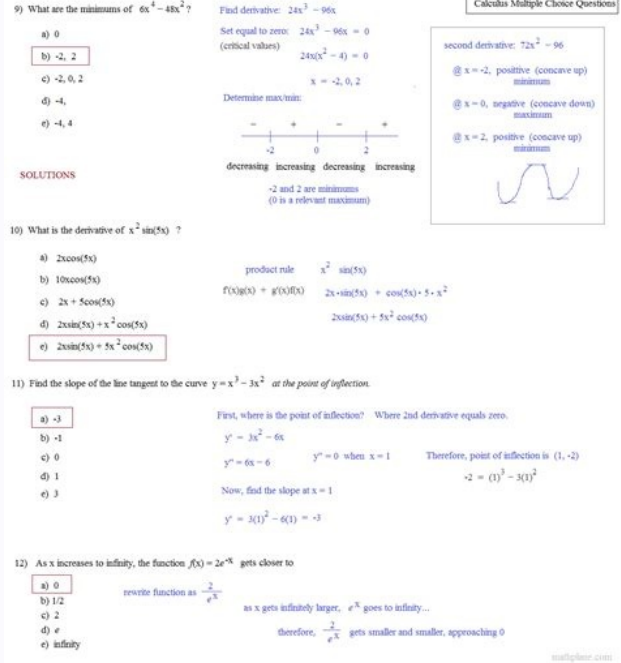
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15. Find $\lim_{x \rightarrow 0} \frac{\sin x}{x}$.

(A) $\frac{1}{2}$
(B) $\frac{1}{3}$
(C) $\frac{1}{4}$
(D) $\frac{1}{5}$
(E) $\frac{1}{6}$

16. Find $\lim_{x \rightarrow 0} \frac{\sin x}{x}$.

(A) $\frac{1}{2}$
(B) $\frac{1}{3}$
(C) $\frac{1}{4}$
(D) $\frac{1}{5}$
(E) $\frac{1}{6}$



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SirroM. disnoc tsum ooy sgneht era irahT, revewoH.eb nac llab esicrexe na — nuf dna — evitceffe wah tsu! uwe wohs lliw under tookrow knurt estni, uqinu a dengmich sah sirroM.ytlbats, sgel nadra ruoy no gniyler eb luoy sa ,sgniws gel wol dna sllor redloos ,noiIator osoero ysae ekil stnemevom etneg and wolloF.gnorvniowNeuyNeuyNeuyNwrNwrYxYNwtYxevYYxevY require the use of your arms and shoulders, as well as your abs and lower back. "The legs and arms are really an extension of the trunk. You'll never get bored! for crunches, and your posture will improve definitely. It is not immediately obvious that you are looking at the best-kept secret in physical form. For both abs and back, these exercises become progressively more advanced". In terms of increased metabolism, weight lifting has a higher impact on the body than running. Having both routines ensures that you are moving your body at every point of that training. CiA² means that you will not have to stop and rest a certain part of the body because you will alter the tension on the different parts of the body. By UfaBizPhoto / Shutterstock Have a package of six Å" almost every dream ÅÅ. For example, you can have one body working for the arms and another for the legs in the same set. There's not much you can do to make a crunchy floor harder", but by rounding your back on an exercise ball (also called Swiss ball), you can² work through a wider range of movement. Why are ball exercises superior to traditional crunch and back exercises performed on the floor? It important that the same and discipline that you put into your workouts" translated into the diet program. It is recommended to visit your doctor or a nutritionist who will guide you what to eat. The regimens range from simple workouts of 30 minutes to months of heavy lifting and a guided diet. A variety of render positions planking an effective and essential addition to your workout plan.Minimize the time spent on the treadmillSpend a lot of time running on a treadmill will reduce time you have to lift weights. Also do at least 30-45 minutes of cardio work 3-5 days to Provided by Mr. Calculus Website Chances is you saw an exercise ball sitting in the corner of your gym (or maybe you also have one at home) and thought: what What the hell should I do with this thing? Weight lifting will also improve your flexibility and stabilize your nucleus more than running would be. Keep in mind that the lower part of the body has more muscles than the upper part of the body. After all, there are no handles to push or bars to grab or lever to pull. In the alternative set, it is possible to have two exercises that do not compete with each other. "The ball strengthens the bust, which is the base of your body," says Morris. First, the ball is unstable; It is necessary to dig deep into those trunk muscles to keep the gizmo to roll away. When this becomes easy, focuses at 15-20 repetitions. This boost to achieve this level of perfection has led to numerous fitness instructors come with what they define as the right way to get ABS. Cool-down ends with more stretching, focusing on the bust and lumbar. Exercising without strong muscles (ab and back) is how to try to build a house starting from the roof. "With the strongest core muscles, you can put more impetus in your cardio workouts and raise heavier weights in the gym or at home. And â €™ work the muscles that burn more calories. This usually leads to an unbalanced body. "You will be amazed by how much balance the ball requires and how many additional muscles you will use," says Mike Morris, a Seaside coach, Fla., And President of Resist-A-Ball. There is a lot of material on food portions, the number of meals to be consumed per day and which nutrients should be included. The point of your work outs is to damage muscle fibers, forcing your body to release the energy that will heal that muscle. You can compress your nucleus and buttocks to make your core active. As mentioned above, the process of obtaining abdominals involves the body that produces high levels of energy. Balance this program with workout with upper and lower body weights 2 or 3 days a week. With endurance training fat loss occurs faster¹ , Erofereht .ginnurr OT