

17 April 2010 [Beware – there might be some typos!]
Non-calculator multiple-choice

1=B

First simplify [multiply], then use end behavior

2=D

First rewrite as x^{-2} , then use Power Rule

3=D

Product Rule AND Chain Rule

4=B

Use u-sub where $u = 2x$

5=A

First factor, then cancel out the greatest common factor

6=A

To find the limit, first factor and cancel out the greatest common factor

7=B

Ack! Once again, using the Sandy Point Beach strategy
[initial position plus accumulated rate of change]

8=E

Chain Rule

9=D

This one requires you to find each function value by replacing the upper bound and finding area

10=C

We did this one already

11=B

Find where the horizontal tangent are [this is where the graph of f' will equal zero] and wherever the function is increasing, then the graph of f' will have positive values, wherever the function is decreasing, then graph of f' will have negative values

12=D

Chain Rule

13=A

First replace the x in $f(x)$ with $\ln x$, then find the derivative [the first term needs the Chain Rule]

14=E

If $f'' > 0$, then f is concave up and if $f'' < 0$, then f is concave down

15=C

Use u-sub where $u = x^2 - 4$

16=D

Use implicit differentiation. Be careful! You need to use the Chain Rule for the $\sin(xy)$ and the Product Rule with implicit differentiation to find the derivative of xy

17=C

By FTC, $g'(x) = f(x)$. The graph of g will have points of inflection whenever the graph of g' changes from increasing to decreasing or decreasing to increasing

18=A

First find y' . You then need to set y' equal to the slope of the line $x + y = k$ which is -1 . Find where $y' = -1$ and use that x -value to find the y -value. Then find k

19=E

This one requires you to find the end behavior. Be careful! You can use $x = 100$ and $x = -100$ to easily find the end behavior.

20=D

First find the possible points of inflection and then test the intervals that result

21=A

Velocity will increase if $a(t) > 0$ or where the graph of $s(t)$ is concave up

22=B

Rate means $\frac{dp}{dt}$ and read the problem to figure out what $\frac{dp}{dt}$ should equal

23=E

Separate, integrate, solve for C, solve for y [and check your given value]

24=B

Write the equation of the tangent line at $x = 2$ and then replace the x in the tangent line equation with 1.9

25=B

First make set up the limits to make the piecewise function continuous. Then write a piecewise derivative and set up limits to make the piecewise function differentiable. You will get two equations with two unknowns.

26=A

Use the Chain Rule with $u = 4x$ to find the derivative and then find the desired value

27=C

Look for the horizontal tangents [if $x = -1$, $y = 0$]

28=A

Derivative of an inverse

Calculator multiple-choice

76=B

f will increase if $f' > 0$

77=C

Just find the limits

78=B

Use your TI to find where $f' > 0$

79=B

$$\int_{-5}^2 f(x) dx + \int_2^5 f(x) dx$$

80=E

Use your TI to find where the graph of f' changes from increasing to decreasing or decreasing to increasing

81=E

Another variation of the Sandy Point Beach problem – initial value plus accumulated rate of change [$f(x) = G'$]

82=B

Use nDeriv to find $v'(3) = a(3)$

83=B

Use your TI to find the upper and lower bounds and to find which function is on top

84=C

Find where the graph of f' changes from positive to negative values

85=B

The anti-derivative of f' is f . Then just use the table of function values

86=C

When $v(t) < 0$, then the position function should be decreasing. When $v(t) > 0$, then the position function should be increasing. There should be a horizontal tangent at $x = 3$

87=D

Ack! The Sandy Point Beach variation again! Add the initial position to the accumulated rate of change

88=C

Given $\frac{dr}{dt} = -2$ and find $\frac{d}{dt}$ of the Surface Area equation. This is just another related rates problem

89=E

The function is continuous but not differential so the Mean Value Theorem does not apply

90=A

Find the table in which the values are increasing at a decreasing rate

91=C

Use the average value formula and your TI

92=B

We have done this problem before.