Name:________________________________

$I \quad D$ $N \quad O$	:									Section # $9:00-11:00$	01 PM.

$Time$ $120 Min$	$Seat$: $No.$:				$Marks$ 150	$Marks$: $Secured$:			

NOTE: Write only the necessary steps for the solution of each question. After your precise solution Check ($\surd$) or Circle Ⓢ only the one right choice.

The questions are not in any order of difficulty at all. All questions carry equal number of marks. Check that this exam has 25 questions and 20 pages.

Only nonprogramable calculators are allowed. All types of pagers or mobile phones are not allowed during the examination.

Use HB 2.5 pencil only. Use a good eraser. Do not use the eraser attached to the pencil.

Write your name, ID number and Section number on the examination paper and in the upper left corner of the answer sheet.

When bubbling your ID number and Section number, be sure that the bubbles match with the numbers that you write.

The Test Code Number is already bubbled in your answer sheet. Make sure that it is the same as that printed on your question paper.

When bubbling, make sure that you do not leave any trace of penciling.

===

<u>EXAMPLE: 51Q52</u>. During this term 103 of summer 2011 I am taking Math course number.

$Q51 \longrightarrow B$ $51B$ & $52C$ $Q52 \longrightarrow C$	$\longrightarrow$	$Math$ 101
$Q51 \longrightarrow E$ $51E$ & $52A$ $Q52 \longrightarrow A$	$\longrightarrow$	$Math$ 102
$Q51 \longrightarrow A$ $51A$ & $52D$ $Q52 \longrightarrow D$	$\longrightarrow$	$Math$ 132
$Q51 \longrightarrow C$ $51C$ & $52E$ $Q52 \longrightarrow E$	$\longrightarrow$	$Math$ 201
$Q51 \longrightarrow D$ $51D$ & $52B$ $Q52 \longrightarrow B$	$\longrightarrow$	$Math$ 202

ANSWER:

51 A■ B C D E

52 A B C D■ E

1Q2. Determine the location of each local (relative) extremum (maximum and minimum) of the function.

$f(x) = x^3 + 5.5x^2 + 6x + 2$

$Q1 \longrightarrow A$ $1A$ & $2D$ $Q2 \longrightarrow D$	$\longrightarrow$	Local Maximum at $x = \frac{2}{3}$; Local Minimum at $x = 3$

$Q1 \longrightarrow B$ $1B$ & $2C$ $Q2 \longrightarrow C$	$\longrightarrow$	Local Maximum at $x = -1$; Local Minimum at $x = -\frac{2}{3}$

$Q1 \longrightarrow C$ $1C$ & $2E$ $Q2 \longrightarrow E$	$\longrightarrow$	Local Maximum at $x = -\ 3$; Local Minimum at $x = -\ \frac{2}{3}$

$Q1 \longrightarrow E$ $1E - 2A$ $Q2 \longrightarrow A$	$\longrightarrow$	Local Maximum at $x = 2$; Local Minimum at $x = 1$

$Q1 \longrightarrow D$ $1D$ & $2B$ $Q2 \longrightarrow B$	$\longrightarrow$	Local Maximum at $x = -\ \frac{2}{3}$; Local Minimum at $x = -\ 3$

==

$3Q4$. (Advertizing and Profits). A company makes a profit of \$ 5 on each item of its product it sells. If it spends A dollars per week on advertizing, then the number of items per week it sells is given by

$x = 2000\left(1 - e^{-kA}\right)$

where $k = 0.001$. Then a net profit P is given by

$P = 5x - A = 10000\left(1 - e^{-kA}\right) - A.$

Find the value of A that maximizes the net profit P.

$Q3 \longrightarrow D$ $3D$ & $4B$ $Q4 \longrightarrow B$	$\longrightarrow$	$\frac{10000}{\ln 10} = 4342.94$

$Q3 \longrightarrow C$ $3C$ & $4A$ $Q4 \longrightarrow A$	$\longrightarrow$	$2000 \ln 10 = 4605.17$

$Q3 \longrightarrow A$ $3A$ & $4D$ $Q4 \longrightarrow D$	$\longrightarrow$	$\frac{2000}{e^{0.001}} = 1998.00$

$Q3 \longrightarrow B$ $3B$ & $4E$ $Q4 \longrightarrow E$	$\longrightarrow$	$1000 \ln 10 = 2302.59$

$Q3 \longrightarrow E$ $3E$ & $4C$ $Q4 \longrightarrow C$	$\longrightarrow$	$1000e = 2718.28$

==

$5Q6$. (Minimum Average Cost). The average cost of manufacturing a certain article is given by

$$\overline{C} = 5 + \frac{48}{x} + 3x^2$$

where x is the number of articles produced. Find the minimum value of $\overline{C}$.

$Q5 \longrightarrow E$ $5E$ & $6C$ $Q6 \longrightarrow C$	$\longrightarrow$	48

$Q5 \longrightarrow A$ $5A$ & $6B$ $Q6 \longrightarrow B$	$\longrightarrow$	62

$Q5 \longrightarrow C$ $5C$ & $6E$ $Q6 \longrightarrow E$	$\longrightarrow$	56

$Q5 \longrightarrow D$ $5D$ & $6A$ $Q6 \longrightarrow A$	$\longrightarrow$	18

$Q5 \longrightarrow B$ $5B$ & $6D$ $Q6 \longrightarrow D$	$\longrightarrow$	41

==

$7Q8$. Determine the intrvals on which the graph of f is concave up and concave down. Then list all INFLECTION points.

$f(x) = 3x^5 - 10x^3 + 10x + 10$.

Then which one of the following statements is TRUE.

$Q7 \longrightarrow A$ $7A$ & $8D$ $Q8 \longrightarrow D$	$\longrightarrow$	The graph is concave up on $(-\infty, -1)$ and $(0, 1)$

$Q7 \longrightarrow E$ $7E$ & $8C$ $Q8 \longrightarrow C$	$\longrightarrow$	The graph is concave down on $(-1, 0)$

$Q7 \longrightarrow B$ $7B$ & $8A$ $Q8 \longrightarrow A$	$\longrightarrow$	The graph is concave down on $(-\infty, 0)$ and $(1, \infty)$.

$Q7 \longrightarrow D$ $7D$ & $8E$ $Q8 \longrightarrow E$	$\longrightarrow$	The graph is concave up on $(-\infty, -1)$ and $(0, \infty)$.

$Q7 \longrightarrow C$ $7C$ & $8B$ $Q8 \longrightarrow B$	$\longrightarrow$	The points $(-1, 7)$, $(0, 10)$, and $(1, 13)$ are the INFLECTION points of the graph.

==

$9Q10$. For the function $f(x) = ax^3 + bx^2$, determine a and b so that the points $(1, \ 6)$ is a point of inlfection of $f(x)$.Then the SUM $a + b$ of the numbers a and b is given by

$Q9 \longrightarrow B$		
$9B$ & $10C$	$\longrightarrow$	$a + b = 6$
$Q10 \longrightarrow C$		

$Q9 \longrightarrow E$		
$9E$ & $10A$	$\longrightarrow$	$a + b = 7$
$Q10 \longrightarrow A$		

$Q9 \longrightarrow A$		
$9A$ & $10D$	$\longrightarrow$	$a + b > 12$
$Q10 \longrightarrow D$		

$Q9 \longrightarrow C$		
$9C$ & $10E$	$\longrightarrow$	$a + b < 0$
$Q10 \longrightarrow E$		

$Q9 \longrightarrow D$		
$9D$ & $10B$	$\longrightarrow$	$a + b = 12$
$Q10 \longrightarrow B$		

==

$11Q12$. If the price charged for a bolt is p cents, then x thousand bolts will be sold in a certain hardware store,

where $p = 29 - \dfrac{x}{34}$.

How many bolts must be sold to maximize revenue $R = xp$?

$Q11 \longrightarrow E$		
$11E$ & $12D$	$\longrightarrow$	986 thousand bolts
$Q12 \longrightarrow D$		

$Q11 \longrightarrow B$ $11B$ & $12C$ $Q12 \longrightarrow C$	$\longrightarrow$	493 thousand bolts

$Q11 \longrightarrow D$ $11D$ & $12A$ $Q12 \longrightarrow A$	$\longrightarrow$	435 thousand bolts

$Q11 \longrightarrow C$ $11C$ & $12E$ $Q12 \longrightarrow E$	$\longrightarrow$	3064 thousand bolts

$Q11 \longrightarrow A$ $11A$ & $12B$ $Q12 \longrightarrow B$	$\longrightarrow$	382500 bolts

==

$13Q14$. Find the criticle numbers. Then find the open inetrvals where the function is increasing and the open intervals where the function is decreasing.

$f(x) = \dfrac{x^2 - 6x + 9}{x + 2}$.

$Q13 \longrightarrow E$ $13E$ & $14D$ $Q14 \longrightarrow D$	$\longrightarrow$	f is INCREASING on $(-\infty,\ 2)$

$Q13 \longrightarrow D$ $13D$ & $14B$ $Q14 \longrightarrow B$	$\longrightarrow$	f is DECREASING on $(-2,\ \infty)$

$Q13 \longrightarrow C$ $13C$ & $14A$ $Q14 \longrightarrow A$	$\longrightarrow$	f is decreasing on $(-7,\ -2)$ and $(-2,\ 3)$

$Q13 \longrightarrow A$ $13A$ & $14C$ $Q14 \longrightarrow C$	$\longrightarrow$	f is INCREASING on $(-7,\ -2)$ and $(-2,\ 3)$

$Q13 \longrightarrow B$ $13B$ & $14E$ $Q14 \longrightarrow E$	$\longrightarrow$	f is DECREASING on $(-\infty,\ -7)$ and $(3,\ \infty)$

==

$15Q16$. Cost. Suppose that the cost function for a product is given by

$C(x) = 0.002x^3 + 9x + 6912.$

Find the production level (i.e., value of x) that will produce the MINIMUM AVERAGE COST $\overline{C}(x) = \dfrac{C(x)}{x}$ per unit.

$Q15 \longrightarrow A$ $15A$ & $16C$ $Q16 \longrightarrow C$	$\longrightarrow$	120 units

$Q15 \longrightarrow D$ $15D$ & $16B$ $Q16 \longrightarrow B$	$\longrightarrow$	80 units

$Q15 \longrightarrow E$ $15E$ & $16A$ $Q16 \longrightarrow A$	$\longrightarrow$	69 units

$Q15 \longrightarrow B$ $15B$ & $16D$ $Q16 \longrightarrow D$	$\longrightarrow$	45 units

$Q15 \longrightarrow C$ $15C$ & $16E$ $Q16 \longrightarrow E$	$\longrightarrow$	150 units

==

$17Q18$. Pollution. A lake polluted by bacteria is treated with an antibacterial chemical. After t days, the number N of bacteria per millimeter of water is approximated by

$N(t) = 20\left[\frac{t}{12} - \ln\left(\frac{t}{12}\right)\right] + 30$; for $1 \leq t \leq 15$.

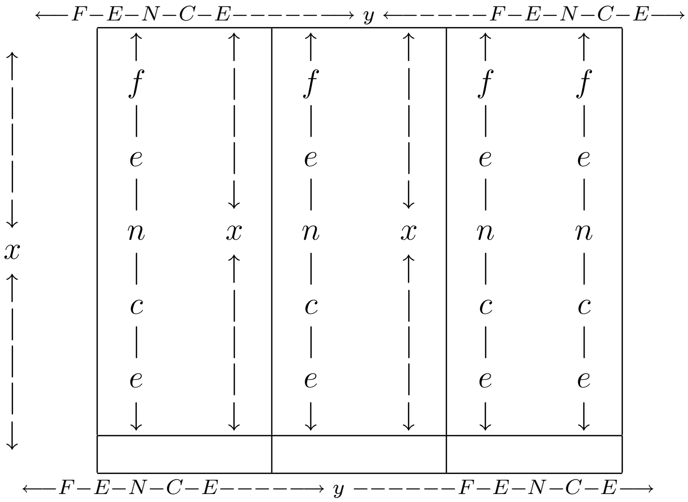
Then which one of the following statements is FALSE.

$Q17 \longrightarrow E$ $17E$ & $18C$ $Q18 \longrightarrow C$	$\longrightarrow$	The number of bacteria will be a minimum at $t = 12$, which represents 12 days.
$Q17 \longrightarrow D$ $17D$ & $18A$ $Q18 \longrightarrow A$	$\longrightarrow$	The minimum number of bacteria is given by $N(12) = 50$, which represents 50 bacteria per ml.
$Q17 \longrightarrow B$ $17B$ & $18E$ $Q18 \longrightarrow E$	$\longrightarrow$	The number of bacteria will be a maximum at $t = 1$, which represents 1 day.
$Q17 \longrightarrow A$ $17A$ & $18B$ $Q18 \longrightarrow B$	$\longrightarrow$	The maximum number of bacteria is given by $N(1) = 81.365$, which represents 81.365 bacteria per ml.
$Q17 \longrightarrow C$ $17C$ & $18D$ $Q18 \longrightarrow D$	$\longrightarrow$	The naximum or minimum number of bacteria is given by $N(15) = 50.537$

==

$19Q20.Area.$ An ecologist is conducting a research project on breeding pheasants in captivity. She first must construct suitable pens. She wants a rectangular area with two additional fences across its width, as shown in the sketch. Find the maximum area she can enclose with 3600 $meters$ (m) of fencing. (Hint: Let $x =$ width of the rectangle, $y =$ the total length of the rectangle; $4x + 2y = 3600$; $A = Area = xy$).

$Q19 \longrightarrow B$ $19B$ & $20E$ $Q20 \longrightarrow E$	$\longrightarrow$	$202500\ m^2$.



$Q19 \longrightarrow E$		
$19E$ & $20C$	$\longrightarrow$	$1620000\ m^2.$
$Q20 \longrightarrow C$		

$Q19 \longrightarrow D$		
$19D$ & $20A$	$\longrightarrow$	$810000\ m^2.$
$Q20 \longrightarrow A$		

$Q19 \longrightarrow C$		
$19C$ & $20D$	$\longrightarrow$	$101250\ m^2.$
$Q20 \longrightarrow D$		

$Q19 \longrightarrow A$		
$19A$ & $20B$	$\longrightarrow$	$405000\ m^2.$
$Q20 \longrightarrow B$		

==

$21Q22$. Find the integral.

$$\int \frac{x\,dx}{(7x^2+3)^5}$$

$Q21 \longrightarrow A$		
$21A$ & $22B$	$\longrightarrow$	$-\frac{1}{14}(7x^2+3)^{-6}+C$
$Q22 \longrightarrow B$		

$Q21 \longrightarrow E$	
$21E$ & $22D$	$\longrightarrow$ $\boxed{-\frac{1}{56}\left(7x^2+3\right)^{-4}+C}$
$Q22 \longrightarrow D$	

$Q21 \longrightarrow C$	
$21C$ & $22A$	$\longrightarrow$ $\boxed{-\frac{7}{3}\left(7x^2+3\right)^{-6}+C}$
$Q22 \longrightarrow A$	

$Q21 \longrightarrow D$	
$21D$ & $22C$	$\longrightarrow$ $\boxed{-\frac{7}{3}\left(7x^2+3\right)^{-4}+C}$
$Q22 \longrightarrow C$	

$Q21 \longrightarrow B$	
$21B$ & $22E$	$\longrightarrow$ $\boxed{-\frac{1}{14}\left(7x^2+3\right)^{-4}+C}$
$Q22 \longrightarrow E$	

==

$23Q24$. Profit. The total profit (in TENS of dollars) from the sale of x hundred boxes of candy is given by $P(x) = -x^3 + 10x^2 - 12x$.

Find the number of boxes of candy that should be sold in order to produce maximum profit and then find the maximum profit in dollars.

$Q23 \longrightarrow D$	
$23D$ & $24E$	$\longrightarrow$ $\boxed{\$\ 6480}$
$Q24 \longrightarrow E$	

$Q23 \longrightarrow A$	
$23A$ & $24C$	$\longrightarrow$ $\boxed{\$\ 720}$
$Q24 \longrightarrow C$	

$Q23 \longrightarrow E$	
$23E$ & $24A$	$\longrightarrow$ $\boxed{\$\ 560}$
$Q24 \longrightarrow A$	

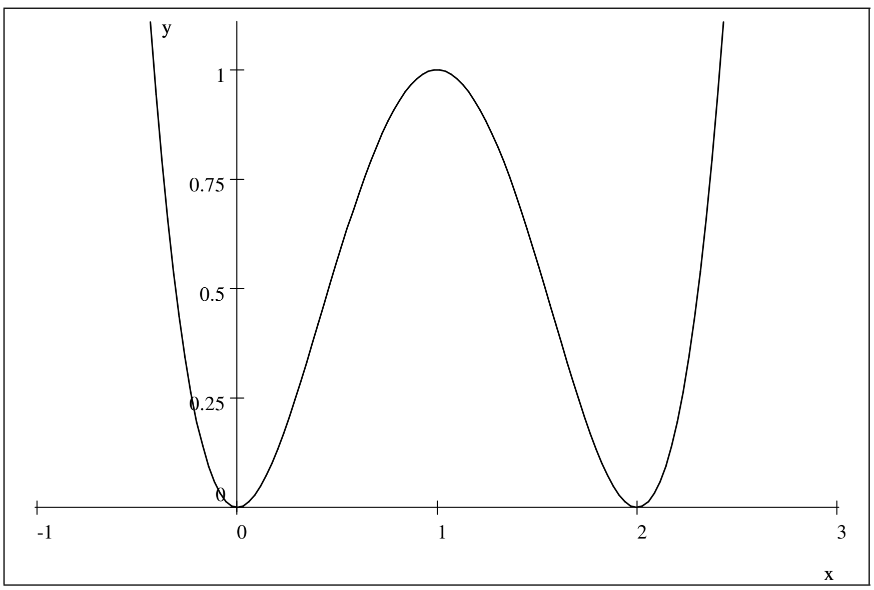
$Q23 \longrightarrow B$		
$23B$ & $24D$	$\longrightarrow$	\$ 2400
$Q24 \longrightarrow D$		

$Q23 \longrightarrow C$		
$23C$ & $24B$	$\longrightarrow$	\$ 1274
$Q24 \longrightarrow B$		

==

$25Q26$. Use the definite integral to find the area between the $x - axis$ and the graph of $f(x)$ over the indicated closed interval.

$f(x) = x^2 (x-2)^2$; $[0,\ 2]$



$Q25 \longrightarrow C$		
$25C$ & $26A$	$\longrightarrow$	$\frac{17}{5}$
$Q26 \longrightarrow A$		

$Q25 \longrightarrow B$		
$25B$ & $26E$	$\longrightarrow$	$\frac{15}{6}$
$Q26 \longrightarrow E$		

$Q25 \longrightarrow D$
$25D$ & $26B$
$Q26 \longrightarrow B$

$\longrightarrow$ $\boxed{\dfrac{15}{17}}$

$Q25 \longrightarrow E$
$25E$ & $26C$
$Q26 \longrightarrow C$

$\longrightarrow$ $\boxed{\dfrac{16}{15}}$

$Q25 \longrightarrow A$
$25A$ & $26D$
$Q26 \longrightarrow D$

$\longrightarrow$ $\boxed{\dfrac{8}{9}}$

==

$27Q28$. Find the particular solution of the differential equation.
$\dfrac{dy}{dx} = 6x^2 - 4x + 17; \quad y = 6$ when $x = 1$.

$Q27 \longrightarrow B$
$27B$ & $28D$
$Q28 \longrightarrow D$

$\longrightarrow$ $\boxed{y = 2x^3 - 4x^2 + 17x - 9}$

$Q27 \longrightarrow A$
$27A$ & $28C$
$Q28 \longrightarrow C$

$\longrightarrow$ $\boxed{y = 2x^3 - 2x^2 + 17x + 11}$

$Q27 \longrightarrow D$
$27D$ & $28B$
$Q28 \longrightarrow B$

$\longrightarrow$ $\boxed{y = 6x^3 - 4x^2 + 17x - 13}$

$Q27 \longrightarrow C$
$27C$ & $28E$
$Q28 \longrightarrow E$

$\longrightarrow$ $\boxed{y = 2x^3 - 2x^2 + 17x - 11}$

$Q27 \longrightarrow E$
$27E$ & $28A$
$Q28 \longrightarrow A$

$\longrightarrow$ $\boxed{y = 2x^3 - 4x^2 + 17x + 23}$

==

29Q30. The rate of infection of a disease (in people per month) is given by the function $f^{/}(t)=\frac{d}{dt}(f(t))=\frac{304t}{t^2+1}$, where t is the time in months since the disease broke out. Find the total number of infected people over the first 3 months of the disease. $\left[Hint: Evaluate \quad \int_0^3 f^{/}(t)\,dt\right]$

$Q29 \longrightarrow E$	
$29E$ & $30B$	$\longrightarrow$ $304\ln 10 = 700$
$Q30 \longrightarrow B$	

$Q29 \longrightarrow A$	
$29A$ & $30D$	$\longrightarrow$ $76\ln 10 = 175$
$Q30 \longrightarrow D$	

$Q29 \longrightarrow D$	
$29D$ & $30E$	$\longrightarrow$ $152\ln 10 = 350$
$Q30 \longrightarrow E$	

$Q29 \longrightarrow C$	
$29C$ & $30A$	$\longrightarrow$ $\frac{608}{\ln 10} = 264$
$Q30 \longrightarrow A$	

$Q29 \longrightarrow B$	
$29B$ & $30C$	$\longrightarrow$ $152e = 413$
$Q30 \longrightarrow C$	

==

31Q32. The graph of $y=\frac{2x^2+2x+3}{4x^2-4x}$ has

$Q31 \longrightarrow D$	
$31D$ & $32B$	$\longrightarrow$ a horizontal asymptote at $y=+\frac{1}{2}$ but no vertical asymptotes.
$Q32 \longrightarrow B$	

$Q31 \longrightarrow E$
$31E$ & $32C$
$Q32 \longrightarrow C$

$\longrightarrow$

no horizontal asymptotes at all but two
two vertical asymptotes, at $x = 0$ and $x = 1$

$Q31 \longrightarrow B$
$31B$ & $32A$
$Q32 \longrightarrow A$

$\longrightarrow$

a horizontal asymptote at $y = \frac{1}{2}$ and
two vertical asymptotes, at $x = 0$ and $x = 1$

$Q31 \longrightarrow C$
$31C$ & $32D$
$Q32 \longrightarrow D$

$\longrightarrow$

a horizontal asymptote at $x = 2$
but no vertical asymptotes

$Q31 \longrightarrow A$
$31A$ & $32E$
$Q32 \longrightarrow E$

$\longrightarrow$

a horizontal asymptote at $y = \frac{1}{2}$ and
two vertical asymptotes, at $x = \pm 1$

==

$33Q34$. Volume of a Tumor. A tumor is approximately spherical in shape. If the radius of the tumor changes from 14 mm to 16 mm, use the differential dV to approximate the change in volume.

[Hint: Volume V of a sphere with radius r is given by: $V = \frac{4}{3}\pi r^3$].

$Q33 \longrightarrow E$
$33E$ & $34B$
$Q34 \longrightarrow B$

$\longrightarrow$ $1792\pi\ mm^3$

$Q33 \longrightarrow D$
$33D$ & $34C$
$Q34 \longrightarrow C$

$\longrightarrow$ $1800\pi\ mm^3$

$Q33 \longrightarrow A$
$33A$ & $34E$
$Q34 \longrightarrow E$

$\longrightarrow$ $1568\pi\ mm^3$

$Q33 \longrightarrow C$		
$33C$ & $34D$	$\longrightarrow$	$2048\pi\ mm^3$
$Q34 \longrightarrow D$		

$Q33 \longrightarrow B$		
$33B$ & $34A$	$\longrightarrow$	$1352\pi\ mm^3$
$Q34 \longrightarrow A$		

==

$35Q36$. Suppose that $\dfrac{dc}{dq} = 0.08q^2 - 1.6q + 6.5$
is a marginal-cost function and fixed cost is \$ 8000. Find the the total cost c for the value of $q = 60$.

$Q35 \longrightarrow D$		
$35D$ & $36A$	$\longrightarrow$	\$ 8000
$Q36 \longrightarrow A$		

$Q35 \longrightarrow B$		
$35B$ & $36E$	$\longrightarrow$	\$ 11270
$Q36 \longrightarrow E$		

$Q35 \longrightarrow A$		
$35A$ & $36C$	$\longrightarrow$	\$ 14150
$Q36 \longrightarrow C$		

$Q35 \longrightarrow C$		
$35C$ & $36B$	$\longrightarrow$	\$ 13760
$Q36 \longrightarrow B$		

$Q35 \longrightarrow E$		
$35E$ & $36D$	$\longrightarrow$	\$ 17030
$Q36 \longrightarrow D$		

==

$37Q38$. Evaluate $\displaystyle\int \frac{4(x+1)}{x^2+2x} \ln(x^2+2x)\,dx$

$Q37 \longrightarrow C$ $37C$ & $38D$ $Q38 \longrightarrow D$	$\longrightarrow$	$\ln(x^2+2x)+C$

$Q37 \longrightarrow A$ $37A$ & $38B$ $Q38 \longrightarrow B$	$\longrightarrow$	$2\ \ln(x^2+2x)+C$

$Q37 \longrightarrow D$ $37D$ & $38E$ $Q38 \longrightarrow E$	$\longrightarrow$	$[\ln(x^2+2x)]^2+C$ $= \ln^2(x^2+2x)+C$

$Q37 \longrightarrow B$ $37B$ & $38A$ $Q38 \longrightarrow A$	$\longrightarrow$	$(x+1)\ln(x^2+2x)+C$

$Q37 \longrightarrow E$ $37E$ & $38C$ $Q38 \longrightarrow C$	$\longrightarrow$	$e^{(x^2+2x)}+C$

==

$39Q40$. Evaluate $\int 6x\,(2x+1)\,e^{(4x^3+3x^2-4)}\,dx$

$Q39 \longrightarrow C$ $39C$ & $40B$ $Q40 \longrightarrow B$	$\longrightarrow$	$(4x^3+3x^2)\,e^{(4x^3+3x^2-4)}+C$

$Q39 \longrightarrow E$ $39E$ & $40A$ $Q40 \longrightarrow A$	$\longrightarrow$	$(4x^3+3x^2)\,e^{(x^4+x^3-4x)}+C$

$Q39 \longrightarrow D$ $39D$ & $40E$ $Q40 \longrightarrow E$	$\longrightarrow$	$\ln\lvert 4x^3+3x^2-4\rvert+C$

$Q39 \longrightarrow A$ $39A$ & $40C$ $Q40 \longrightarrow C$	$\longrightarrow$	$(4x^3+3x^2)+e^{\left(4x^3+3x^2-4\right)}+C$

$Q39 \longrightarrow B$ $39B$ & $40D$ $Q40 \longrightarrow D$	$\longrightarrow$	$e^{\left(4x^3+3x^2-4\right)}+C$

==

$41Q42$. Evaluate $\displaystyle\int \frac{xe^{x^2}}{\sqrt{e^{x^2}+2}}dx$

$Q41 \longrightarrow A$ $41A$ & $42D$ $Q42 \longrightarrow D$	$\longrightarrow$	$\dfrac{1}{\sqrt{e^{x^2}+2}}+C$

$Q41 \longrightarrow E$ $41E$ & $42C$ $Q42 \longrightarrow C$	$\longrightarrow$	$\sqrt{e^{x^2}+2}+C$

$Q41 \longrightarrow B$ $41B$ & $42A$ $Q42 \longrightarrow A$	$\longrightarrow$	$x^2\sqrt{e^{x^2}+2}\,+\,C$

$Q41 \longrightarrow D$ $41D$ & $42E$ $Q42 \longrightarrow E$	$\longrightarrow$	$e^{x^2}\sqrt{e^{x^2}+1}\,+\,C$

$Q41 \longrightarrow C$ $41C$ & $42B$ $Q42 \longrightarrow B$	$\longrightarrow$	$x^2e^{x^2}\sqrt{e^{x^2}+1}\,+\,C$

==

$43Q44$. Evaluate $\int \dfrac{\ln\left(x^2e^x\right)}{x}dx$

$Q43 \longrightarrow D$ $43D$ & $44A$ $Q44 \longrightarrow A$	$\longrightarrow$	$\ln(x^2) + x + C$

$Q43 \longrightarrow E$ $43E$ & $44B$ $Q44 \longrightarrow B$	$\longrightarrow$	$\ln\lvert x\rvert + x + C$

$Q43 \longrightarrow B$ $43B$ & $44D$ $Q44 \longrightarrow D$	$\longrightarrow$	$\ln^2 x + x + C.$

$Q43 \longrightarrow A$ $43A$ & $44C$ $Q44 \longrightarrow C$	$\longrightarrow$	$\ln x^2 + \frac{x^2}{2} + C$

$Q43 \longrightarrow C$ $43C$ & $44E$ $Q44 \longrightarrow E$	$\longrightarrow$	$2\ln x + e^x + C$

==

$45Q46$. Evaluate $\int_0^1 \frac{2x(2x^2+1)}{x^4+x^2+1}dx$

$Q45 \longrightarrow E$ $45E$ & $46D$ $Q46 \longrightarrow D$	$\longrightarrow$	$\frac{\ln 3}{3} = 0.366204096$

$Q45 \longrightarrow A$ $45A$ & $46C$ $Q46 \longrightarrow C$	$\longrightarrow$	$\ln 6 = 1.791759469$

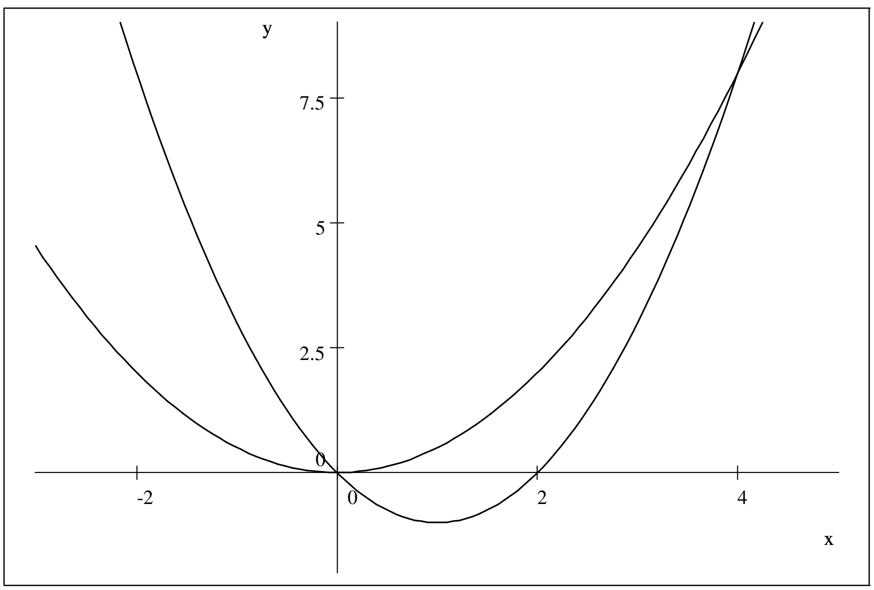
$Q45 \longrightarrow C$ $45C$ & $46E$ $Q46 \longrightarrow E$	$\longrightarrow$	$\ln 2 = 0.69314718$

$Q45 \longrightarrow B$		
$45B$ & $46A$	$\longrightarrow$	$\ln 3 = 1.098612289$
$Q46 \longrightarrow A$		

$Q45 \longrightarrow D$		
$45D$ & $46B$	$\longrightarrow$	$e^3 = 20.08553692$
$Q46 \longrightarrow B$		

==

$47Q48$. Find the area of the region bounded by the graphs of the given equations. $f(x) = \frac{1}{2}x^2$; $g(x) = x^2 - 2x$.



$Q47 \longrightarrow A$		
$47A$ & $48E$	$\longrightarrow$	$\frac{32}{3}$
$Q48 \longrightarrow E$		

$Q47 \longrightarrow D$		
$47D$ & $48B$	$\longrightarrow$	$\frac{16}{3}$
$Q48 \longrightarrow B$		

$Q47 \longrightarrow E$		
$47E$ & $48D$	$\longrightarrow$	$\frac{8}{3}$
$Q48 \longrightarrow D$		

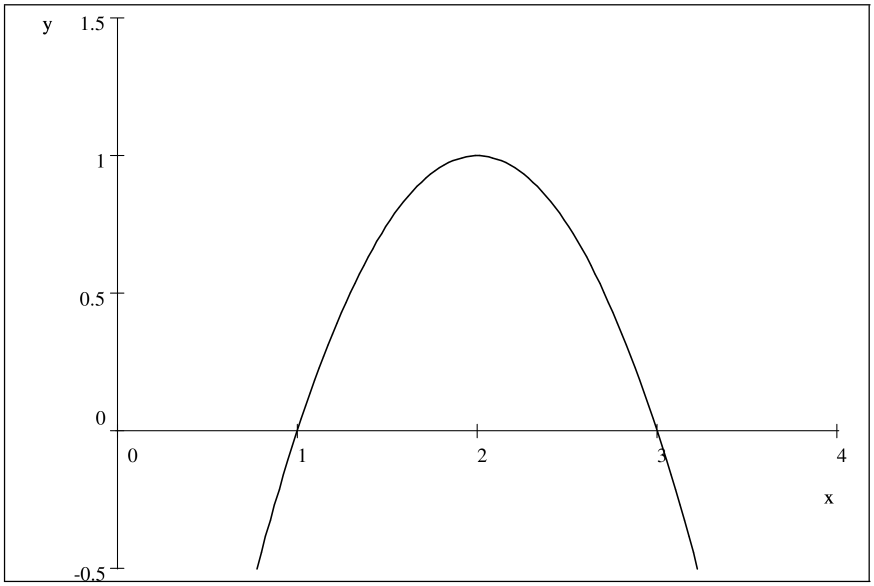
$Q47 \longrightarrow C$		
$47C$ & $48A$	$\longrightarrow$	16
$Q48 \longrightarrow A$		

$Q47 \longrightarrow B$
$47B$ & $48C$
$Q48 \longrightarrow C$

$\longrightarrow$ $\boxed{8}$

==

$49Q50$. Find the area of the region bounded by the curve $y = -\,x^2 + 4x - 3$ and the $x - axis$.



$Q49 \longrightarrow C$
$49C$ & $50E$
$Q50 \longrightarrow E$

$\longrightarrow$ $\boxed{\frac{3}{2}}$

$Q49 \longrightarrow E$
$49E$ & $50B$
$Q50 \longrightarrow B$

$\longrightarrow$ $\boxed{3}$

$Q49 \longrightarrow D$
$49D$ & $50A$
$Q50 \longrightarrow A$

$\longrightarrow$ $\boxed{2}$

$Q49 \longrightarrow B$
$49B$ & $50D$
$Q50 \longrightarrow D$

$\longrightarrow$ $\boxed{4}$

$Q49 \longrightarrow A$
$49A$ & $50C$
$Q50 \longrightarrow C$

$\longrightarrow$ $\boxed{\frac{4}{3}}$

MATH - 132- 103- EXAM - TWO. August 9, 2011. CODE: 001.

Questions	First	Second	Math-132-Exam-II-103-Answer-August-08-2011	Remark
$1Q2$	$1-C$	$2-E$	Local Maximum at $x=-\ 3$; Local Minimum at $x=-\ \frac{2}{3}$	III
$3Q4$	$3-B$	$4-E$	2302.59 $\left[P^{/}=10e^{-kA}-1\rightarrow kA=\ln 10=2.30\rightarrow A=2302.59\right]$	IV
$5Q6$	$5-B$	$6-D$	41 $\left[\frac{d\overline{C}}{dx}=-\frac{48}{x^2}+6x,\frac{d\overline{C}}{dx}=0\rightarrow x=2,\overline{C}(2)=41\right]$	V
$7Q8$	$7-C$	$8-B$	*The points* $(-1,7)$, $(0,10)$, *and* $(1,13)$ *are the INFLECTION points of the graph.*	V
$9Q10$	$9-B$	$10-C$	$a+b=6\ \ [a=-\ 3,b=9]$	I
$11Q12$	$11-E$	$12-D$	493 thousand bolts	II
$13Q14$	$13-C$	$14-A$	f is decreasing on $(-\ 7,\ -2)$ and $(-2,\ 3)$	III
$15Q16$	$15-A$	$16-C$	120 units	I
$17Q18$	$17-C$	$18-D$	Hint: $True$: $t=12$ is the only critical number.	V
$19Q20$	$19-A$	$20-B$	$405000\ m^2$. $[x=450,y=900;(450)(900)=405000\ m^2]$	V
$21Q22$	$21-E$	$22-D$	$-\frac{1}{56}(7x^2+3)^{-4}+C$	II
$23Q24$	$23-A$	$24-C$	\$ 720 $(P(6)=72)$	II
$25Q26$	$25-E$	$26-C$	$\frac{16}{15}$	IV
$27Q28$	$27-C$	$28-E$	$y=2x^3-2x^2+17x-11$	IV
$29Q30$	$29-D$	$30-E$	$152\ln 10=350$	III
$31Q32$	$31-B$	$32-A$	a horizontal asymptote at $y=\frac{1}{2}$ *and* two vertical asymptotes, *at* $x=0$ *and* $x=1$	III
$33Q34$	$33-A$	$34-E$	$1568\pi\ mm^3$. $(V=\frac{4}{3}\pi r^3,\ dV=4\pi r^2=1568\pi\ mm^3)$	III
$35Q36$	$35-B$	$36-E$	\$ 11270 $\left[c=\frac{0.08}{3}q^3-0.8q^2+6.5q+800;q=60\rightarrow c=11270\right]$	II
$37Q38$	$37-D$	$38-E$	$[\ln(x^2+2x)]^2+C=\ln^2(x^2+2x)+C$	III
$39Q40$	$39-B$	$40-D$	$e^{4x^3+3x^2-4}+C$	V
$41Q42$	$41-E$	$42-C$	$\sqrt{e^{x^2}+2}+C$	II
$43Q44$	$43-B$	$44-D$	$\ln^2 x+x+C$	III
$45Q46$	$45-B$	$46-A$	$\ln 3=1.098612289$	IV
$47Q48$	$47-D$	$48-B$	$\frac{16}{3}$	II
$49Q50$	$49-A$	$50-C$	$\frac{4}{3}\left[\int_1^3(-x^2+4x-3)\,dx=\left[-\frac{1}{3}x^3+2x^2-3x\right]=\frac{4}{3}\right]$	V