SAMPLE MIDTERM 1
MAT 122 Fall 2003
Midterm 1 is 8:30-10:00pm,
Tuesday 10/14/03
Exam locations given
in table on right

room	sections
Javits 111	R1
Harriman 112	R2
Harriman 116	R3
Physics P-113	ELC2

1. Place the letter corresponding to the correct answer in the box next to each question. Each question is worth 1 point.

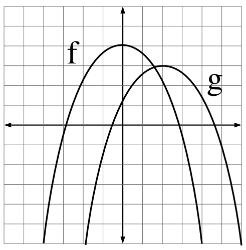
(i) Suppose $a < 0$ and $b > 0$. Then which of the following must be true? **(a)** $ab > 0$ **(b)** $a - b > 0$ **(c)** $b - a > 0$ **(d)** $b^2 - a^2 > 0$ **(e)** $a^2 + b^2 < 0$ **(f)** none of these.

(ii) The natural domain of $f(x) = \frac{\sqrt{x-5}}{x}$ is **(a)** all real numbers **(b)** $x > 0$ **c)** $x < -5$ **(d)** $-5 \leq x < 0$ or $0 < x$ **(e)** $x > 5$ **(f)** none of these.

(iii) Suppose f is a linear function such that $f(1) = -1$ and $f(3) = 2$. Then $f(4) =$? **(a)** 3 **(b)** $3\frac{1}{3}$ **(c)** $3\frac{2}{3}$ **(d)** $3\frac{1}{2}$ **(e)** $3\frac{3}{4}$ **(f)** none of these.

(iv) Suppose S is inversely proportional to r and θ. Then **(a)** $S = k/(r\theta)$ **(b)** $S = kr^2\theta^2$ **(c)** $S = kr^2/\theta^2$ **(d)** $S = kr\theta$ **(e)** $S = kr^2\theta$ **(f)** none of these.

(v) What is the relationship between f and g in the graph below?
(a) $g(x) = f(x-1) + 2$ **(b)** $g(x) = f(x-2) - 1$ **(c)** $g(x) = f(x+2) - 1$ **(d)** $g(x) = f(x+1) - 2$ **(e)** $g(x) = f(x-2) + 1$ **(f)** none of these.

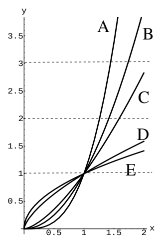


(vi) Which function in the following table represents an exponential function?
(a) f **(b)** g **(c)** h **(d)** j **(e)** k **(f)** none of these.

x	1	2	3	4	5
f(x)	10	20	30	40	50
g(x)	16	24	36	54	81
h(x)	10	15	25	40	60
j(x)	2	4	8	14	26
k(x)	2	12	36	72	108

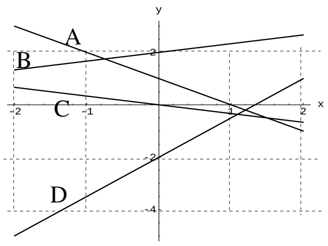
2. Each formula below corresponds to one of the graphs on the right. Put the letter of the graph in the box next to the corresponding formula.

x^2 x^3 $x^{1/2}$ $x^{3/2}$ $x^{1/3}$



3. Each line on the right corresponds to one of the formulas on the left. Put the letter of the graph in the box next to the corresponding formula. Two boxes should be left blank.

$y = \frac{3}{4}x - 2$	$y = -\frac{1}{3}x$	$y = 2 + \frac{1}{3}x$
$y = x - 1$	$y = \frac{1}{2} - \frac{1}{2}x$	$y = -\frac{1}{3}x - 1$

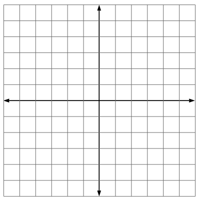
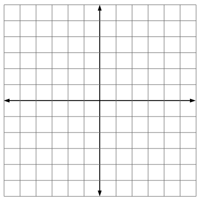
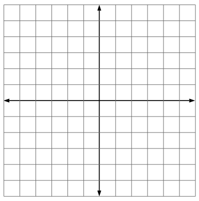


4. Sketch

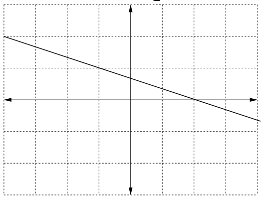
(i) $y = \frac{1}{3}x - 2$

(ii) $y = -x^2 + 4$

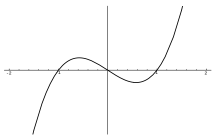
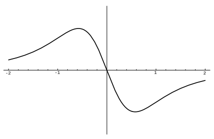
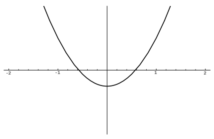
(iii) $y = \sqrt{6 - x}$

5. Find the equation of the linear function graphed below.

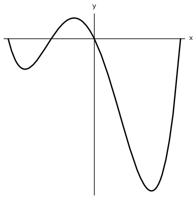


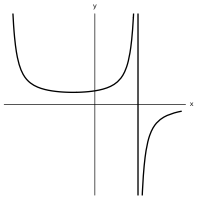
6. Sketch the derivative function for each of the following functions.

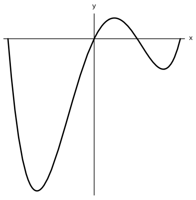




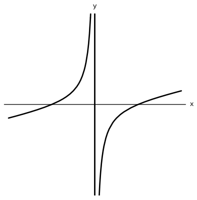
7. Each of the following polynomials and rational functions is graphed below. Match the formulas to the correct graphs (shown on $-2 \leq x \leq 2$).

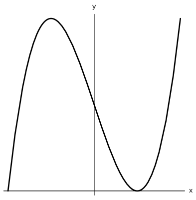
$x(x-1)(x^2-4)$	$(x-1)^2(x-2)$	$\frac{x^2-1}{x^2} + 5$	$\frac{x^2-1}{x}$

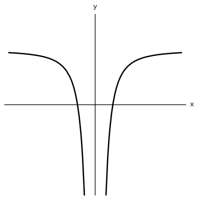
A 

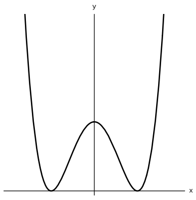
B 

C 

D 

E 

F 

G 

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