SAMPLE MIDTERM 1
MAT 122 Fall 2004
Midterm 1 is 8:30-10:00pm,
Wednesay 9/29/04

room	sections
Lib. Alliance	R1, ELC2
Lt. Engin.	R2,R3

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

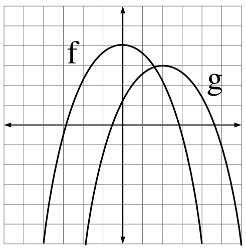
   (i) Suppose $a < 0$ and $b > 0$. Then which of the following must be true? **(a)** $ab > 0$ **(b)** $a - b > 0$ **(c)** $b - a > 0$ **(d)** $b^2 - a^2 > 0$ **(e)** $a^2 + b^2 < 0$ **(f)** none of these.

   (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.

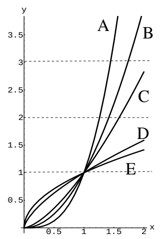


   (vi) Which function in the following table represents an exponential function?
   (a) f **(b)** g **(c)** h **(d)** j **(e)** k **(f)** none of these.

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.

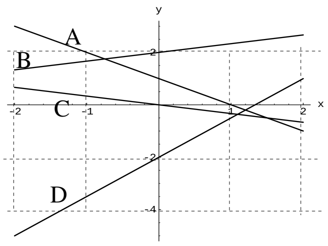
   x^2 x^3 $x^{1/2}$ $x^{3/2}$ $x^{1/3}$



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.

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

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

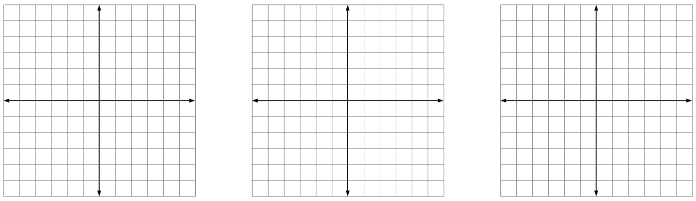


4. Sketch

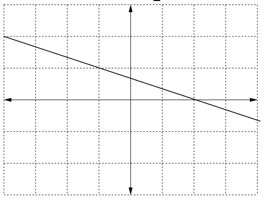
   (i) $y = \frac{1}{3}x - 2$

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

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



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



6. You need 10,000 dollars in your account 3 years from now and the interest rate is 8 percent a year, compounded continuously. How much should you deposit now?

7. If the size of a bacteria colony doubles in five hours, how long will it take to triple in size?

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

$\square$ $x(x-1)(x^2-4)$ $\square$ $(x-1)^2(x-2)$ $\square$ $(x^2-1)^2$