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MATH 126 TEST 1 SAMPLE

NOTE: The actual exam will only have 13 questions. The different parts of each question (part A, B, etc.) are variations. Know how to do all the variations on this exam.

1A.) (6 pts) Given: A = (–4, 3) and B = (8, –2), find the following:

i.) The distance from A to B. i._____

ii.) The midpoint of a line segment containing A and B. ii._____

iii.) The slope of a line passing through A and B. iii._____

1B.) (6 pts) Given: A = (4, –3) and B = (6, 4), find the following:

i.) The distance from A to B. i._____

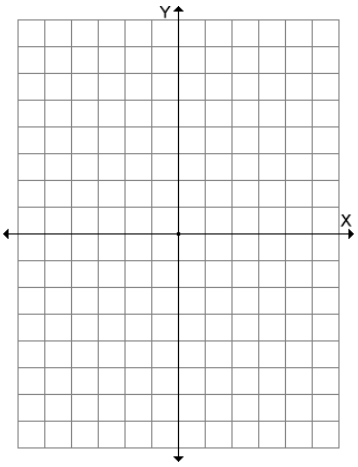
ii.) The midpoint of a line segment containing A and B. ii._____

iii.) The slope of a line passing through A and B. iii._____

2A.) (5 pts) Identify the center and radius: $x^2 + y^2 + 4x + 2y - 11 = 0$
Then graph.

Center:_____

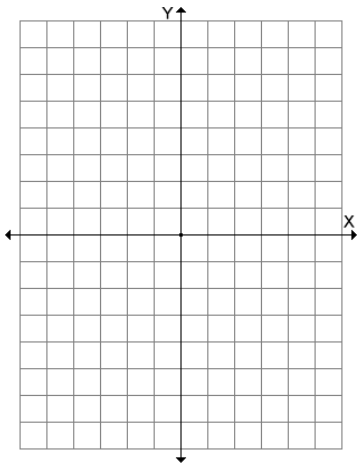
Radius:_____



2B.) (5 pts) Identify the center and radius: $x^2 + y^2 - x + 2y - \frac{11}{4} = 0$
Then graph.

Center:_____

Radius:_____



3A.) (3 pts) Find the domain: $f(x) = \dfrac{|x-4|}{\sqrt{7x-3}}$

Write your answer in interval notation.

3A._____

3B.) (3 pts) Find the domain: $f(x) = \dfrac{\sqrt{3-4x}}{30}$

Write your answer in interval notation.

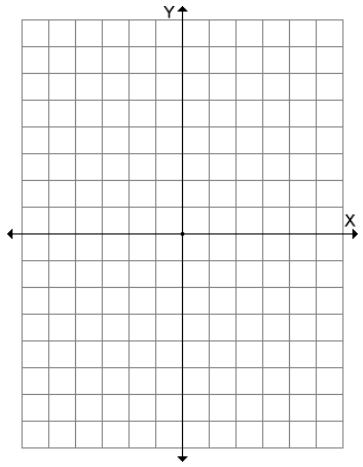
3B._____

3C.) (3 pts) Find the domain: $f(x) = \dfrac{5x}{x^2 - 5x + 6}$

Write your answer in interval notation.

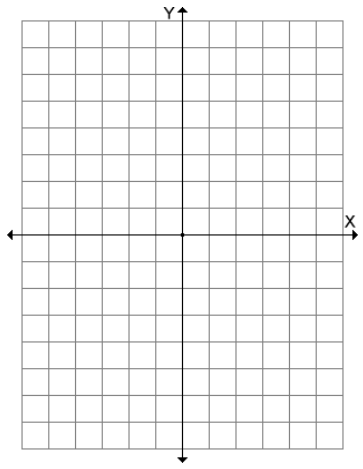
3C._____

4A.) (4 pts) Find the equation, in slope-intercept form, of a line that is perpendicular to the line $5x + 4y + 8 = 0$ and passes through $(-5, 4)$. Graph your equation.



Equation:_____

4B.) (4 pts) Find the equation, in slope-intercept form, of a line that is parallel to the line $2x + y + 4 = 0$ and passes through $(-1, -2)$. Graph your equation.



Equation:_____

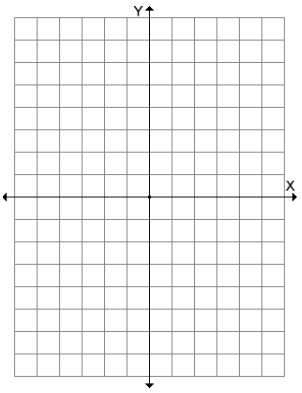
5A.) (4 pts) A company plans to manufacture a certain product with fixed costs of $50000. It will cost $140 to manufacture each unit, and each will be sold for $300. Write a function that describes the profit, P, in terms of units sold x.

5A._____

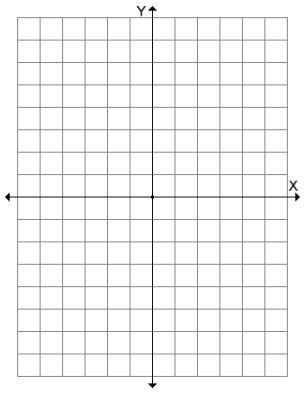
5B.) (4 pts) Suppose that a company purchases a new car for $28000. After 3 years, the car is worth $16000. Write a linear function that expressed the value, V, of the car as a function of its age, t.

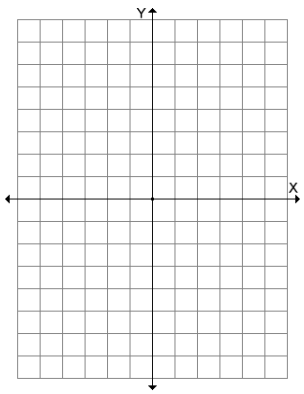
5B._____

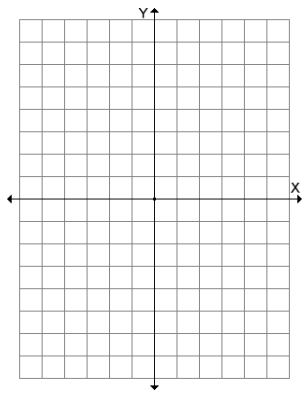
6A.) (5 pts) Graph using transformations: $y = -|x+1|+3$. Start with the base graph (library function) and then graph each successive transformation. The final graph will be your graph of $y = -|x+1|+3$.



Base Graph

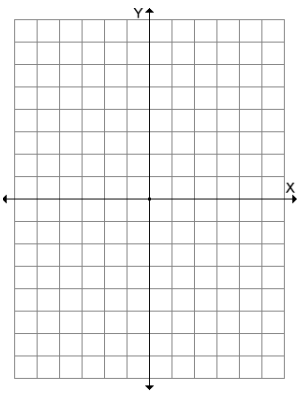




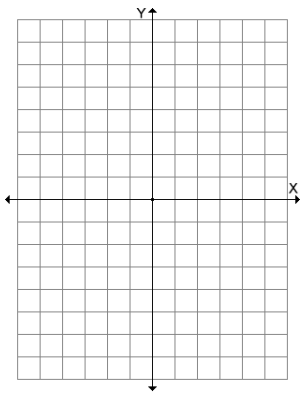


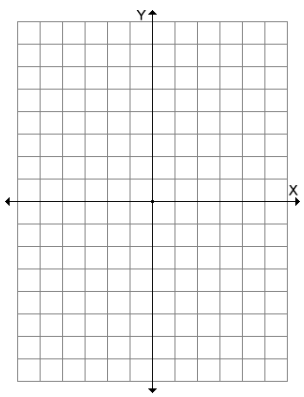
Final Graph

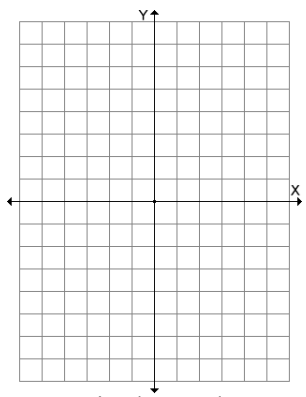
6B.) (5pts) Graph using transformations: $y = \sqrt{1-x}-2$. Start with the base graph (library function) and then graph each successive transformation. The final graph will be your graph of $y = \sqrt{1-x}-2$.



Base Graph







Final Graph

7A.) (5 pts) Indicate what kind of symmetry (*x*-axis, *y*-axis, origin) this graph has: $y = \dfrac{9-x^2}{3x}$. Also find its *x* and *y* intercepts.

Sym:_____

x-int:_____

y-int:_____

7B.) (5 pts) Indicate what kind of symmetry (*x*-axis, *y*-axis, origin) this graph has: $x^2 - y = 4$. Also find its *x* and *y* intercepts.

Sym:_____

x-int:_____

y-int:_____

8A. (4 pts) Determine algebraically whether $f(x) = \dfrac{-x^3}{3x^2 - 9}$ is even, odd, or neither.

8A._____

8B. (4 pts) Determine algebraically whether $f(x) = \sqrt[3]{2x^2 - 3}$ is even, odd, or neither.

8A._____

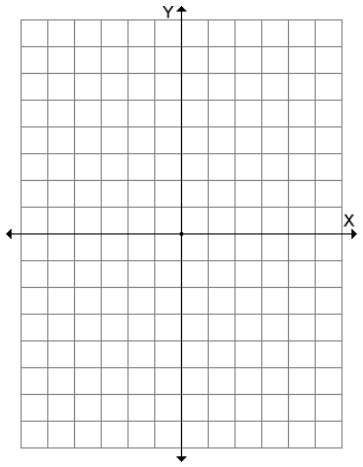
9A.) (4 pts) Find the difference quotient for $f(x) = 3x - 2x^2$ by using $\frac{f(x+h) - f(x)}{h}$.

9A._____

9B.) (4 pts) Find the difference quotient for $f(x) = \frac{x}{3} - 4$ by using $\frac{f(x+h) - f(x)}{h}$.

9B._____

10A.) (6 pts) Given $f(x) = \begin{cases} 3+x & if \quad -3 \le x < 0 \\ 3 & if \quad x = 0 \\ \sqrt{x} & if \quad x > 0 \end{cases}$ find the following and graph.



a.) $f(0)$:_____

b.) $f\left(-\frac{3}{2}\right)$:_____

c.) $f(9)$:_____

d.) $f(-4)$:_____

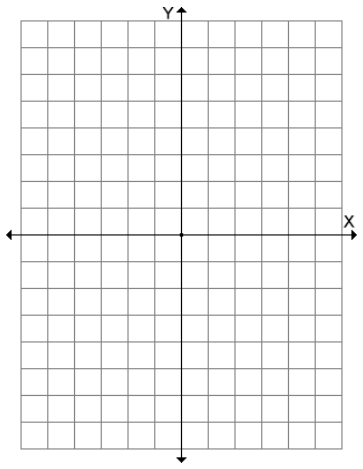
10B.) (6 pts) Given $f(x)=\begin{cases}1+x & \text{if } x<0\\ x^2 & \text{if } x\geq 0\end{cases}$ find the following and graph.

a.) $f(0)$:_____

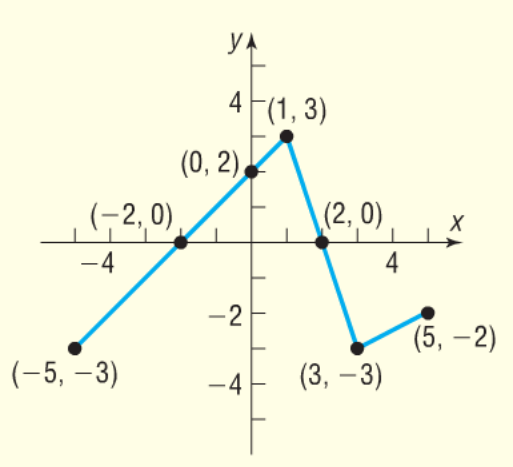
b.) $f(-3)$:_____

c.) $f\left(\frac{2}{3}\right)$:_____

d.) $f\left(-\frac{1}{2}\right)$:_____



11A.) (4 pts) Use the graph of $f(x)$ below to answer the questions.



a.) Find $f(5)$ 11a._____

b.) Find all values of x such that $f(x)=-3$. 11b._____

c.) Find the domain. 11c._____

d.) Find the range. 11d._____

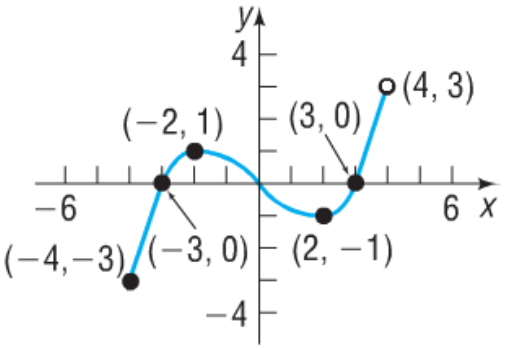
e.) Interval(s) of decreasing 11e._____

f.) List the number at which the graph has relative max. 11f._____

g.) What is the value of the relative minimum? 11g._____

h.) How many times does the line y = –5/2 intersect *f*? 11h._____

11B.) (4 pts) Use the graph of $f(x)$ below to answer the questions.



a.) Find $f(-4)$ 11a._____

b.) Find all values of x such that $f(x) = 0$. 11b._____

c.) Find the domain. 11c._____

d.) Find the range. 11d._____

e.) Interval(s) of increasing 11e._____

f.) List the number at which the graph has relative min. 11f._____

g.) What is the value of the relative maximum? 11g._____

h.) How many times does the line y = –1/2 intersect *f*? 11h._____

12A.) (6 pts) Let $f(x) = \dfrac{1}{2x-3}$ and $g(x) = \dfrac{x+3}{2}$

i.) Find $(f \circ g)(0)$ if possible. i._____

ii.) Find $(g \circ f)(x)$. Write as a single fraction. ii._____

iii.) Find $(f \circ g)(x)$. Simplify. iii._____

12B.) (6 pts) Let $f(x) = x + 3$ and $g(x) = x^2 - 4$

i.) Find $(f \circ g)(1)$ if possible. i._____

ii.) Find $(g \circ f)(x)$. Factor your answer. ii._____

iii.) Find $(f \circ g)(x)$. Factor your answer. iii._____

13A.) (4 pts) Find $f^{-1}(x)$ if $f(x) = \sqrt[5]{3x+5}$. You do NOT need to do a check to verify your answer. 13A._____

13B.) (4 pts) Find $f^{-1}(x)$ if $f(x) = \dfrac{x-2}{2x+3}$. You do NOT need to do a check to verify your answer. 13B._____