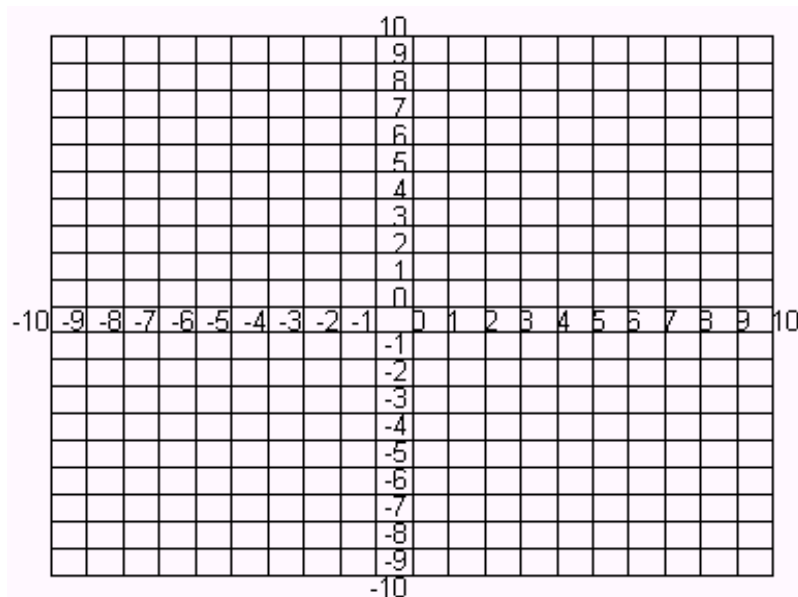


Name _____ points of 145 _____ %

Write answers and show all work on these sheets. Since partial credit will be given, show sufficient detail.
The number of points for each question is shown in parentheses after the number of the question.

1. (5) In the graph below, sketch the set of all points (x,y) for which $xy < 0$.



2. (8) Show that $A(-4,-1)$, $B(0,-2)$, $C(6,1)$, $D(2,2)$ are vertices of a parallelogram.
3. (6) Find the center and radius of the circle $x^2 + y^2 + 8x - 10y + 37 = 0$.
4. (10) Find the equation of the circle whose center is $C(4,-1)$ that is tangent to the x -axis.
5. (10) Determine whether or not $P(3,8)$ is within, outside, or on the circle whose center is $C(-2,-4)$ and whose radius is $r = 13$.

6. (6) For the line $3x + 2y = 7$, find
slope =

x-intercept =

y-intercept =

7. (5) Find the equation of the line through A(7,-3) that is perpendicular to the line of #6.

8. (8) Find the equation of the perpendicular bisector of the segment joining A(4,2) and B(-2,10).

9. (5) Find the domain of $f(x) = \frac{1}{(x-3)\sqrt{x+3}}$.

10. (4) Identify as odd, even, or neither, and describe the graphical meaning of the symmetry (if any): $f(x) = \frac{1}{2}x^3 + x$.

11. (15) A steel storage tank is to be constructed in the shape of a right circular cylinder of altitude 10 feet with a hemisphere attached to each end. The radius r is yet to be determined. Express the volume V (in ft^3) of the tank as a function of r (in ft).



12. (15) Obtain the graph of $f(x) = -\frac{1}{2}\sqrt{x-2} + 3$ from a basic shape by a sequence of transformations.

13. (8) A doorway has the shape of a parabolic arch and is 9 feet high at the center and 6 feet wide at the base. If a rectangular box 8 feet high must fit through the doorway, what is the maximum width the box can have?

14. (10) (a.) Show that $f(x) = \frac{1}{x+3}$ is one-to-one.

(b.) Find the inverse f^{-1} of f .

15. (10) Coulomb's law in electrical theory states that the force F of attraction between two oppositely charged particles varies directly as the product of the magnitudes Q_1 and Q_2 of the charges and inversely as the square of the distance d between the particles.

(a.) (4) Find a formula for F in terms of Q_1 , Q_2 , d , and a constant of variation k .

(b.) (6) What is the effect of reducing the distance d by a factor of $\frac{1}{4}$ while increasing Q_1 by a factor of 3?

16. (20) Sections of cylindrical tubing are to be made from thin rectangular sheets that have an area of 200 in^2 (see the figure). Is it possible to construct a tube that has a volume of 200 in^3 ? If so, find r and h .

