

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.  
TURN IN ALL WORKSHEETS. CALCULATORS ARE REQUIRED ON THIS TEST.

1. Given the points (4, -3) and (-2, -7), find:

a) midpoint

b) slope

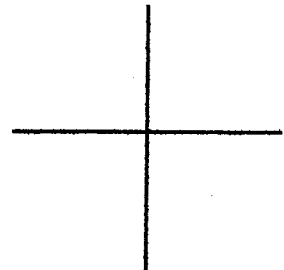
c) distance

2. Find the equation (in

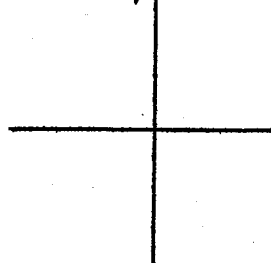
$y = mx + b$  form) of the perpendicular bisector of (4, -3) and (-2, -7).

[Hint: use results of #1.]

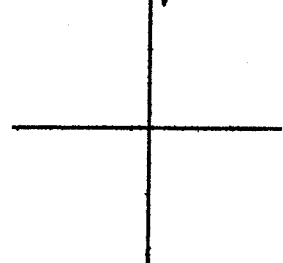
3. Sketch the graphs of a)  $Y = \sqrt[3]{X}$



b)  $Y = \sqrt[3]{X+3}$

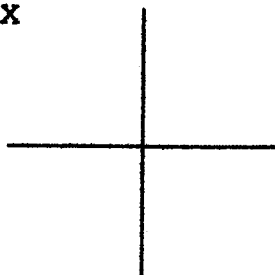


c)  $Y = -\sqrt[3]{X} - 4$

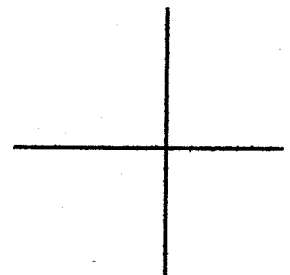


In 4 - 5, use the graphing calculator or completing the square method to find the vertex and sketch the graph. (Outline calculator steps!)

4.  $Y = -2X^2 - 8X$

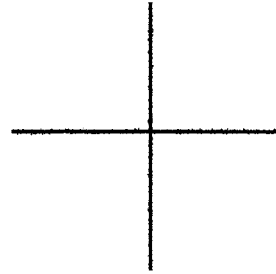


5.  $X = Y^2 + 8Y - 5$



6. Find the center and radius by completing the square. Sketch.

$$X^2 + Y^2 - 6X + 8Y + 21 = 0$$



7. Let  $f(X) = \frac{4X + 2}{X - 4}$

a)  $f(4) =$

b)  $f(-4) =$

c)  $f(3X-7) =$

8. Let  $f(X) = \frac{X}{X - 5}$  and  $g(X) = 3X + 5$

a) find  $f[g(X)]$  and simplify.

b) find  $g[f(X)]$  and simplify.

9. Find the domain (give interval notation when appropriate).  
Use graphing calculator for c).

a)  $Y = \frac{X - 2}{X^2 - 2X - 8}$     b)  $Y = \frac{X - 3}{\sqrt{2 - X}}$     c)  $Y = \sqrt{X^2 - 3X}$     d)  $Y = X^2 - 25$

10. Given  $XY - 4Y = 6$

a) Domain:

b) Range:

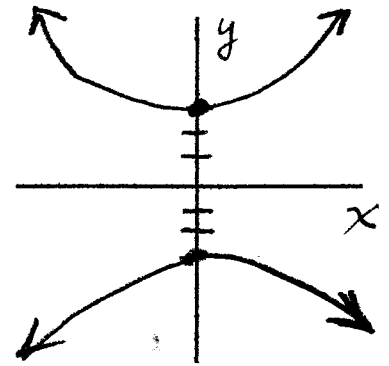
c) Function?

11. Given:

a) Domain:

b) Range:

c) Function?



12. Let  $f(X) = 2X + 4$  and  $g(X) = X^2 - 4X - 4$

a)  $(f + g)(3) =$

b)  $(f - g)(3) =$

c)  $(f \cdot g)(3) =$

d)  $(f/g)(3) =$

e)  $(f \circ g)(3) =$

f)  $(g \circ f)(3) =$

13. Given  $f(X) = \frac{X + 2}{X}$ , find  $f^{-1}(X)$ .

14. Find the equation of a circle whose center is at  $(-2, 6)$  that passes through  $(4, 2)$ .

# COLLEGE ALGEBRA EXAM 2 HG Solutions.

1.  $(4, -3)$   $(-2, -7)$

a) midpoint  $\left(\frac{4+(-2)}{2}, \frac{(-3)+(-7)}{2}\right)$   
 $(1, -5)$

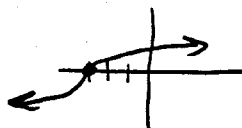
b)  $m = \frac{y_2 - y_1}{x_2 - x_1}$   
 $= \frac{-7 - (-3)}{-2 - 4}$   
 $= \frac{-4}{-6} = \frac{2}{3}$

c)  $d = \sqrt{6^2 + 4^2}$   
 $= \sqrt{36 + 16}$   
 $= \sqrt{52}$   
 $= 2\sqrt{13}$

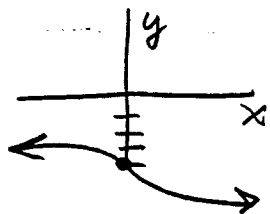
2.  $y = mx + b$   
 $m_{\perp} = -\frac{3}{2}$   $(1, -5)$   
 $2(-5) = 1(-\frac{3}{2}) + b$   
 $-10 = -\frac{3}{2} + b$   
 $-7 = b$   
 $y = -\frac{3}{2}x - \frac{7}{2}$

3a)  $y = \sqrt{x}$

b)  $y = \sqrt{x+3}$



c)  $y = -\sqrt{x} - 4$



4.  $y = -2x^2 - 8x$  Parabola, Opens Down.

$y - 8 = -2(x^2 + 4x + 4)$

$y - 8 = -2(x + 2)^2$

$V(-2, 8)$

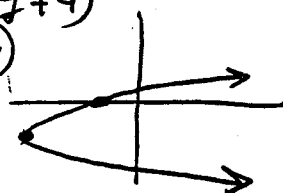


5.  $x = y^2 + 8y - 5$  Opens Right.

$\frac{x+16}{+5} = \frac{y^2 + 8y + 16}{+5} - 5$

$x + 21 = (y + 4)^2$

$V(-21, -4)$

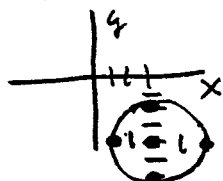


6.  $x^2 + y^2 - 6x + 8y + 21 = 0$

$x^2 - 6x + 9 + y^2 + 8y + 16 = -21 + 9 + 16$

$(x-3)^2 + (y+4)^2 = 4$

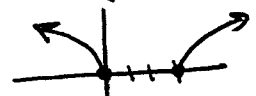
Circle center  $(3, -4)$   $r = 2$



9a)  $y = \frac{x-2}{(x-4)(x+2)}$

D:  $x \neq 4, -2$

c)  $y = \sqrt{x^2 - 3x}$



D:  $(-\infty, 0] \cup [3, \infty)$

b)  $y = \frac{x-3}{\sqrt{2-x}}$

D:  $2-x > 0$   
 $-x > -2$   
 $x < 2$

$(-\infty, 2)$

d)  $y = x^2 + 25$   
 No Restrictions.

All Reals  $(-\infty, \infty)$

7.  $f(x) = \frac{4x+2}{x-4}$

a)  $f(4) = \frac{4 \cdot 4 + 2}{4 - 4}$   
 Undefined

b)  $f(-4) = \frac{-16+2}{-4-4}$   
 $= \frac{-14}{-8} = \frac{7}{4}$

c)  $f(3x-7) = \frac{4(3x-7)+2}{3x-7-4}$   
 $= \frac{12x-26}{3x-11}$

8.  $f(x) = \frac{x}{x-5}$   $g(x) = 3x+5$

a)  $f[g(x)] = \frac{3x+5}{3x+5-5}$   
 $= \frac{3x+5}{3x}$

b)  $g[f(x)] = 3\left(\frac{x}{x-5}\right) + 5$   
 $= \frac{3x+5(x-5)}{x-5}$   
 $= \frac{8x-25}{x-5}$

10.  $xy - 4y = 6$

D: Solve for y  
 $y(x-4) = 6$   
 $y = \frac{6}{x-4}$

D: all  $x \neq 4$   
 F? Yes

R: Solve for x  
 $xy = 4y + 6$   
 $x = \frac{4y+6}{y}$

R: all  $y \neq 0$

11.  $(-\infty, \infty)$

6)  $(-\infty, -3] \cup [3, \infty)$

12.  $f(x) = 2x+4$   $g(x) = x^2 - 4x - 4$   
 $f(3) = 2(3)+4 = 10$   $g(3) = 3^2 - 4 \cdot 3 - 4 = -7$

a)  $(f+g)(3) = 10 + (-7) = 3$

b)  $(f-g)(3) = 10 - (-7) = 17$

c)  $(fg)(3) = 10 \cdot (-7) = -70$

d)  $(f/g)(3) = \frac{10}{-7}$

Eg. of Circle  $(x+2)^2 + (y-6)^2 = 52$

12e)  $(f \circ g)(3) = f[g(3)] = f[-7] = 2(-7)+4 = -10$

12f)  $(g \circ f)(3) = g[f(3)] = g[10] = 10^2 - 4 \cdot 10 - 4 = 56$

13.  $y = f(x)$   
 $y = \frac{x+2}{x}$   
 $x = \frac{y+2}{y}$

$xy = y+2$   
 $xy - y = 2$   
 $y(x-1) = 2$   
 $y = \frac{2}{x-1} = f(x)$

c) Not a function

14.  $r = \sqrt{6^2 + (-4)^2} = \sqrt{36+16} = \sqrt{52} = 2\sqrt{13}$