COLLEGE ALGEBRA EXAM 2 IG R^2 NAME _____

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.

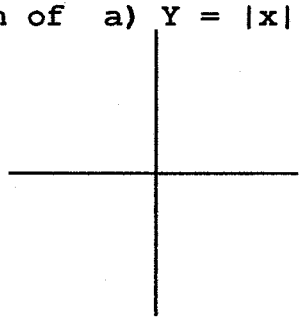
TURN IN ALL WORKSHEETS. CALCULATORS ARE REQUIRED ON THIS TEST.

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

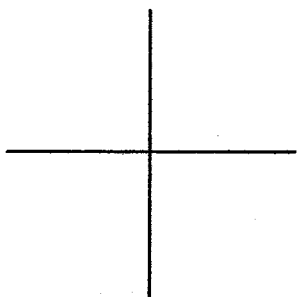
   a) slope b) distance c) midpoint

2. Find the equation (in slope intercept form) of the perpendicular bisector of (-4, 3) and (2, -7). [Hint: use results of #1.]

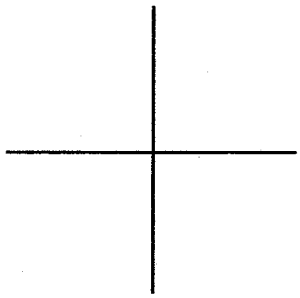
3. Sketch the graph of a) $Y = |x|$



b) $Y = |X-2| + 3$

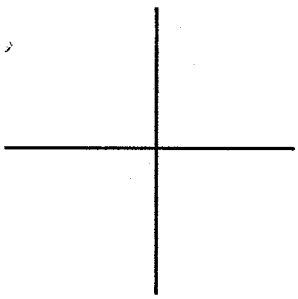


c) $Y = -|X+2|$



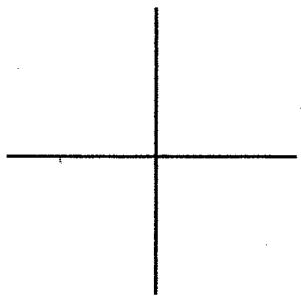
4. Find the vertex by graphing calculator methods or completing the square. Sketch the graph.

   $Y = 2X^2 - 12X + 2$



5. Find the vertex by completing the square. Sketch the graph.

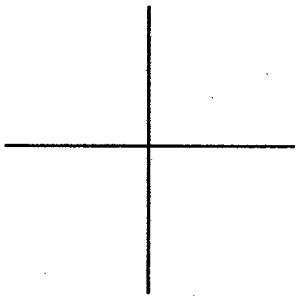
   $X = -2Y^2 - 8Y$



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

$X^2 + Y^2 - 6X + 18Y + 74 = 0$

7. Find the equation of the circle with center at (3, -4) and of radius 9.



8. Let $f(x) = \frac{4x - 2}{4 - x}$

a) f(4) =

b) f(-4) =

c) f(7-3x) =

d) f(2x-4)

9. Let $f(x) = X^2 - 2x + 5$ and $g(x) = \frac{x + 3}{2x}$

a) find f[g(X)] b) find g[f(X)]

10. Find the domain (give interval notation when appropriate):

a) $y = \frac{x - 2}{\sqrt{9 - x}}$ b) $y = x^2 + 4$ c) $y = \frac{x - 3}{x^2 - 2x - 15}$ d) $y = \sqrt{x - 12}$

11. Given $xy + 4x = 6$

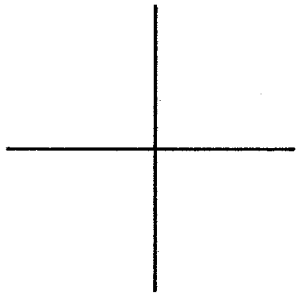
a) Domain:

b) Range:

c) Function?

12. Use the graphing calculator:

$y = -\sqrt{x^2 + 3x}$ (Draw graph!)



a) Domain:

b) Range:

c) Function?

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

14. Given $f(x) = \frac{x^3 - 5}{8}$

find $f^{-1}(x)$.

15. $f(x) = \begin{cases} x^2 + 4 & \text{if } x \leq -2 \\ -3x & \text{if } -2 < x \leq 2 \\ -6 & \text{if } x > 2 \end{cases}$

a) $f(4)$

b) $f(-1) =$

c) $f(2)$

d) $f(-2) =$

COLLEGE ALG EXAM 2 IG Solutions

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

a) $m = \frac{-7-3}{2+4} = \frac{-10}{6} = \frac{-5}{3}$

b) $d = \sqrt{6^2+10^2} = \sqrt{136} = 2\sqrt{34}$ or 11.66

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

$(-4,3)$ $(2,-7)$ Midpt

2. $m = -5/3$ $m_\perp = 3/5$ $(-1,-2$

$y = mx+b$

$5(-2) = \frac{3}{5}(-1) + b$.

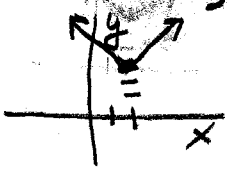
$-10 = -3 + 5b$.

$-7 = 5b$. $y = mx+b$

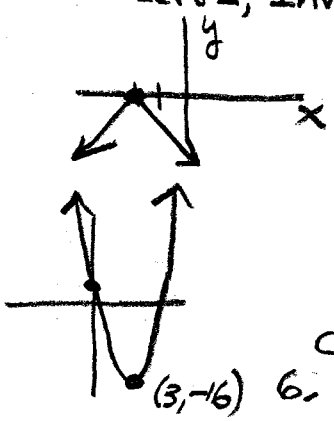
$b = -7/5$ $y = \frac{3}{5}x - \frac{7}{5}$

3a) $y = \text{abs}\, x$

b) $y = \text{abs}(x-2)+3$ Right 2, up 3



c) $y = -\text{abs}(x+2)$ Left 2, Invert



Parabola

4. $y = 2x^2 - 12x + 2$ opens up.

$y \_\_\_ = 2(x^2 - 6x \_\_\_) + 2$

$\frac{y+18}{-2} = \frac{2(x^2-6x+9)}{-2} + \frac{2}{-2}$

$y + 16 = 2(x-3)^2$

$y = -16$ $x = 3$ $V(3,-16)$

TI 85: MORE, MATH, MORE, FMIN

TI 86: MORE, MATH, FMIN

Parabola

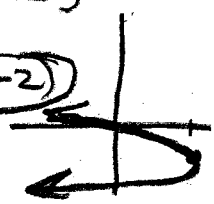
5. $x = -2y^2 - 8y$ opens Left

$x \_\_ = -2(y^2 + 4y + \_\_)$

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

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

$x = 8$ $y = -2$ $V(8,-2)$



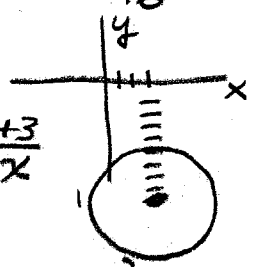
CIRCLE

6. $x^2 - 6x + \_\_ + y^2 + 18y + \_\_ = -74$

$x^2 - 6x + 9 + y^2 + 18y + 81 = -74 + 9 + 81$

$(x-3)^2 + (y+9)^2 = 16$

$C(3,-9)$ $r = 4$



7. $C(3,-4)$ $r = 9$ $(x-3)^2 + (y+4)^2 = 81$

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

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

b) $f(-4) = \frac{4(-4)-2}{4-(-4)} = \frac{-18}{8} = -\frac{9}{4}$

c) $f(7-3x) = \frac{4(7-3x)-2}{4-(7-3x)} = \frac{26-12x}{3x-3}$ or $\frac{2(13-6x)}{3(x-1)}$

d) $f(2x-4) = \frac{4(2x-4)-2}{4-(2x-4)} = \frac{8x-18}{8-2x} = \frac{2(4x-9)}{2(4-x)}$

9. $f(x) = x^2 - 2x + 5$ $g(x) = \frac{x+3}{2x}$

a) $f[g(x)] = \left(\frac{x+3}{2x}\right)^2 - 2\left(\frac{x+3}{2x}\right) + 5$

$= \frac{x^2+6x+9}{4x^2} - \frac{2x_2(x+3)}{2x\ 2x} + \frac{5\cdot 4x^2}{1\cdot 4x^2}$

$= \frac{x^2+6x+9-4x^2-12x+20x^2}{4x^2}$

$= \frac{17x^2-6x+9}{4x^2}$

b) $g[f(x)] = \frac{(x^2-2x+5)+3}{2(x^2-2x+5)} = \frac{x^2-2x+8}{2(x^2-2x+5)}$

10a) $y = \frac{x-2}{\sqrt{9-x}}$

$9 - x > 0$

$-x > -9$

$x < 9$

$(-\infty, 9)$

b) $y = x^3 + 4$ $(-\infty, \infty)$

c) $y = \frac{x-3}{(x-5)(x+2)}$ all $x \neq 5, -3$

d) $y = \sqrt{x-12}$

$x - 12 \geq 0$

$x \geq 12$

$[12, \infty)$

11. $xy + 4x = 6$

$xy = 6 - 4x$

$y = \frac{6-4x}{x}$

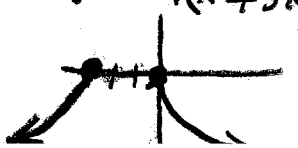
$x(y+4) = 6$

$x = \frac{6}{y+4}$

D: $x \neq 0$ F? Yes

R: $y \neq -4$

12. $y = -\sqrt{(x^2+3x)}$



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

b) $R = (-\infty, 0]$

c) [illegible]

13. $f(x) = 2x - 4$ $g(x) = x^2 - 4x - 4$

$f(3) = 6 - 4 = 2$ $g(3) = 9 - 12 - 4 = -7$

a) $2 + (-7) = -5$ b) $2 - (-7) = 9$

c) $2 \cdot -7 = -14$ d) $\frac{2}{-7}$

e) $f[g(3)] = 2(-7) - 4 = -18$ f) $g[f(3)] = 2^2 - 4(2) - 4$

14. $y = \frac{x^3 - 5}{8}$

$y = f(x)$

$x = \frac{y^3 - 5}{8}$ $y = f^{-1}$

$8x = y^3 - 5$

$8x + 5 = y^3$

$y = \sqrt[3]{8x+5}$