East Los Angeles College
Department of Mathematics
Math 125
Test 3

Solutions

Solve the following Radical Equations for x.

1. $2\sqrt{x-5}-8=-4$
2. $\sqrt[3]{x}+9=6$
3. $\sqrt{3x+5}=\sqrt{x-9}$
4. $\sqrt{x+7}=x-5$

Let $y=x^2-6x+4$

5. Complete the square and write in the graphing form of $y=a(x-h)^2+k$
6. Determine the vertex.
7. Opens up or opens down.
8. Determine the axis of symmetry.
9. Determine the x-intercepts, if any.
10. Determine the y-intercept.
11. Sketch the parabola on the graph portion of the answer sheet.

Let $x^2+y^2+2x-6y+6=0$

12. Complete the square with both x and y variables.
13. Determine the center of this conic section (circle).
14. Determine the radius of this circle.
15. Sketch the circle on the graph portion of the answer sheet.

Let $\frac{x^2}{36}+\frac{y^2}{4}=1$

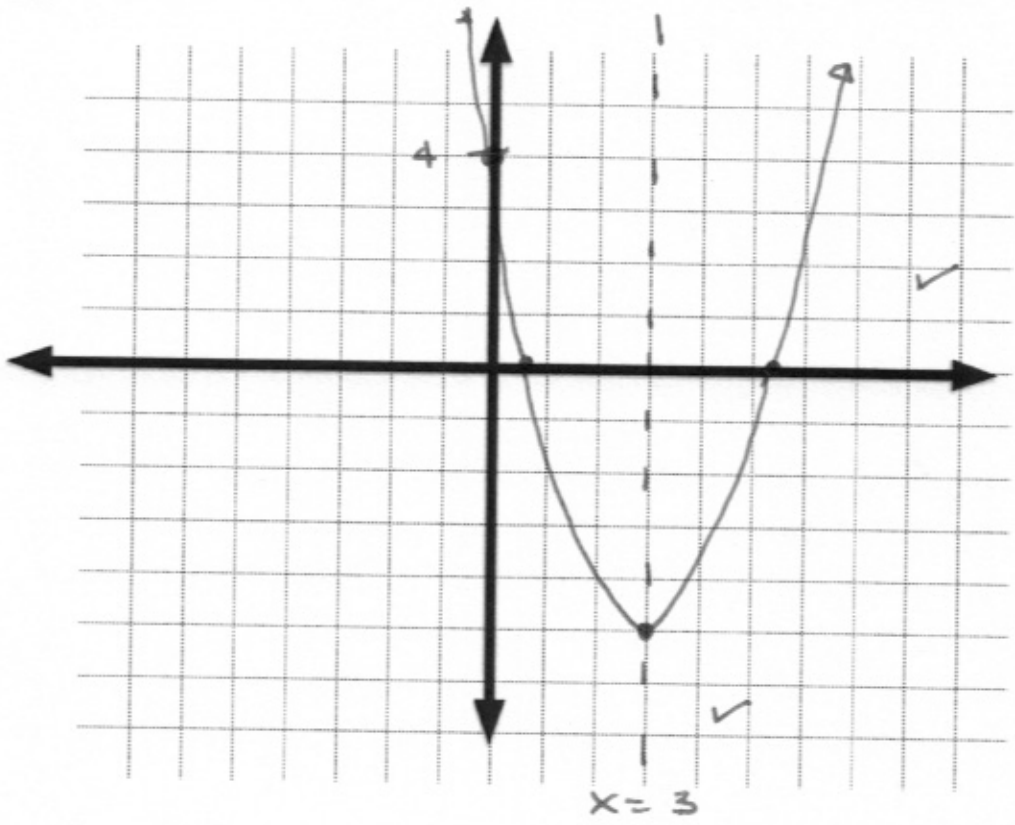
16. Determine the a-values for this ellipse.
17. Determine the b-values for this ellipse.
18. Sketch the ellipse on the graph portion of the answer sheet.

1	9 ✓	13	Use Graph Portion	25	$\{x \mid x \neq 2\}$ ✓
2	-27 ✓	14	2 ✓	26	$f(x) = \frac{2x+5}{x}$ ✓
3	-7 ✓	15	Use Graph Portion	27	$\{x \mid x \geq -4\}$ ✓
4	9 ✓	16	$a = \pm 6$ ✓✓	28	$f(x) = x^2 - 4$ ✓
5	$y = (x-3)^2 - 5$ ✓	17	$b = \pm 2$ ✓✓	29	$\mathbb{R}$ ✓
6	$(3, -5)$ ✓✓	18	Use Graph Portion	30	$f(x) = x^3 + 2$ ✓
7	up ✓	19	$a = \pm 4.5$ ✓✓	31	$\mathbb{R}$ ✓
8	$x = 3$ ✓	20	$b = \pm 3.2$ ✓✓	32	$f(x) = \sqrt{x}$ ✓
9	$x = 3 + \sqrt{5}$ (5.2) ✓ $x = 3 - \sqrt{5}$ (0.8) ✓	21	Use Graph Portion	33	$(f \circ g)(x)$ $= 3x^2 + 11$ ✓
10	$y = 4$ ✓	22	$a = \pm 7$ ✓✓	34	$(g \circ f)(x)$ $= 9x^2 - 24x + 21$ ✓
11	Use Graph Portion	23	$b \approx \pm 2.2$ ✓✓		
12	$(x+1)^2 + (y-3)^2$ ✓ $=$ 4 ✓	24	Use Graph Portion		

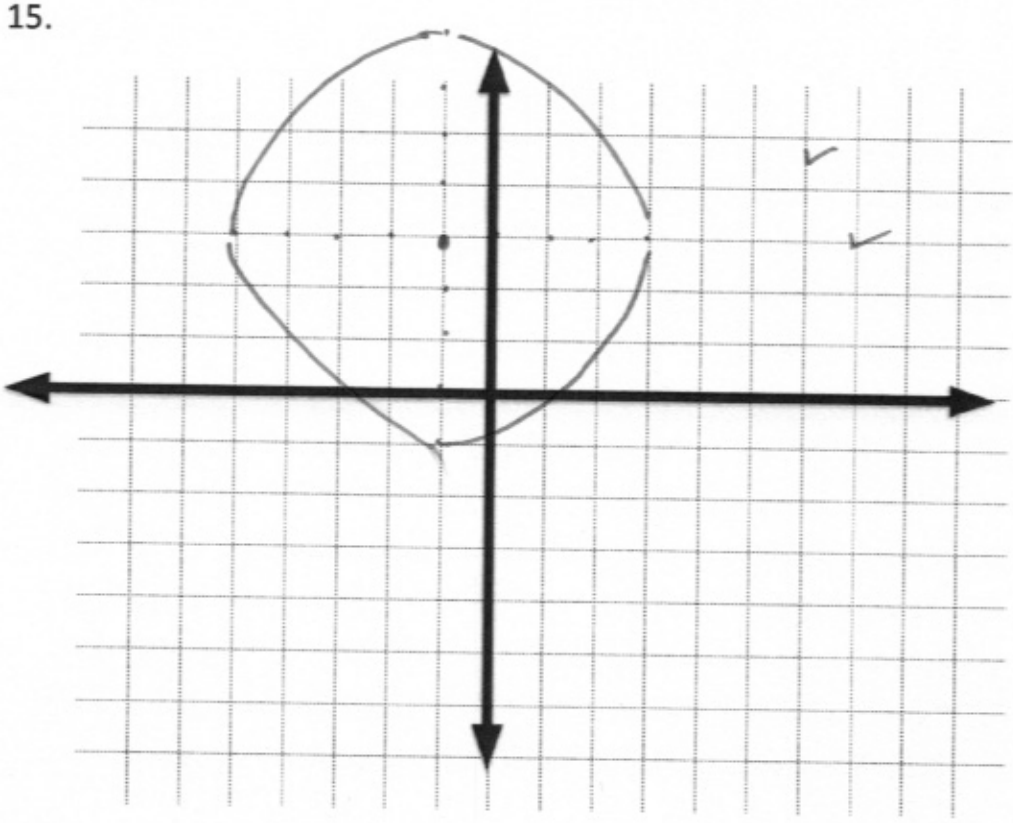
$37 + 10 = (47)$

graph

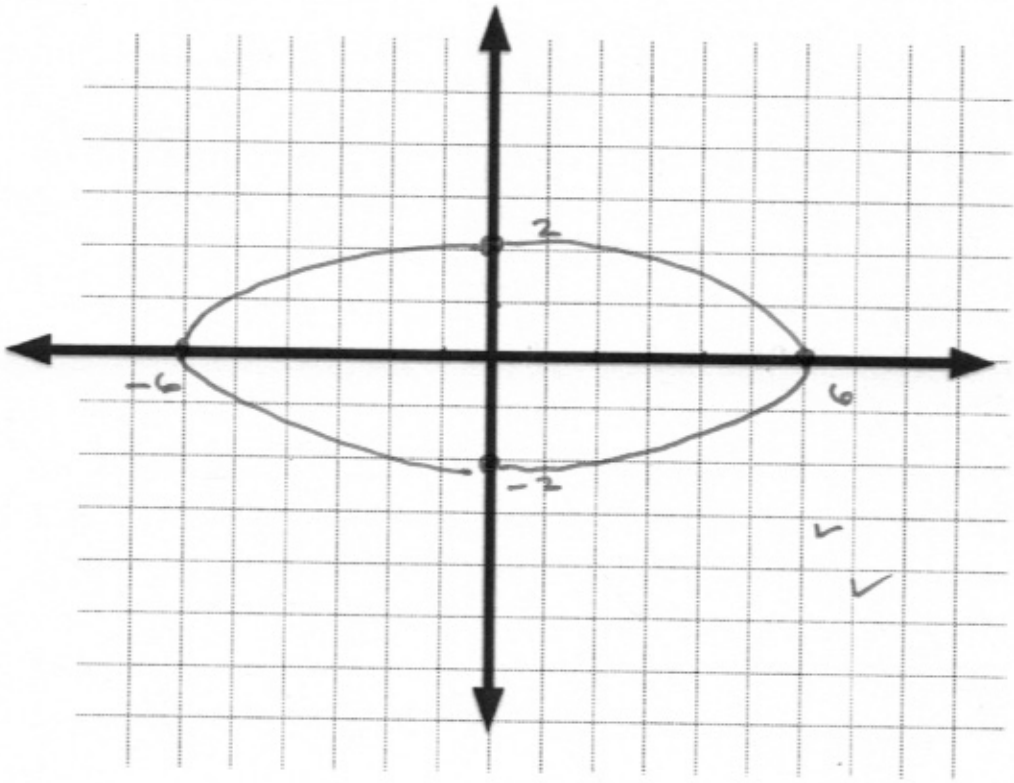
11.



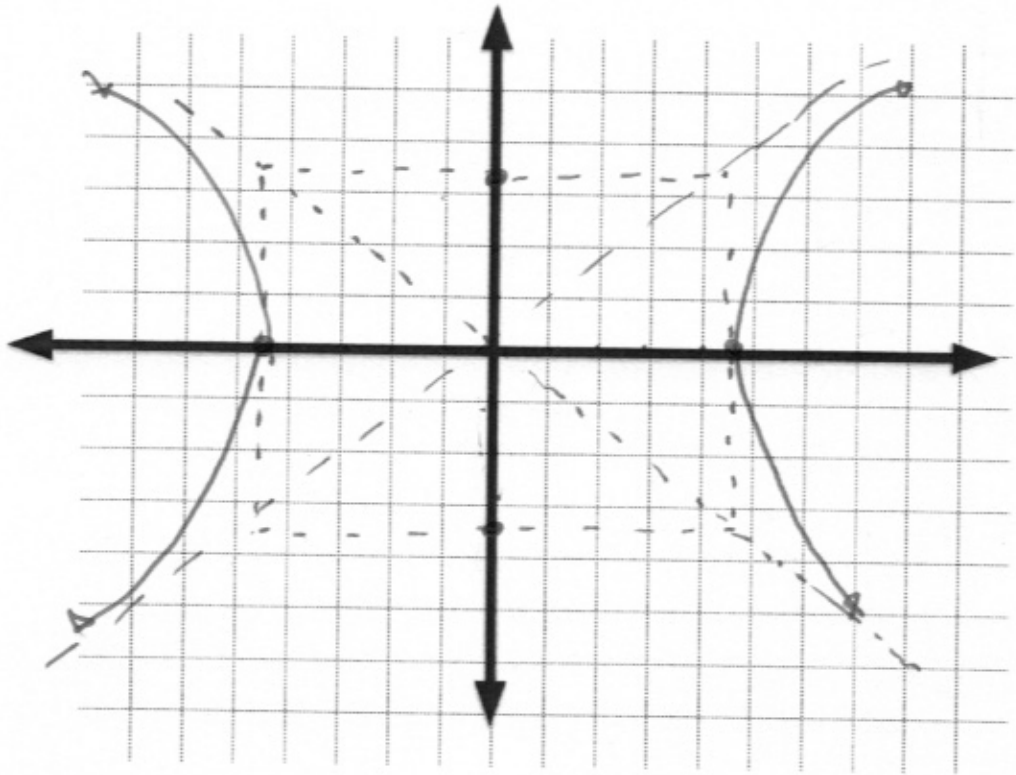
15.



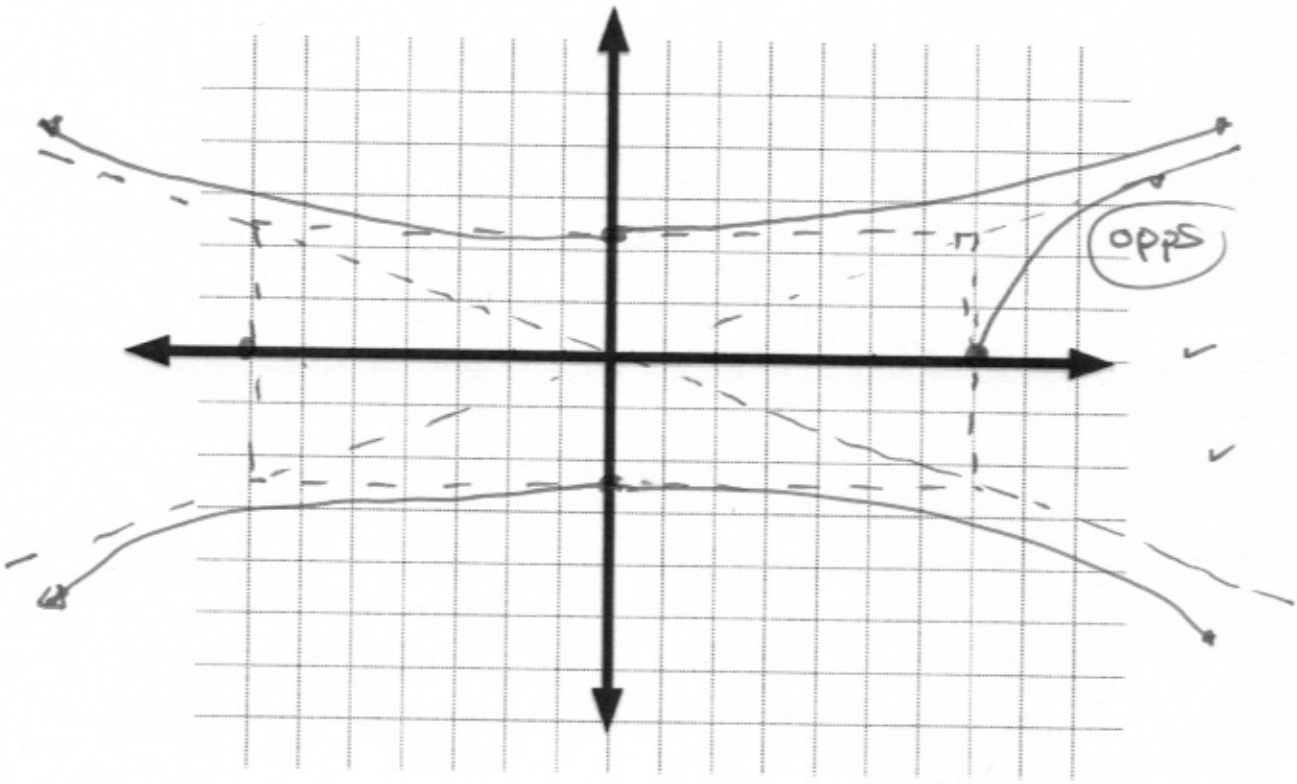
18.



21.



24.



math 125 Test 3

(1) $2\sqrt{x-5} - 8 = -4$

$+8 \quad +8$

$\frac{2\sqrt{x-5}}{2} = \frac{4}{2}$; $\sqrt{x-5} = 2$

$(\sqrt{x-5})^2 = 2^2$

$x-5 = 4$

$+5 \quad +5$

; $x = 9$

(2) $\sqrt[3]{x} + 9 = 6$

$-9 \quad -9$

$\sqrt[3]{x} = -3$

$(\sqrt[3]{x})^3 = (-3)^3$

$x = -27$

(3) $(\sqrt{3x+5})^2 = (\sqrt{x-9})^2$

$3x+5 = x-9$

$-x \quad -x$

$2x+5 = -9$

$-5 \quad -5$

$\frac{2x}{2} = \frac{-14}{2}$

$x = -7$

④ $\sqrt{x+7} = x-5$

$(\sqrt{x+7})^2 = (x-5)^2$

$x+7 = (x-5)(x-5)$

$x+7 = x^2 - 10x + 25$

$-x \qquad\qquad -x$

$7 = x^2 - 11x + 25$

$-7 \qquad\qquad -7$

$x^2 - 11x + 18 = 0$

$(x-9)(x-2) = 0$

$x-9=0$	$x-2=0$
$+9 \quad +9$	$+2 \quad +2$
$x=9$	$x=2$

Check:

$\sqrt{9+7} = 9-5$

$\sqrt{16} = 4$ True

$\sqrt{9+2} = 2-5$

$\sqrt{11} \neq -3$

$y = x^2 - 6x + 4$; $\frac{b}{2} = \frac{-6}{2} = -3$

$(\frac{b}{2})^2 = (-3)^2$

$y = \underbrace{x^2 - 6x + 9}_{\text{factor}} - \underbrace{9 + 4}_{\text{added}}$ $= 9$

(5) $y = (x-3)^2 - 5$

(6) $(3, -5)$ (7) $a = 1 > 0$ opens up

(8) $x = 3$ (9) x-int ; let $y = 0$; solve for x

$(x-3)^2 - 5 = 0$

$(x-3)^2 = 5$; $x - 3 = \pm\sqrt{5}$

$+3 \quad +3$

$x = 3 \pm \sqrt{5}$; $x = 3 + \sqrt{5}$

$x = 3 - \sqrt{5}$

Calculator ; $x \approx 5.2$

$x \approx 0.8$

(10) y-int ; $x = 0$

solve for y

$y = (0-3)^2 - 5$ $y = 9 - 5$

$y = (-3)^2 - 5$ $y = 4$

(12) $x^2 + y^2 + 2x - 6y + 6 = 0$

$x^2 + 2x + y^2 - 6y + 6 = 0$

(x) $\frac{2}{2} = 1$ $\quad$ (y) $-\frac{6}{2} = -3$

$1^2 = 1$ $\quad$ $(-3)^2 = 9$

$x^2 + 2x + 1 - 1 + y^2 - 6y + 9 - 9 + 6 = 0$

$(x+1)^2 - 1 + (y-3)^2 - 9 + 6 = 0$

$(x+1)^2 + (y-3)^2 - 4 = 0$

$$(x+1)^2 + (y-3)^2 = 4$$

Circle

(13) $(-1, 3)$ $\quad$ (14) $r^2 = 4$; $r = \pm\sqrt{4}$

$r = 2$

(16) $a^2 = 36$ $\quad$ $b^2 = 4$

$a = \pm\sqrt{36}$ $\quad$ $b = \pm\sqrt{4}$

$a = \pm 6$ $\quad$ (17) $\quad$ $b = \pm 2$

(19) $a^2 = 20$

$a = \pm\sqrt{20}$

$a \simeq \pm 4.5$

(20) $b^2 = 10$

$b = \pm\sqrt{10}$

$b \simeq \pm 3.2$

(22) $a^2 = 49 \therefore a = \pm\sqrt{49}$

$a = \pm 7$

(23) $b^2 = 5$

$b = \pm\sqrt{5}$

$b \simeq \pm 2.2$

(25) $f(x) = \frac{5}{x-2}$

$x - 2 = 0 \therefore x = 2$

$D = \{x \mid x \neq 2\}$

(26) (1) $y = \frac{5}{x-2}$

(2) $x = \frac{5}{y-2}$

(3) $x(y-2)$ $x = \frac{5}{y-2}$

Solve for y

$\frac{5}{y-2} = x$

$5 = x(y-2)$

$5 = xy - 2x$

$+2x \quad +2x$

$xy = 2x + 5$

$y = \frac{2x+5}{x}$

(4) $f^{-1}(x) = \frac{2x+5}{x}$

(27) $f(x) = \sqrt{x+4}$

$x + 4 \geq 0$

$-4 \quad -4$; $x \geq -4$

$D = \{x \mid x \geq -4\}$

(28) (1) $y = \sqrt{x+4}$

(2) $x = \sqrt{y+4}$

(3) Solve for y

$\left(\sqrt{y+4}\right)^2 = x^2$

$y + 4 = x^2$; $y = x^2 - 4$

$-4 \quad -4$

(4) $f^{-1}(x) = x^2 - 4$

(29) $f(x) = \sqrt[3]{x-2}$ (112)

(30) (1) $y = \sqrt[3]{x-2}$

(2) $x = \sqrt[3]{y-2}$

(3) Solve for y

$\left(\sqrt[3]{y-2}\right)^3 = x^3$

$y - 2 = x^3$

$+2 \quad +2$

$y = x^3 + 2$

(4) $f^{-1}(x) = x^3 + 2$

(31) $f(x) = x^2 \; ; \; x \geq 0$

(12)

(32) (1) $y = x^2 \; ; \; x \geq 0$

(2) $x = y^2 \; ; \; y \geq 0$

(3) solve for y

$y^2 = x \; ; \; y = \pm \sqrt{x}$

$y = \sqrt{x}$

(4) $\boxed{f^{-1}(x) = \sqrt{x}}$

(33) $f(x) = 3x - 4 \qquad g(x) = x^2 + 5$

$(f \circ g)(x) = f[g(x)]$

$= f[x^2 + 5]$

$= 3(x^2 + 5) - 4$

$= 3x^2 + 15 - 4$

$\boxed{(f \circ g)(x) = 3x^2 + 11}$

(34) $g[f(x)] = g[3x - 4]$

$= (3x - 4)^2 + 5$

$= (3x - 4)(3x - 4) + 5$

FOIL

$(g \circ f)(x) = 9x^2 - 24x + 16 + 5$

$(g \circ f)(x) = 9x^2 - 24x + 21$