Test 6.2 Review Answers:

① $6x^2 + 6y^2 = 40$

$6x^2 + 6y^2 - 40 = 0$

$x^2 + y^2$ w/ same coefficient

$\boxed{\text{circle}}$

② $y^2 - 4y + 8x - 10 = 0$

only $y$ is squared

$\boxed{\text{parabola}}$

③ $3x^2 - 3y^2 = 9$

$3x^2 - 3y^2 - 9 = 0$

difference $x^2$ & $y^2$

$\boxed{\text{hyperbola}}$

④ $8x^2 + 12y^2 = 140$

$8x^2 + 12y^2 - 140 = 0$

$x^2 + y^2$ w/ diff. coefficient

$\boxed{\text{ellipse}}$

⑤ $(x-2)^2 = -8(y+1)$

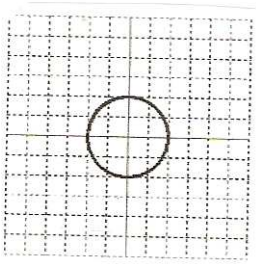
$\boxed{\text{parabola}}$

⑥ $4y^2 - x^2 = 25$

difference $x^2$ & $y^2$

$\boxed{\text{hyperbola}}$

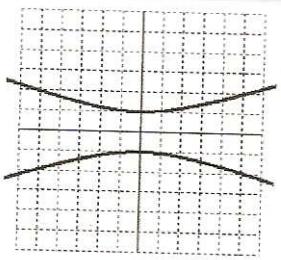
⑦



D: $-2 \le x \le 2$

R: $-2 \le y \le 2$

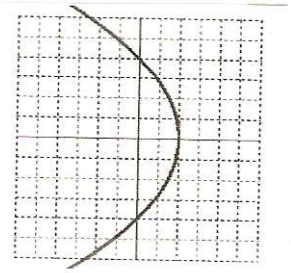
⑧



D: $\mathbb{R}$

R: $y \le -1$ OR $y \ge 1$

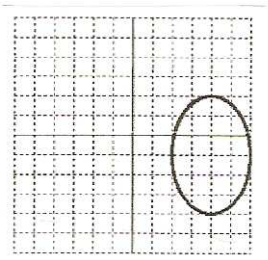
(9)



D: $x \le 2$

R: $\mathbb{R}$

(10)



D: $2 \le x \le 6$

R: $-4 \le y \le 2$

(11) $x^2 = -4y$

$(x-0)^2 = -4(y-0)$

$\boxed{\begin{array}{l} V(0,0) \\ \text{opens down} \end{array}}$

(12) $y^2 = 2x$

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

$\boxed{\begin{array}{l} V(0,0) \\ \text{opens right} \end{array}}$

(13) $(x-1)^2 = 8(y+2)$

$(x-1)^2 = +8(y--2)$

$\boxed{\begin{array}{l} V(1,-2) \\ \text{opens up} \end{array}}$

(14) $(x+5)^2 = 8y$

$(x--5)^2 = +8(y-0)$

$\boxed{\begin{array}{l} V(-5,0) \\ \text{opens up} \end{array}}$

(15) $(y-3)^2 = -12x$

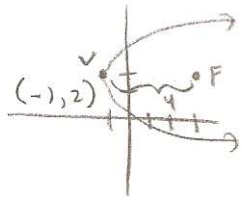
$(y-3)^2 = -12(x-0)$

$\boxed{\begin{array}{l} V(0,3) \\ \text{opens left} \end{array}}$

(16) $(y-4)^2 = -4(x-1)$

$\boxed{\begin{array}{l} V(1,4) \\ \text{opens left} \end{array}}$

(17)



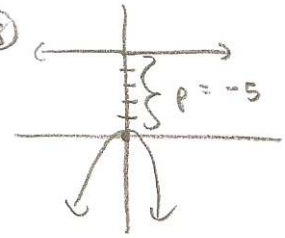

$p = +4$

$(y-k)^2 = 4p\,(x-h)$

$(y-2)^2 = 16(x--1)$

$\boxed{(y-2)^2 = 16(x+1)}$

(18)

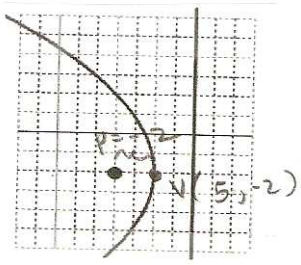



$(x-h)^2 = 4p(y-k)$

$(x-0)^2 = -20(y-0)$

$\boxed{x^2 = -20y}$

(19)

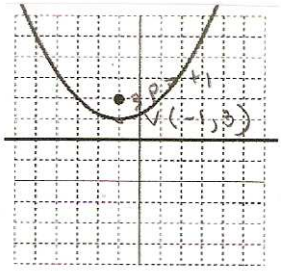



$(y-k)^2 = 4p(x-h)$

$(y--2)^2 = -8(x-5)$

$\boxed{(y+2)^2 = -8(x-5)}$

(20)

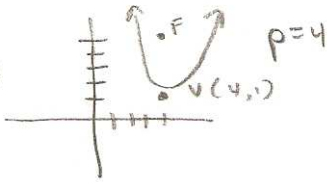



$(x-h)^2 = 4p(y-k)$

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

$\boxed{(x+1)^2 = 4(y-3)}$

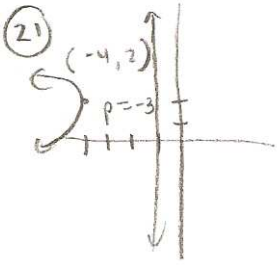
(22)




$(x-h)^2 = 4p(y-k)$

$(x-4)^2 = 16(y-1)$

(21)




$(y-k)^2 = 4p(x-h)$

$(y-2)^2 = -12(x--4)$

$\boxed{(y-2)^2 = -12(x+4)}$

(23) $y^2 - 2y + 12x + 37 = 0$

$y^2 - 2y + \underline{1} = -12x - 37 + \underline{1}$

$(y-1)^2 = -12x - 36$

$\boxed{(y-1)^2 = -12(x+3)}$

(24) $x^2 + 14x - 2y + 51 = 0$

$x^2 + 14x + \underline{49} = 2y - 51 + \underline{49}$

$(x+7)^2 = 2y - 2$

$\boxed{(x+7)^2 = 2(y-1)}$

(25) $(x+2)^2 = -12(y-4)$

$(x-h)^2 = 4p(y-k)$ $\quad p = -3$

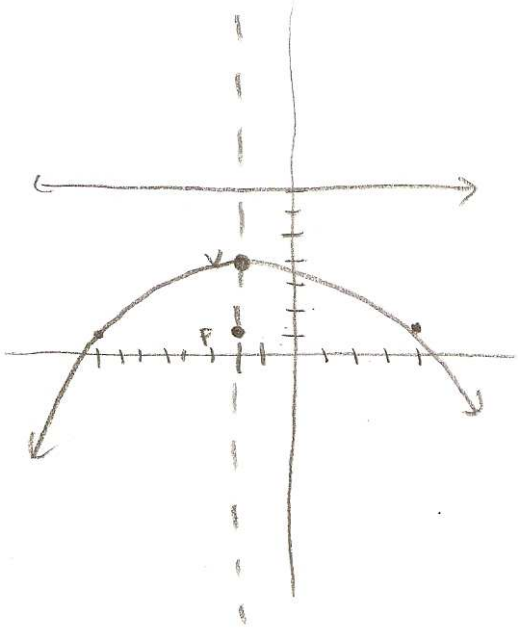
Vertex $(-2, 4)$

axis of symmetry: $x = -2$

focus: $(-2, 1)$

directrix: $y = 7$

focal chord length: 12



(26) $(y+1)^2 = 16(x-3)$

$(y-k) = 4p(x-h)$ $p=4$

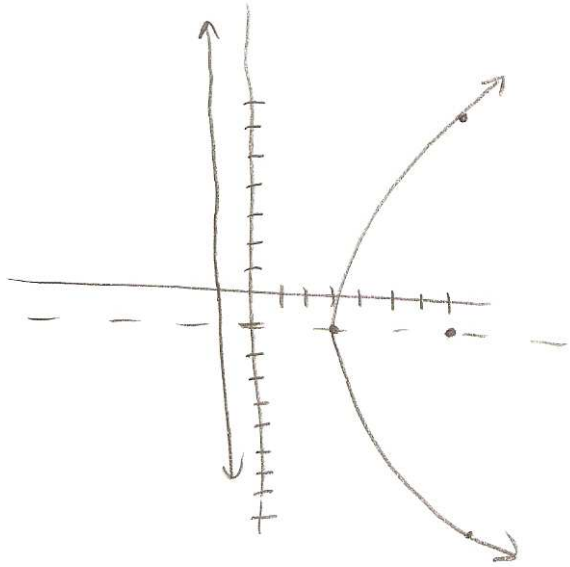
vertex $(3,-1)$

axis of symmetry $y=-1$

focus $(7,-1)$

directrix $x=-1$

focal chord length 16



| $x$ | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|
| $f(x)$ | 3 | 2 | 1 | 0 | -1 |

| $x$ | -2 | -1 | 0 | 1 | 2 |
|---|---|---|---|---|---|
| $g(x)$ | -1 | 3 | 7 | 11 | 15 |

(27) $(f-g)(2) = f(2) - g(2)$

$= 0 - 15$

$= \boxed{-15}$

(28) $\left(\frac{f}{g}\right)(1) = \frac{f(1)}{g(1)}$

$= \boxed{\frac{1}{11}}$

(29) $(f \circ g)(-1) = f(g(-1))$

$= f(3)$

$= \boxed{-1}$

(30) $(g-f)(x) = g(x) - f(x)$

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

$= -3x+9-x^2+2x$

$= \boxed{-x^2-x+9}$

(31) $(fg)(x) = f(x) \cdot g(x)$

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

$= \boxed{-3x^3 + 15x^2 - 18x}$

| | $x^2$ | $-2x$ |
|---|---|---|
| $-3x$ | $-3x^3$ | $6x^2$ |
| $9$ | $9x^2$ | $-18x$ |

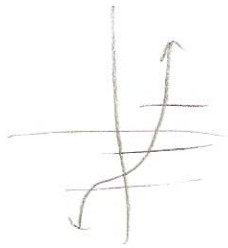
(32) $g(f(x)) = g(x^2 - 2x)$

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

$= \boxed{-3x^2 + 6x + 9}$

(33) $f(x) = 2x^3 - 4$

$y = 2x^3 - 4$



passes HLT,

so inverse <u>is</u> a function

inverse:

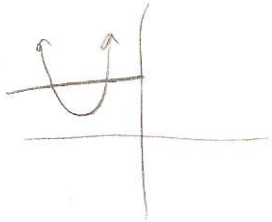
$x = 2y^3 - 4$

$x + 4 = 2y^3$

$\frac{x+4}{2} = y^3$

$\boxed{y = \sqrt[3]{\frac{x+4}{2}}}$

(34) $g(x) = (x+3)^2 + 2$



fails HLT

So inverse is NOT a function

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

inverse:

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

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

$y+3 = \pm\sqrt{x-2}$

$y = -3 \pm \sqrt{x-2}$

(35) $f(x) = 4x - 3$ $\quad g(x) = 3x + 4$

$f(g(x)) = f(3x+4) = 4(3x+4) - 3$

$= 12x + 16 - 3$

$= 12x + 13 \neq x$

$\boxed{\text{not inverses}}$

(36) $f(x) = -2x + 7$ $\quad g(x) = \frac{x-7}{-2}$

$f(g(x)) = f\left(\frac{x-7}{-2}\right) = -2\left(\frac{x-7}{-2}\right) + 7$

$= x - 7 + 7$

$= x$ ✓

$\boxed{\text{inverses}}$

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

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

$= x$ ✓