Precalculus Ch. 7/8 Test A

1)

$2x+4y=-2$
$9x-2y=31$

$(3,-2)$
sum $=1$
A

$2x+4y=-2$
$18x-4y=62$

$\frac{20x}{20}=\frac{60}{20}$

$x=3$

$2(3)+4y=-2$
$4y=-2-6$
$4y=-8$
$y=-2$

2)

$5x-2y=9$
$6x-5y=16$

$(1,-2)$
sum $=-1$
C

$25x-10y=45$
$-12x+10y=-32$

$13x=13$
$x=1$

$5(1)-2y=9$
$-2y=9-5$
$-2y=4$
$y=-2$

3)

$x+y=1$
$x^2+3y^2=21$

$y=1-x$
sub

$y=1+3/2$
$y=5/2$

$y=1-3$
$y=-2$

$(-3/2, 5/2)$ $(3,-2)$

$x^2+3(1-x)^2=21$
$x^2+3(1-x)(1-x)=21$
$x^2+3(1-2x+x^2)=21$
$x^2+3-6x+3x^2=21$
$4x^2-6x+3=21$
$4x^2-6x-18=0$
$2(2x^2-3x-9)=0$
$2(2x+3)(x-3)=0$
$x=-3/2$ or $x=3$

4) $x + y = 1000$

$.03x + .04y = 31.5$

$-.04x - .04y = -40$

$.03x + .04y = 31.5$

$-.01x = -8.5$

$x = 850$

D

5) $3x^2 + 6x - 4y + 12 = 0$

x^2 term & a y term

parabola

D

6) $x^2 + x - 4y^2 + 130 = 0$

comparing x^2 & y^2 on the same side of the equation

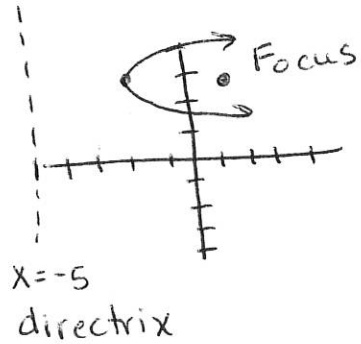
They are subtracted

hyperbola

B

7) $(y-3)^2 = 12(x+2)$

parabola opens right



V: $(-2, 3)$

$4p = 12$

$p = 3$

F: $(1, 3)$

C

8) $x^2 - 4x - 4y + 16 = 0$

complete square

$x^2 - 4x + \_\_\_ \quad -4y + 16 = 0 + \_\_\_$

$x^2 - 4x + \underline{4} \quad -4y + 16 = 0 + \underline{4}$

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

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

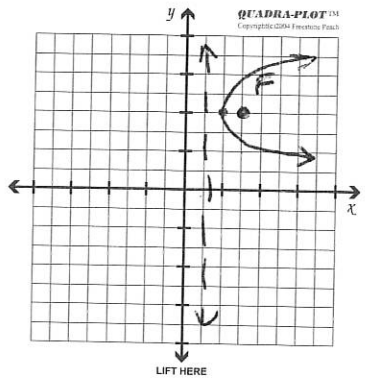
$(x-2)^2 = 4(y-3)$

vertex

$(2, 3)$

D

9. focus $(3,4)$ directrix $x=1$



vertex $(2,4)$

$p = 1$

equation $4p(x-2) = (y-4)^2$

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

$4(x-2) = (y-4)^2$ mult. out

$4x-8 = y^2-8y+16$

$0 = y^2-8y-4x+24$

A

10. $8x^2+y^2-16x+6y+7=0$

$8x^2-16x \quad + y^2+6y \quad = -7$

$8(x^2-2x+\underline{1}) + (y^2+6y+\underline{9}) = -7+8+9$

$8(x-1)^2 + (y+3)^2 = 10$

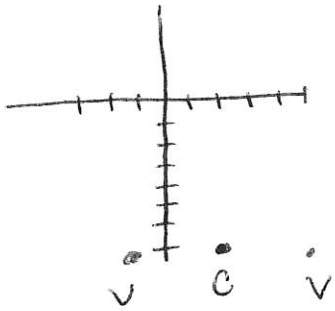
$$\frac{8(x-1)^2}{10} + \frac{(y+3)^2}{10} = 1$$

A

$$\frac{4(x-1)^2}{5} + \frac{(y+3)^2}{10} = 1$$

11. $\frac{(x-2)^2}{9} - \frac{(y+7)^2}{16} = 1$

C: (2,-7)



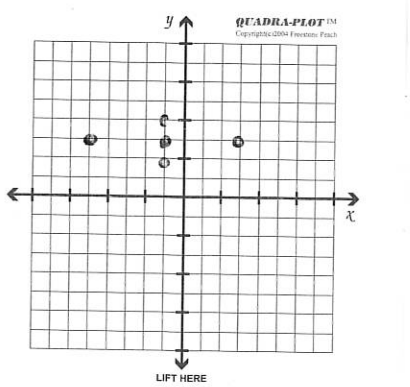
(A) (5,-7) (-1,-7)

12. Branches are left & right
so the x^2 term is positive

C: (2,-2) Vertices are about (4.3,-2) & (-.3,-2)
so that means you are $\sqrt{5}$ from the center

(C)

13. C: (-1,3) V: (3,3) minor axis length 2



$\frac{(x+1)^2}{16} + \frac{(y-3)^2}{1} = 1$

(D)

14. $5x^2 - 4y^2 - 20x - 16y - 16 = 0$

$5x^2 - 20x \quad -4y^2 - 16y \quad = 16$

$5(x^2 - 4x + 4) - 4(y^2 + 4y + 4) = 16 + 20 - 16$

$5(x-2)^2 - 4(y+2)^2 = 20$

$\frac{5(x-2)^2}{20} - \frac{4(y+2)^2}{20} = 1$

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

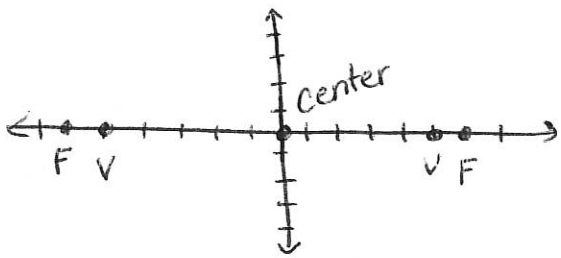
Slope of asymptote
$\frac{\text{rise}}{\text{run}} = \frac{\sqrt{5}}{2}$

$\underbrace{y+2 = \frac{\sqrt{5}}{2}(x-2)}_{\text{center}}$

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

(A)

15. V: $(\pm 5, 0)$ foci $(\pm 6, 0)$



$a^2+b^2=c^2$

$a=5$
$b=?$
$c=6$

$25+b^2=36$

$b^2=36-25$

$b^2=11$

D

$$\frac{x^2}{25}-\frac{y^2}{11}=1$$

16. $$\frac{16-x}{x^2+3x-10}=\frac{A}{(x+5)}+\frac{B}{(x-2)}$$

$(x+5)(x-2)$

$16-x = A(x-2)+B(x+5)$

$= Ax-2A+Bx+5B$

$= Ax+Bx-2A+5B$

$16-x = x(A+B)-2A+5B$

$$\frac{16-x}{x^2+3x-10}=\frac{-3}{x+5}+\frac{2}{x-2}$$

$A+B=-1$
$-2A+5B=16$

$2A+2B=-2$
$-2A+5B=16$

$7B=14$

$B=2$

$A+2=-1$
$A=-3$

17. $$\frac{5x^2+20x+6}{x^3+2x^2+x}=\frac{A}{x}+\frac{B}{x+1}+\frac{C}{(x+1)^2}$$

$x(x^2+2x+1)$

$x(x+1)^2$

$= A(x+1)^2+B(x)(x+1)+C(x)$

$= A(x^2+2x+1)+B(x^2+x)+Cx$

$= Ax^2+2Ax+A+Bx^2+Bx+Cx$

$= Ax^2+Bx^2+2Ax+Bx+Cx+A$

$5x^2+20x+6 = x^2(A+B)+x(2A+B+C)+A$

$A+B=5$
$2A+B+C=20$
$A=6$

$6+B=5$
$B=-1$

$2(6)-1+C=20$
$11+C=20$
$C=9$

$$\frac{5x^2+20x+6}{x^3+2x^2+x}=\frac{6}{x}-\frac{1}{x+1}+\frac{9}{(x+1)^2}$$

18. What are the dimensions of a rectangular tract of land if its perimeter is 40 miles and its area is 96 square miles?

$2x+2y=40$

$xy=96$

$x=96/y$

$2(96/y)+2y=40$

$\frac{192}{y}+2y=40$

$192+2y^2=40y$

$2y^2-40y+192=0$

$y^2-20y+96=0$

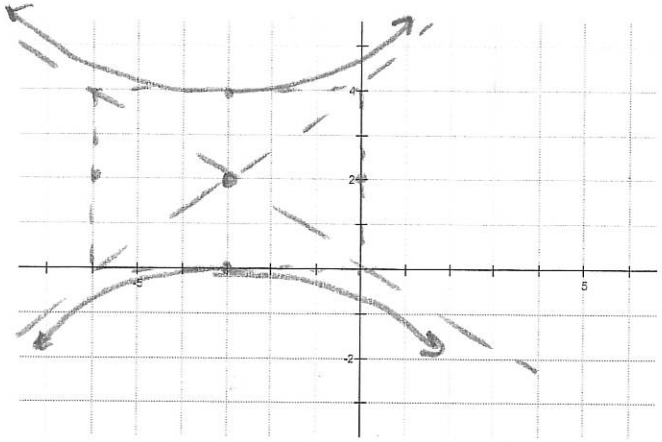
$(y-12)(y-8)=0$

$y=12$ or $y=8$

$(12,8)$ or $(8,12)$

8×12 miles

19. Find the center, vertices, foci, and the equations of the asymptotes for the following: $-4x^2+9y^2-24x-36y-36=0$, then graph the equation.



$9y^2-36y \quad -4x^2-24x \quad =36$

$9(y^2-4y+4)-4(x^2+6x+9)=36+36-36$

$9(y-2)^2-4(x+3)^2=36$

$\frac{(y-2)^2}{4} - \frac{(x+3)^2}{9}=1$

$a^2 \quad b^2$

$4+9=c^2$

$c=\sqrt{13}$

C: $(-3,2)$

V: $(-3,4)$

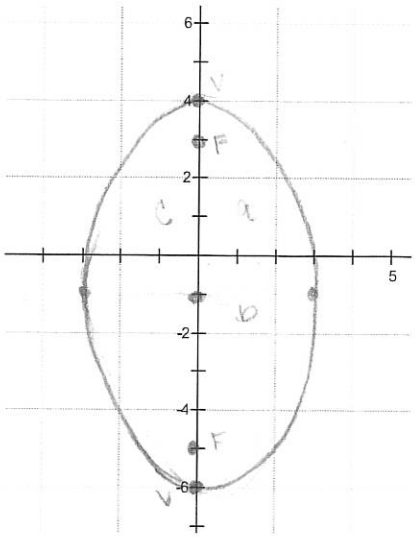
$(-3,0)$

F: $(-3, 2+\sqrt{13})$

$(-3, 2-\sqrt{13})$

$y=\pm \frac{2}{3}(x+3)+2$

20. Find the standard form of the ellipse with vertices (0,4), (0,-6) and foci (0,3), then graph.



$b^2+c^2=a^2$

$b^2+16=25$

$b^2=9$

$\frac{(y+1)^2}{25}+\frac{(x-0)^2}{9}=1$