Test Notes

distance formula

$D = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$ given 2pts (x_1, y_1) & (x_2, y_2)

* remember you cannot just square root each piece

circles

standard form:

$(x-h)^2 + (y-k)^2 = r^2$

center is (h, k)

r is radius

expanded form:

$x^2 + y^2 + bx + by + c = 0$

* no paretheses
* set equal to zero

standard form ⟶ expanded form

FOIL & move everything over

expanded form ⟶ standard form

complete the square

balance the equation

examples

1. SF → EF

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

$x^2 - 4x + 4 + y^2 + 8y + 16 = 9$

$\boxed{x^2 + y^2 - 4x + 8y + 11 = 0}$

2. EF → SF

$x^2 + 8x + y^2 - 4y = 10$

$x^2 + 8x + 16 + y^2 - 4y + 4 = 10 + 16 + 4$

* must balance

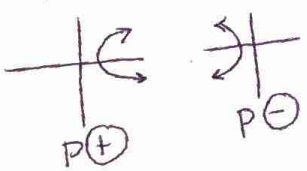
$\left(\frac{b}{2}\right)^2$

$\boxed{(x+4)^2 + (y-2)^2 = 30}$

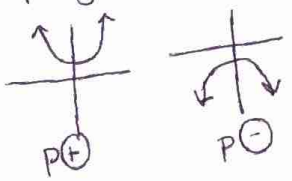
parabolas

options

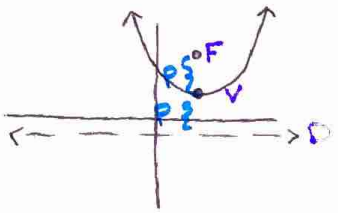
$4p(x-h) = (y-k)^2$

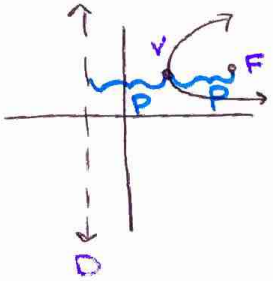


$4p(y-k) = (x-h)^2$



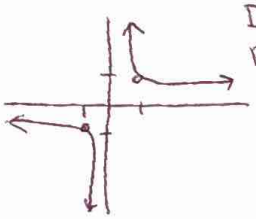
- (h, k) is the vertex
- p is the distance between the vertex & focus or vertex & directrix





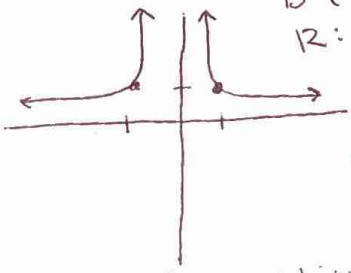
rational equations graphing

PF $\frac{1}{x}$



D: $(-\infty,0)\cup(0,\infty)$
R: $(-\infty,0)\cup(0,\infty)$
$x=0$, $y=0$ are the asymptotes

PF $\frac{1}{x^2}$



D: $(-\infty,0)\cup(0,\infty)$
R: $(0,\infty)$
$x=0$, $y=0$ are the asymptotes

transformations

$\frac{1}{x-h}+k$ Right H, up K

$\frac{1}{x+h}-k$ Neg left H, down K

} move the asymptotes (dashed lines)

$\frac{a}{x}$ VD by a (spaces off the horizontal asymptote)

$-\frac{1}{x}$ reflection over x-axis

transformations

$\frac{1}{(x-h)^2}+k$ right H, up K

$\frac{1}{(x+h)^2}-k$ left H, down K

} moves asymptotes

$\frac{a}{x^2}$ VD by a

$-\frac{1}{x^2}$ reflection over x-axis

application problems

* hint write the problem in words ~~first~~ first

ex 60 mL of a solution is 35% lemons & 65% water. How much water would need to be added to reach 80% water?

→ $\frac{\text{water amount}}{\text{total}} \rightarrow \frac{60(0.65)+x}{60+x} = \frac{80}{100}$

current water; total; added water; goal

$100(39+x) = 80(60+x)$

$3900+100x = 4800+80x$

$20x = 900$

$\boxed{x = 45 \text{ mL}}$