

EXAM 1 REVIEW

CH 3 REVIEW EXERCISES #28, 29, 31, 32, 33, 36, 42, 44, 46, 56, 58, 62

#28.

$$\begin{array}{r} 2x^2 + 4x - 1 - \frac{10}{5x-3} \\ 5x-3 \overline{) 10x^3 - 26x^2 + 17x - 13} \\ \underline{-10x^3 + 6x^2} \\ -20x^2 + 17x \\ \underline{-20x^2 + 12x} \\ -5x - 13 \\ \underline{+5x + 3} \\ -10 \end{array}$$

#36. $f(x) = 3x^5 - 2x^4 - 15x^3 + 10x^2 + 12x - 8$
 POSSIBLE RATIONAL ZEROS

$$\frac{p}{q} = \frac{\pm 8, \pm 4, \pm 2, \pm 1}{\pm 3, \pm 1}$$

$$= \pm 8, \pm 4, \pm 2, \pm 1, \pm \frac{8}{3}, \pm \frac{4}{3}, \pm \frac{2}{3}, \pm \frac{1}{3}$$

29.

$$\begin{array}{r} 2x^2 + 3x - 1 \\ 2x^2 + 1 \overline{) 4x^4 + 6x^3 + 0x^2 + 3x - 1} \\ \underline{-4x^4} \\ 6x^3 - 2x^2 \\ \underline{-6x^3} \\ -2x^2 \\ \underline{-2x^2} \\ 0 \\ -1 \\ \underline{-1} \\ 0 \end{array}$$

#42. $8x^3 - 36x^2 + 46x - 15 = 0$

$$\frac{p}{q} = \frac{\pm 15, \pm 5, \pm 3, \pm 1}{\pm 8, \pm 4, \pm 2, \pm 1}$$

$$\pm \left[\frac{15}{8}, \frac{15}{4}, \frac{15}{2}, 15, \frac{5}{8}, \frac{5}{4}, \frac{5}{2}, 5, \frac{3}{8}, \frac{3}{4}, \frac{3}{2}, 3, \frac{1}{8}, \frac{1}{4}, \frac{1}{2}, 1 \right]$$

$$\begin{array}{r} 5/2 \overline{) 8 \quad -36 \quad 46 \quad -15} \\ \underline{8 \quad -16 \quad 6 \quad 0} \end{array}$$

$$8x^2 - 16x + 6 = 0$$

$$4x^2 - 8x + 3 = 0$$

$$(2x - 3)(2x - 1) = 0$$

$$x = 3/2 \text{ or } 1/2$$

SOLUTIONS: $5/2, 3/2 \text{ or } 1/2$

31.
$$\begin{array}{r} 2 \overline{) 3 \quad 0 \quad -2 \quad -10 \quad 0} \\ \underline{6 \quad 12 \quad 20 \quad 20} \\ 3 \quad 6 \quad 10 \quad 10 \quad 20 \end{array}$$

$$3x^3 + 6x^2 + 10x + 10 + \frac{20}{x-2}$$

32. $f(x) = 2x^3 - 7x^2 + 9x - 3$

$$\begin{array}{r} -13 \overline{) 2 \quad -7 \quad 9 \quad -3} \\ \underline{-26 \quad 429 \quad -5694} \\ 2 \quad -33 \quad 438 \quad -5697 \end{array} \quad \therefore f(-13) = -5697$$

#44. $x^4 - x^3 - 7x^2 + x + 6 = 0$

$$\frac{p}{q} = \pm 6, \pm 3, \pm 2, \pm 1$$

$$\begin{array}{r} -2 \overline{) 1 \quad -1 \quad -7 \quad 1 \quad 6} \\ \underline{-2 \quad 6 \quad 2 \quad -6} \\ 1 \quad -3 \quad -1 \quad 3 \quad 0 \\ -1 \overline{) 1 \quad -3 \quad -1 \quad 3} \\ \underline{-1 \quad 4 \quad -3} \\ 1 \quad -4 \quad 3 \quad 0 \end{array}$$

$$x^2 - 4x + 3 = 0$$

$$(x-3)(x-1) = 0$$

$$x = 3 \text{ or } 1$$

SOLUTIONS $\{-2, -1, 1, 3\}$

33. FIND ALL ZEROS OF $f(x) = 2x^3 + x^2 - 13x + 6$
 GIVEN $x-2$ IS A FACTOR.

$$\begin{array}{r} 2 \overline{) 2 \quad 1 \quad -13 \quad 6} \\ \underline{4 \quad 10 \quad -6} \\ 2 \quad 5 \quad -3 \quad 0 \end{array}$$

ZEROS
 $(2, 1/2 \text{ or } -3)$

Solve $2x^2 + 5x - 3 = 0$

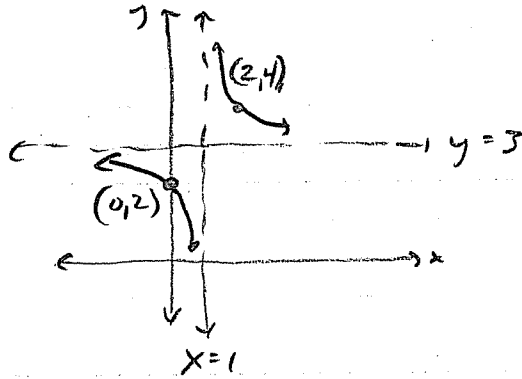
$$(2x-1)(x+3) = 0$$

$$x = 1/2 \text{ or } -3$$

CH 3 REVIEW

#56. $h(x) = \frac{1}{x-1} + 3$

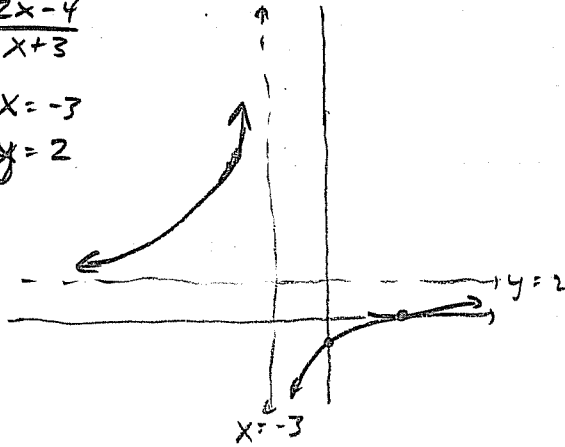
RIGHT 1
UP 3



#58. $g(x) = \frac{2x-4}{x+3}$

VERT ASYM $x = -3$
HOR ASYM $y = 2$

x	S(x)
0	0
0	$-\frac{4}{3}$
-5	7



#62.

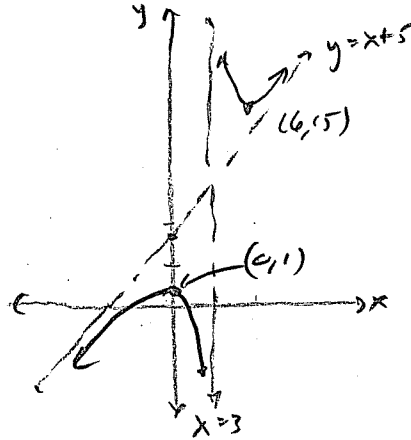
$y = \frac{x^2 + 2x - 3}{x-3}$

VA: $x=3$

$(x+5)$ ← SLANT $y=x+5$

$$\begin{array}{r} x-3 \overline{) x^2 + 2x - 3} \\ \underline{-x^2 + 3x} \\ 5x - 3 \end{array}$$

$$\begin{array}{r} x y \\ 0 1 \\ 6 13 \end{array}$$



CH. 9 REVIEW EXERCISES

$$\#3. \begin{bmatrix} 1 & 2 & 3 & -5 \\ 2 & 1 & 1 & 1 \\ 1 & 1 & -1 & 8 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 2 & 3 & -5 \\ 0 & -3 & -5 & 11 \\ 0 & 1 & 4 & -13 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 2 & 3 & -5 \\ 0 & 1 & 4 & -13 \\ 0 & 0 & 7 & -28 \end{bmatrix}$$

$$y + 4(-4) = -13$$

$$\boxed{y = 3}$$

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

$$x + 6 - 12 = -5$$

$$\boxed{x = 1}$$

$$7z = -28$$

$$\boxed{z = -4}$$

SOLUTION (1, 3, -4)

BACK SUBSTITUTION

$$8. \begin{bmatrix} 2 & -3 & 1 & 1 \\ 1 & -2 & 3 & 2 \\ 3 & -4 & -1 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & -2 & 3 & 2 \\ 0 & 1 & -5 & -3 \\ 0 & 2 & -10 & -5 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & -2 & 3 & 2 \\ 0 & 1 & -5 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

NO SOLUTION

$$0 \neq 1$$

$$11. \begin{cases} 2x + 3y - 5z = 15 \\ x + 2y - z = 4 \end{cases} \rightarrow \begin{bmatrix} 1 & 2 & -1 & 4 \\ 0 & -1 & -3 & 7 \end{bmatrix} \quad \begin{cases} x + 2(-3t-7) - t = 4 \\ x - 6t - 14 - t = 4 \\ x = 7t + 18 \end{cases}$$

$$-y - 3z = 7, \quad y = -3z - 7$$

SOLUTION (7t+18, -3t-7, t)

$$46. \begin{vmatrix} 3 & 2 \\ -1 & 5 \end{vmatrix} = 15 - (-2) = \boxed{17}$$

$$47. \begin{vmatrix} -2 & -3 \\ -4 & -8 \end{vmatrix} = 16 - 12 = \boxed{4}$$

$$52. \begin{cases} x - 2y = 8 \\ 3x + 2y = -1 \end{cases}$$

$$x = \frac{\begin{vmatrix} 8 & -2 \\ -1 & 2 \end{vmatrix}}{\begin{vmatrix} 1 & -2 \\ 3 & 2 \end{vmatrix}} = \frac{16 - 2}{2 + 6} = \frac{14}{8} = \boxed{\frac{7}{4}}$$

$$y = \frac{\begin{vmatrix} 1 & 8 \\ 3 & -1 \end{vmatrix}}{\begin{vmatrix} 1 & -2 \\ 3 & 2 \end{vmatrix}} = \frac{-1 - 24}{2 + 6} = \boxed{-\frac{25}{8}}$$

$$53. \begin{cases} 7x + 2y = 0 \\ 2x + y = -3 \end{cases}$$

$$x = \frac{\begin{vmatrix} 0 & 2 \\ -3 & 1 \end{vmatrix}}{\begin{vmatrix} 7 & 2 \\ 2 & 1 \end{vmatrix}} = \frac{6}{7 \cdot 1 - 2 \cdot 4} = \frac{6}{-5} = \boxed{-\frac{6}{5}}$$

$$y = \frac{\begin{vmatrix} 7 & 0 \\ 2 & -3 \end{vmatrix}}{\begin{vmatrix} 7 & 2 \\ 2 & 1 \end{vmatrix}} = \frac{-21}{-5} = \boxed{\frac{21}{5}}$$

CH10 REVIEW EXERCISES

7. $4x^2 + 9y^2 + 24x - 36y + 36 = 0$

$4(x^2 + 6x + \boxed{9}) + 9(y^2 - 4y + \boxed{4}) = -36 + \boxed{36} + \boxed{36}$

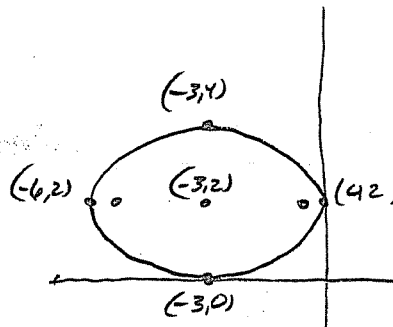
$\frac{4(x+3)^2}{36} + \frac{9(y-2)^2}{36} = \frac{36}{36}$

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

$a=3, b=2, \text{Center } (-3, 2)$

$c^2 = 5, c = \pm\sqrt{5}$

Foci: $(-3 \pm \sqrt{5}, 2)$



22. $x^2 - y^2 - 2x - 2y - 1 = 0$

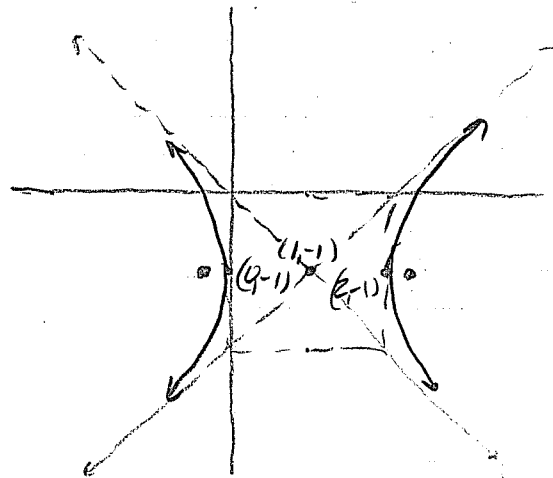
$(x^2 - 2x + \boxed{1}) - (y^2 + 2y + \boxed{1}) = 1 + 1 - 1$

$(x-1)^2 - (y+1)^2 = 1 \text{ Center } (1, -1)$

$a=1, b=1$

Foci: $c^2 = 2, c = \pm\sqrt{2}$

Foci: $(1 \pm \sqrt{2}, -1)$



31. $x^2 + 4y = 4$ *OPENS DOWN*

$x^2 = -4y + 4$

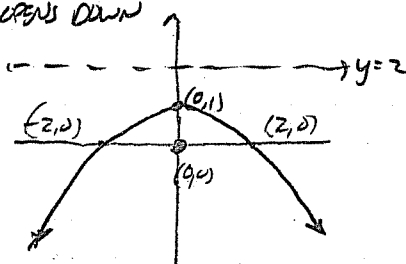
$x^2 = -4(y-1)$

VERTEX $(0, 1)$

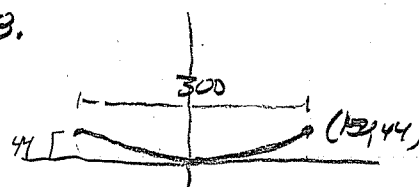
$4p = -4$

$p = -1$

DIRECTRIX: $y = 2$



#38.



$x^2 = 4py$

$(150)^2 = 4p(44)$

$\frac{5625}{44} = p \approx 127.8 \text{ ft from THE BASE}$

32. $y^2 - 4x - 10y + 21 = 0$

$y^2 - 10y + \boxed{25} = 4x - 21 + 25$

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

$(y-5)^2 = 4(x+1)$

VERTEX $(-1, 5)$

$4p = 4, p = 1$ FOCUS $(0, 5)$

DIRECTRIX $x = -2$

