

# SEMESTER REVIEW DAY 2

$$14(b) \quad x^4 - 4x^3 - 7x^2 + 34x - 24 = 0$$

$$\begin{array}{l} \pm 1 \quad \pm 24 \\ \pm 2 \quad \pm 12 \\ \pm 3 \quad \pm 8 \\ \pm 4 \quad \pm 6 \end{array}$$

$$\begin{array}{r} 1 \overline{) 1 \ -4 \ -7 \ 34 \ -24} \\ \underline{1 \quad \phantom{-4} \quad \phantom{-7} \quad \phantom{34} \quad \phantom{-24}} \\ 1 \quad -3 \quad -10 \quad 24 \quad 0 \end{array}$$

$$(x-1)(x^3 - 3x^2 - 10x + 24)$$

$$\sim \mid x=1 \quad 0$$

$$\begin{array}{r} 2 \overline{) 1 \ -3 \ -10 \ 24} \\ \underline{2 \quad -2 \quad -24} \\ 1 \quad -1 \quad -12 \quad 0 \end{array}$$

$$(x-1)(x-2)(x^2 - x - 12)$$

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

$$\sim \mid x=2 \quad 0$$

$$x = 1, 2, -3, 4$$

15(a) Multiply by common  
denom + cancel  
all denoms

$$\left[ \frac{2}{x+3} + \frac{4x}{x-5} = \frac{2x-1}{(x-5)(x+3)} \right]$$

$$2(x-5) + 4x(x+3) = 2x-1$$

15(b) 1) Set  $> 0$  or  $< 0$   
2) Make common  
denom  
3) Test points

$$\frac{5}{x+2} \leq \frac{3}{x}$$

$$x \frac{5}{x+2} - \frac{3}{x} \leq 0$$

$$\frac{5x-3x-6}{x(x+2)} \leq 0$$

$$\frac{2x-6}{x(x+2)} \leq 0$$

$$\frac{x+2}{-2} + \frac{x+2}{0} + \frac{x+2}{3}$$

$$(-\infty, -2) \cup (0, 3]$$

$$x < -2 \text{ or } 0 < x \leq 3$$

# PARTIAL FRACTIONS

$$\frac{Ax^2 + Bx + C + D}{x^4 + 11}$$

$$\frac{2x-3}{(x+3)(x^2+7)} = \frac{A}{x+3} + \frac{Bx+C}{x^2+7}$$

$$\frac{\quad}{x^2(x+4)^2} = \frac{D}{x^2} + \frac{C}{x} + \frac{B}{(x+4)^2} + \frac{A}{x+4}$$

16(a)

$$\frac{6x^2 - 11x - 8}{x^3 - x^2 - 2x}$$

$$x(x^2 - x - 2)$$

$$\frac{6x^2 - 11x - 8}{x(x-2)(x+1)} = \frac{A}{x} + \frac{B}{x-2} + \frac{C}{x+1}$$

$$6x^2 - 11x - 8 = A(x-2)(x+1) + Bx(x+1) + Cx(x-2)$$

$$6x^2 - 11x - 8 = Ax^2 - Ax - 2A + Bx^2 + Bx + Cx^2 - 2Cx$$

$$6 = A + B + C$$

$$-11 = -A + B - 2C$$

$$-8 = -2A$$

$$\begin{bmatrix} 1 & 1 & 1 \\ -1 & 1 & -2 \\ -2 & 0 & 0 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 6 \\ -11 \\ -8 \end{bmatrix}$$

17  
Pull out  
common  
factors

$$\frac{4(2x-5)^3(3x^2+1)^{2/3} - 6(2x-5)^2(3x^2+1)^{1/3+1/3}}{(3x^2+1)^{1/3}}$$

$$\frac{2(2x-5)^2(3x^2+1)^{1/3} [2(2x-5) - 3(3x^2+1)]}{(3x^2+1)^{1/3+2/3}}$$

$$\frac{2(2x-5)^2 [4x - 10 - 9x^2 - 3]}{3x^2+1}$$

$$- \frac{2(2x-5) [9x^2 + 4x + 13]}{3x^2+1}$$

$$\ln e^7 = 7$$

$$\log_3 9 = \log_3 3^2 = 2$$

$$\log_8 \sqrt[3]{64} = \log_8 8^{2/3} = 2/3$$

$$\log_9 \frac{1}{81} = \log_9 9^{-2} = -2$$

$$e^{3 \ln 5} = 5^3 = 125$$

### Properties of Logs

$$\log_b m + \log_b n = \log_b (mn)$$

$$\log_b m - \log_b n = \log_b \left(\frac{m}{n}\right)$$

$$\log_b m^p = p \log_b m$$

$$\log_3 \sqrt[5]{27} = x$$

$$\log_{1/3} \sqrt[3]{27} = \frac{1}{3} x$$

$$\sqrt[5]{27} = \frac{1}{3} x$$

$$\sqrt[5]{3^3}$$

$$3^{3/5} = 3^{-x}$$

$$\frac{3}{5} = -x$$

$$\boxed{-\frac{3}{5} = x}$$

$$e^{\ln(3x+7)} = 4$$

$$3x+7 = e^4$$

$$x = \frac{e^4 - 7}{3}$$

$$\approx \dots$$

$$f) \ln(x+3) + \ln(2x) = 5$$

$$e^{\ln(2x^2+6x)} = e^5$$

$$2x^2+6x = e^5$$

$$2x^2+6x - e^5 = 0$$

$$x = \frac{-6 \pm \sqrt{36 - 4(2)(-e^5)}}{2(2)}$$

$$= \frac{-6 \pm \sqrt{36 + 8e^5}}{4}$$

$$x = 7.24 \quad x = -10.24$$

$$h) e^{2x} + 4e^x - 12 = 0$$

$$(e^x - 2)(e^x + 6) = 0$$

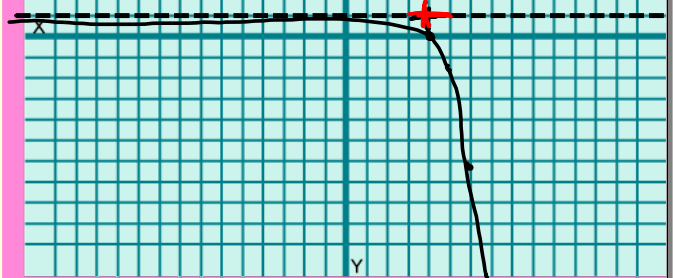
$$e^x - 2 = 0 \quad e^x + 6 = 0$$

$$\ln e^x = \ln 2 \quad \ln e^x = \ln(-6)$$

$$x = \ln 2 \quad x = \ln(-6)$$

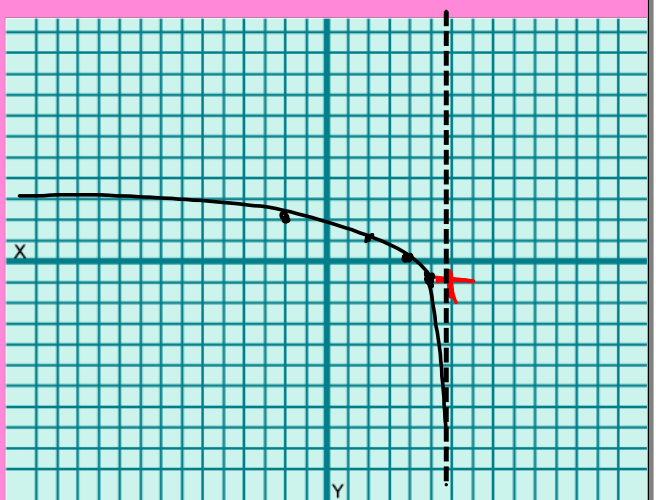
$$y = -e^{x-4} + 1$$

0	$e^0 = 1$
1	$e^1 = 2.7$
2	$e^2 = 7.4$



$$y = \log_2(6-x) - 1$$

$2^0$	-1	0
$2^1$	-2	1
$2^2$	-4	2
	-8	3



St. Dev.

- 1) Find mean.
- 2) Data - mean
- 3) Square difference
- 4) Find mean of squares
- 5)  $\sqrt{\quad}$

Outliers

$$IQR * 1.5 = \#$$

$$\text{Lower boundary} = Q_1 - \#$$

$$\text{Upper boundary} = Q_3 + \#$$

population data

$$Z = \frac{x - \mu}{\sigma}$$

Conf. Intervals

$$\sigma_{\bar{x}} = \frac{s}{\sqrt{n}}$$

$$E = Z \cdot \sigma_{\bar{x}}$$

$$\bar{x} \pm E$$

