

Midterm Scoring: $y' = y^2$
 $= y^3$

T/F: $y' = f(y)$ always has

some solution $y: \mathbb{R} \rightarrow \mathbb{R}$

(i.e. $y = y(t)$ defined for all t).

[False! E.g. $f(y) = y^2 + 1 \dots$]

So midterm out of 23

Min passing:

(1) - Lagrange better than monomial

when x_i close together

$$- A = SBS^{-1} \Rightarrow A^{10} = SB^{10}S^{-1}$$

(2) 1 (or more) for writing

$$x_{n+1} - (1+3h)x_n = 0 \quad (\text{homog.})$$

$$\text{and } x_n = C(1+3h)^n.$$

(3) .5 (or more) for

$$y_{n+1} = y_n + h(3y_n + 3)$$

$$\Rightarrow y_{n+1} = (1+3h)y_n + 3h$$

(4) 1 pt for setting up

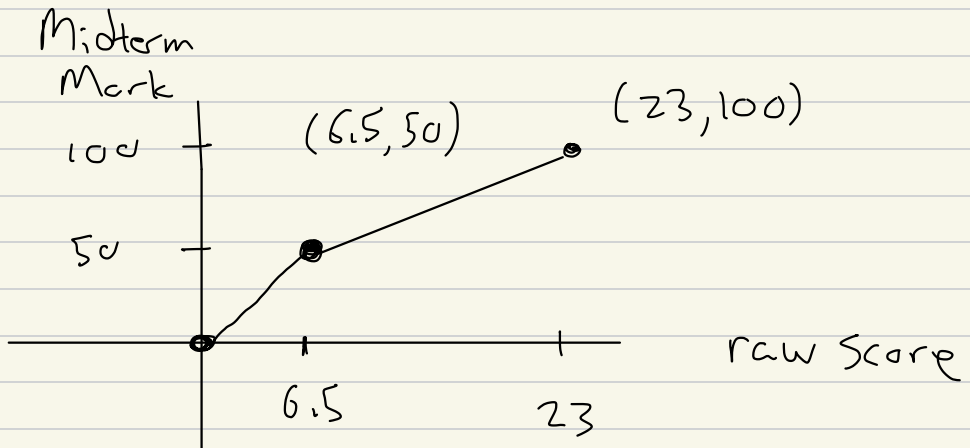
- monomial interp
- Lagrange interm

1.5 pts for

- Noting $p(x)$, $q(x+10)$ are of degree 2, agree on $x = 1, 2, 3$, and giving (possibly incorrect or incomplete) argument based on this.

Total Min Pass:

$$4 + 1 + 0.5 + 1 = 6.5$$



So:

if $0 \leq \text{raw} \leq 6.5$:

$$\text{Midterm} = 50\% \left(\frac{\text{raw}}{6.5} \right)$$

if $6.5 \leq \text{raw} \leq 23$

Midterm =

$$\frac{x - 23}{6.5 - 23} 50\% + \frac{x - 6.5}{23 - 6.5} 100\%$$

raw

midterm

0

0

6.5

50%

7

51.5151...

9

57.5757...

11

63.6363...

13

69.6969...

15

75.7575...

Median 16.25

79.5454... (A⁻)

17

81.8181...

19

87.8787...

21

93.9393...

23

100

MATLAB

>> syms x

$$\begin{aligned} \Rightarrow y &= (x-23) \cdot (0.5) / (6.5-23) \\ &+ (x-6.5) \cdot 1 / (23-6.5) \end{aligned}$$

$$y = \frac{x}{33} + \frac{10}{33}$$

Simplified Scaling

$$\text{Midterm}(raw) = \frac{raw}{33} + \frac{10}{33}$$

$$\text{Check: } raw = 11 \Rightarrow \frac{11}{33} + \frac{10}{33} = \frac{21}{33} = \frac{63}{99}$$