

21. a) end behaviour
as $x \rightarrow \infty$ $y \rightarrow \infty$
as $x \rightarrow -\infty$ $y \rightarrow \infty$

Degree = 4
Lead. Coeff = 2

possible turning points

3 or 1

possible zeros

4 or 3 or 2 or 1 or none

b) Degree = 5
Lead. Coeff = -2

end behaviour
as $x \rightarrow \infty$ $y \rightarrow -\infty$
as $x \rightarrow -\infty$ $y \rightarrow \infty$

possible turning points

4 or 2 or none

possible zeros

5 or 4 or 3 or 2 or 1

22. i) a) exponential since
1st ratios = $\frac{\text{next}}{\text{prev}} = 2$ } true only if HA
is $y = 0$

b) $y = a b^{x/c}$
 $y = a(2)^{x/5}$

sub pt. $(-6, 0.3)$

$$0.3 = a(2)^{-6/5}$$

$$\frac{0.3}{2^{-6/5}} = a$$

$$0.3(2)^{6/5} = a$$

$$0.69 = a$$

$$\therefore y = 0.69(2)^{x/5}$$

22. ii) a) linear since
1st differences = 3

$$b) y = mx + b$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 2}{0.6 - 0.2}$$

$$= \frac{3}{0.4} = 7.5$$

$$y = 7.5x + b$$

sub pt. $(0.2, 2)$

$$2 = 7.5(0.2) + b$$

$$2 = 1.5 + b$$

$$0.5 = b$$

$$\therefore y = 7.5x + 0.5$$

iii) a) quadratic since
2nd differences = 2

$$y = ax^2 + bx + c$$

y-int
 $(0, 13)$

$$y = ax^2 + bx + 13$$

sub pt.
 $(1, 8) \rightarrow ① 8 = a + b + 13$

sub pt.
 $(2, 5) \rightarrow ② 5 = 4a + 2b + 13$

$$① \times 2 \quad 16 = 2a + 2b + 26$$

subtract $-11 = 2a - 13$

$$\frac{2=2a}{1=a}$$

$$8 = a + b + 13$$

$$8 = 1 + b + 13$$

$$-6 = b$$

$$\therefore y = -1x^2 - 6x + 13$$