

2) Match each function to its end behavior

$$y = 3x^7$$

$$y = -\frac{1}{2}x^3$$

$$y = 2x^4$$

$$y = -0.25x^6$$

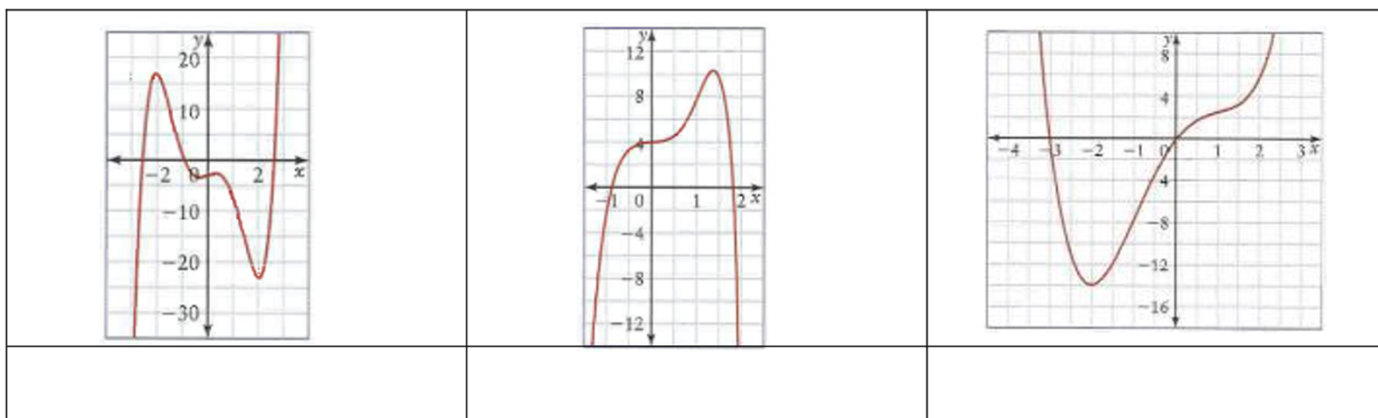
End Behaviour	Functions
Q3 to Q1	
Q2 to Q4	
Q2 to Q1	
Q3 to Q4	

4) Use end behaviours, turning points, and zeros to match each equation with the most likely graph. Write the letter of the equation beneath the graph.

A) $g(x) = 0.5x^4 - 3x^2 + 5x$

B) $h(x) = x^5 - 7x^3 + 2x - 3$

C) $p(x) = -x^6 + 5x^3 + 4$



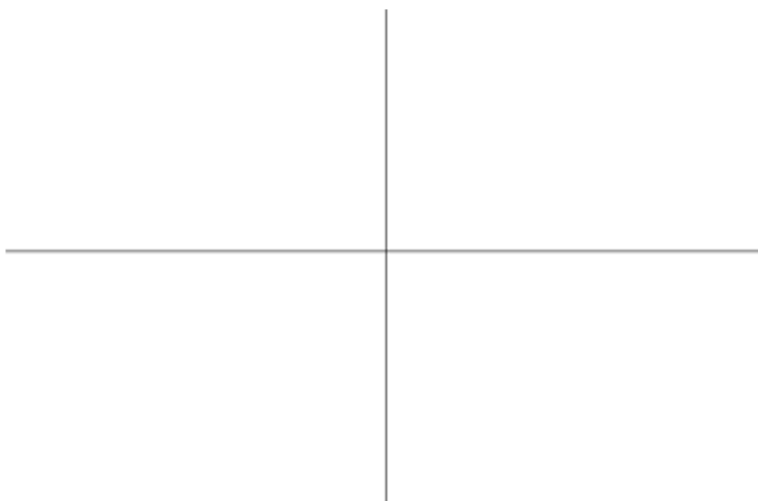
5) Complete the following table

Equation	Degree	Sign of Leading Coefficient	End Behaviour	Possible number of turning points	Possible number of x-intercepts
$f(x) = 6x^3 + 2x$					
$g(x) = -20x^6 - 5x^3 + x^2 - 17$					
$p(x) = 22x^4 - 4x^3 + 3x^2 - 2x + 2$					
$h(x) = -x^5 + x^4 - x^3 + x^2 - x + 1$					

10) For each function, complete the chart and sketch a possible graph of the function labelling key points.

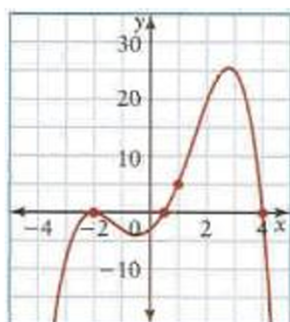
c) $h(x) = (x - 4)^2(x + 3)^3$

Degree	Leading Coefficient	End Behaviour	x-intercepts	y-intercept



12) Write the equation of each of the following functions:

a)



b) The quartic function has zeros at -3, -1, and 2 (order 2) and passes through the point (1, 4)

12) Write an equation for the function that results from the given transformations.

a) The function $f(x) = x^4$ is compressed vertically by a factor of $\frac{3}{5}$, stretched horizontally by a factor of 2, reflected horizontally in the y -axis, and translated 1 unit up and 4 units to the left.

b) The function $f(x) = x^3$ is compressed horizontally by a factor of $\frac{1}{4}$, stretched vertically by a factor of 5, reflected vertically in the x -axis, and translated 2 units to the left and 7 units up.

13) Identify the a , k , d and c values and explain what transformation is occurring to the parent function for $g(x) = 2[-4(x + 7)]^4 - 1$

16) Consider the polynomial function $f(x) = -3x^4 + 6x^2 - 10$

a) Show algebraically whether f is even, odd or neither.

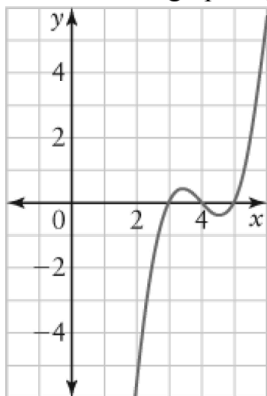
c) What are the maximum and minimum number of zeros the above polynomial could have?

29. The height of a square-based box is 4 cm more than the side length of its square base. If the volume of the box is 225 cm^3 , what are its dimensions?
30. The height, h , in metres, of a weather balloon above the ground after t seconds can be modelled by the function $h(t) = -2t^3 + 3t^2 + 149t + 410$, for $0 \leq t \leq 10$. When is the balloon exactly 980 m above the ground?
31. Amit has designed a rectangular storage unit to hold large factory equipment. His scale model has dimensions 1 m by 2 m by 4 m. By what amount should he increase each dimension to produce an actual storage unit that is 9 times the volume of his scale model?
32. Solve $-x^3 + 5x^2 - 8x + 4 \geq 0$ algebraically and graphically.

Multiple choices:

- _____ 2. If $P(x) = 4x^3 - 11x^2 - 6x + 9$ is divided by $x - 3$, what is the remainder?
 a. $P(3)$ c. 0
 b. $P(-3)$ d. A and C
- _____ 3. When $x^3 - 4x^2 + mx - 2$ is divided by $x - 1$, the remainder is -7 . What is the value of m ?
 a. $m = -2$ c. $m = 0$
 b. $m = 1$ d. $m = -8$
- _____ 4. A factor of $x^3 - 5x^2 - 8x + 12$ is
 a. 1 c. $x - 1$
 b. 8 d. $x - 8$
- _____ 5. Which of the following binomials is a factor of $x^3 - 6x^2 + 11x - 6$?
 a. $x - 1$ c. $x + 7$
 b. $x + 1$ d. $2x + 3$
- _____ 6. Which set of values for x should be tested to determine the possible zeros of $x^3 - 2x^2 + 3x - 12$?
 a. 1, 2, 3, 4, 6, and 12 c. $\pm 1, \pm 2, \pm 3, \pm 4$, and ± 6
 b. $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6$, and ± 12 d. $\pm 2, \pm 3, \pm 4, \pm 6$, and ± 12
- _____ 7. Find k if $2x + 1$ is a factor of $kx^3 + 7x^2 + kx - 3$.
 a. $k = -2$ c. $k = \frac{11}{5}$
 b. $k = 2$ d. none of the above
- _____ 8. Which of the following is the fully factored form of $x^3 - 6x^2 - 6x - 7$?
 a. $(x - 7)(x + 1)^2$ c. $(x - 7)(x^2 + x + 1)$
 b. $(x - 7)(x + 1)(x - 1)$ d. $(x - 6)(x + 1)(x - 1)$

9. Based on the graph of $f(x) = x^3 - 12x^2 + 47x - 60$ shown, what are the real roots of $x^3 - 12x^2 + 47x - 60 = 0$?



- a. 3, 4, 5
 b. -3, -4, -5
 c. impossible to determine
 d. no real roots

10. Which of the following is a quartic polynomial function with zeros 1 (order 2), 2, and -5?

- a. $y = (x - 1)^2(x - 2)(x + 5)$
 b. $y = -\frac{5}{8}(x - 1)^2(x - 2)(x + 5)$
 c. $y = -0.0034(x - 1)^2(x - 2)(x + 5)$
 d. all of the above

11. Examine the following functions. Which function does not belong to the same family?

- a. $y = \frac{1}{3}(x - 2)^3(x + 7)$
 b. $y = -0.000\ 01(x + 7)(x - 2)^3$
 c. $y = \frac{1}{3}(3x - 6)^3(x + 7)$
 d. $y = 104\ 935(x - 2)^3(x + 7)$