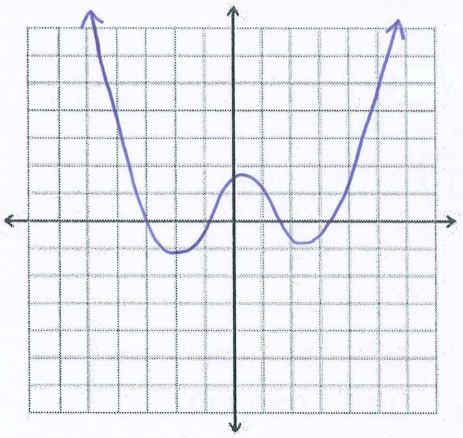
Name ANSWER KEY

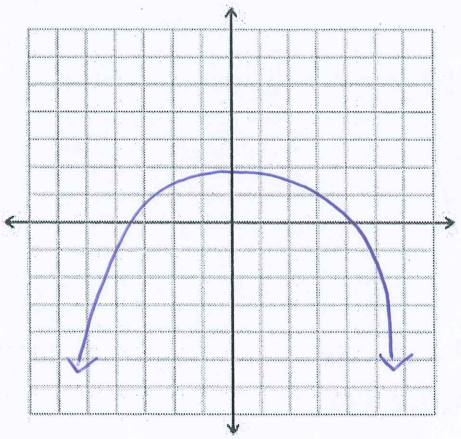
PreCalculus; Sec 2.2a – Polynomial Functions of Higher Degree

Use the Leading Coefficient Test to determine the right and left hand behavior of the polynomial function, then sketch what the graph might look like.

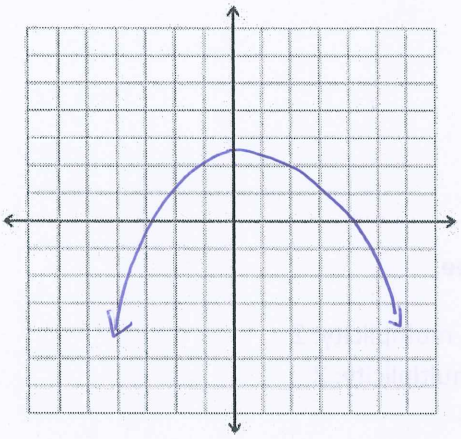
1. $f(x) = 2x^4 - 3x + 1$



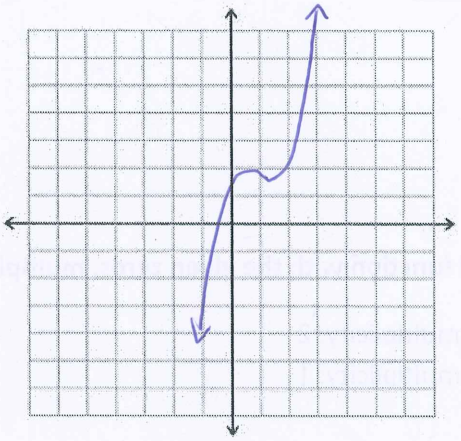
2. $g(x) = 1 - x^6$



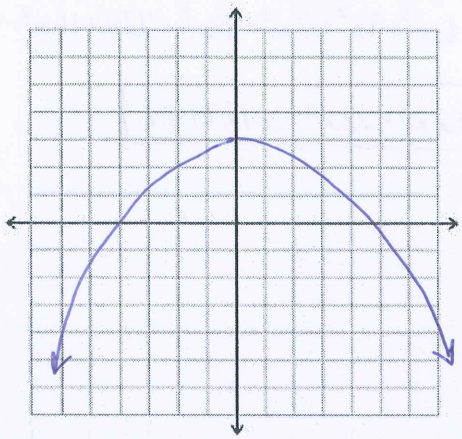
3. $h(x) = 5 - \frac{7}{2}x - 3x^2$



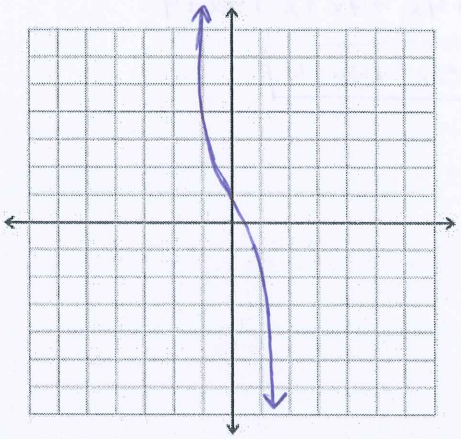
4. $k(x) = \frac{1}{3}x^3 + 5x$



5. $f(x) = -\frac{2}{3}(x^2 - 5x + 3)$



6. $g(x) = -\frac{1}{8}(x^3 + 5x^2 - 7x + 1)$



Find all the real zeros of the polynomial function.

7. $f(x) = 3x^2 - 12x + 3$

$3x^2 - 12x + 3 = 0$

$x^2 - 4x + 1 = 0$

$x = \frac{4 \pm \sqrt{16-4}}{2}$

$= \frac{4 \pm 2\sqrt{3}}{2}$

$= 2 \pm \sqrt{3}$

8. $g(x) = 5x^2 - 10x - 5$

$5x^2 - 10x - 5 = 0$

$x^2 - 2x - 1 = 0$

$x = \frac{2 \pm \sqrt{4+4}}{2}$

$= \frac{2 \pm 2\sqrt{2}}{2}$

$= 1 \pm \sqrt{2}$

9. $f(x) = x^5 + x^3 - 6x$

$x^5 + x^3 - 6x = 0$

$x(x^4 + x^2 - 6) = 0$

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

$x = 0, \pm\sqrt{2}$

10. $f(x) = x^3 - 4x^2 - 25x + 100$

$x^3 - 4x^2 - 25x + 100 = 0$

$x^2(x-4) - 25(x-4) = 0$

$(x^2 - 25)(x-4) = 0$

$x = \pm 5, 4$

Find a polynomial function with the given zeros, multiplicities, and degree.

11. Zero: -2, multiplicity: 2
Zero: -1, multiplicity: 1
Degree: 3

$p(x) = (x+2)^2(x+1)$

$= (x+1)(x^2 + 4x + 4)$

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

$= x^3 + 5x^2 + 8x + 4$

12. Zero: -4, multiplicity: 2
Zero: 3, multiplicity: 2
Degree: 4

$f(x) = (x+4)^2(x-3)^2$

$= (x^2 + 8x + 16)(x^2 - 6x + 9)$

$= x^4 - 6x^3 + 9x^2 + 8x^3 - 48x^2 + 72x + 16x^2 - 96x + 144$

$= x^4 + 2x^3 - 23x^2 - 24x + 144$