Algebra 2 Worksheet Name: Key

Section 6.7 – Investigating Graphs of Polynomial Functions

I. Find the requested information for each polynomial graph. All polynomials are in standard form.

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

Leading Coefficient: -4

Degree: 4 y-intercept: 4

Total Number of Roots: 4 (same as degree)

End Behavior:

$x \to -\infty,\ y \to -\infty$

$x \to +\infty,\ y \to -\infty$

even w/ −

↓ ↓

2. $P(x) = 2x^7 + 6x^5 - 2x^3 + 0$

Leading Coefficient: 2

Degree: 7 y-intercept: 0

Total Number of Roots: 7

End Behavior:

$x \to -\infty,\ y \to -\infty$

$x \to +\infty,\ y \to +\infty$

odd w/ +

↓ ↑

3. $P(x) = 5x^6 + 3x^5 + \ldots + 4x - 9$

Leading Coefficient: 5

Degree: 6 y-intercept: -9

Total Number of Roots: 6

End Behavior:

$x \to -\infty,\ y \to +\infty$

$x \to +\infty,\ y \to +\infty$

even w/ +

↑ ↑

4. $P(x) = -9x^5 + 4x + \ldots + 2x + 4$

Leading Coefficient: -9

Degree: 5 y-intercept: 4

Total Number of Roots: 5

End Behavior:

$x \to -\infty,\ y \to +\infty$

$x \to +\infty,\ y \to -\infty$

odd w/ −

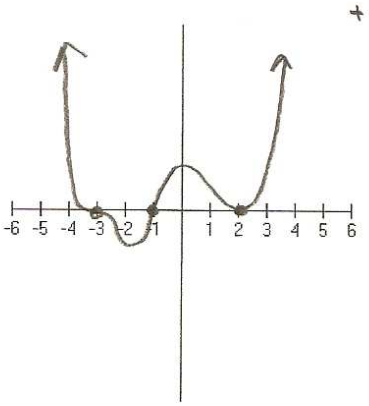
↑ ↓

II. Sketch a graph of the function WITHOUT using the graphing calculator. Include real zeros on the graph and the end behavior.

5. $P(x) = +(x-2)^2(x+3)^3(x+1)$

2 d.r. −3 t.r. −1 single

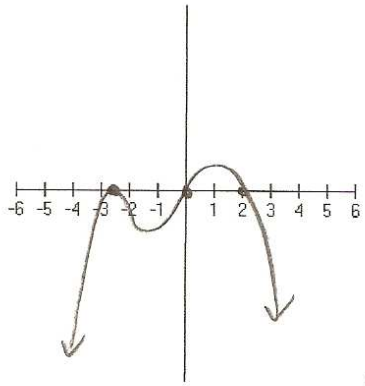
$\boxed{\text{degree} = 6}$



6. $P(x) = -x(2x+5)^2(x-2)$

0 single $-\frac{5}{2}$ d.r. -2.5 2 single

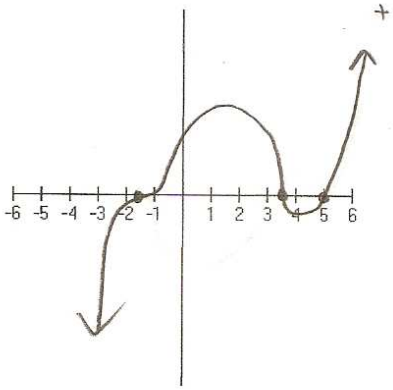
$\boxed{\text{degree} = 4}$



7. $P(x) = +(2x+3)^3(x-5)(2x-7)$

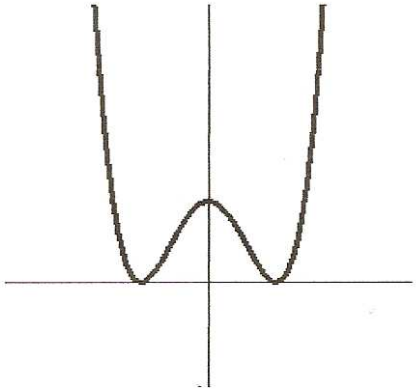
$-\frac{3}{2}$ t.r. -1.5 5 single $\frac{7}{2}$ single 3.5

$\boxed{\text{degree} = 5}$



IV. Identify whether the following graphed functions have an odd or even degree and also whether they have a positive negative leading coefficient. Also, for the real roots, identify whether positive or negative and their multiplicity.

8.



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Odd or Even? even

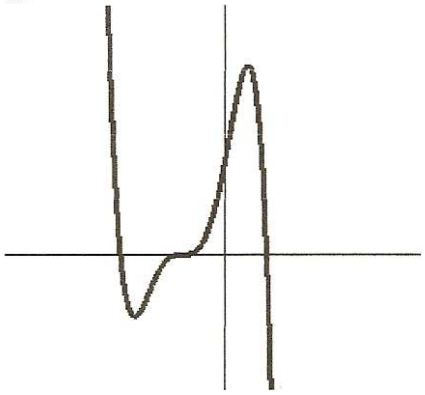
+ or − Leading Coefficient? +

Real Roots? (+ or − AND multiplicity)

one positive real root w/ mult. 2

one negative real root w/ mult. 2

9.



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Odd or Even? odd

+ or − Leading Coefficient? −

Real Roots? (+ or − AND multiplicity)

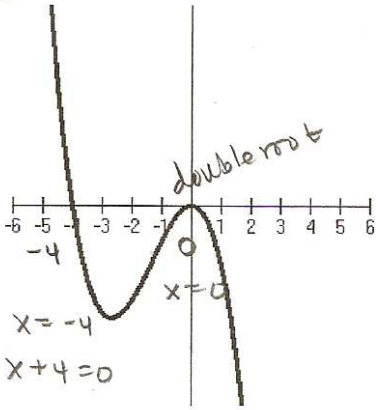
one positive real root w/ mult. 1

a negative real root w/ mult. 3

and a negative real root w/ mult. 1

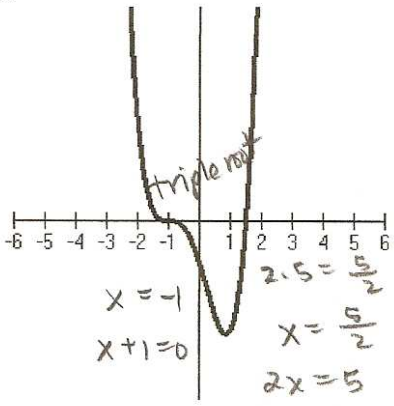
III. Write a possible equation for a polynomial with the following sketch. Leave your equation in factored form.

10.



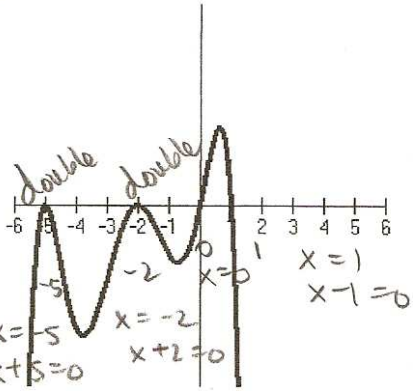
$$\boxed{y = x^2(x+4)}$$

11.



$$\boxed{y = (x+1)^3(2x-5) \text{ OR } y = (x+1)^3\left(x - \frac{5}{2}\right)}$$

12.



$$\boxed{y = x(x+5)^2(x+2)^2(x-1)}$$