PC12 Polynomials Assignment Name: _____

1. Is $y = \sqrt{3}x^3 + \pi x - e$ a polynomial? $e \approx 2.718$

2. Is $y = 2x^5 + 3x^2 + \frac{1}{x} + 5$ a polynomial?

3. Sketch $y = -(x+3)^3$ and label 3 points.

4. Sketch $y = (x+4)(x)(x-6)$.

5. $f(x) = (3x-2)(x+2)^2(x-1)^{\frac{2}{3}}$
   a. x-intercepts?

   b. y-intercept?

   c. Evaluate $f(-1)$.

   d. Fun: what does the multiplicity $\frac{2}{3}$ do?

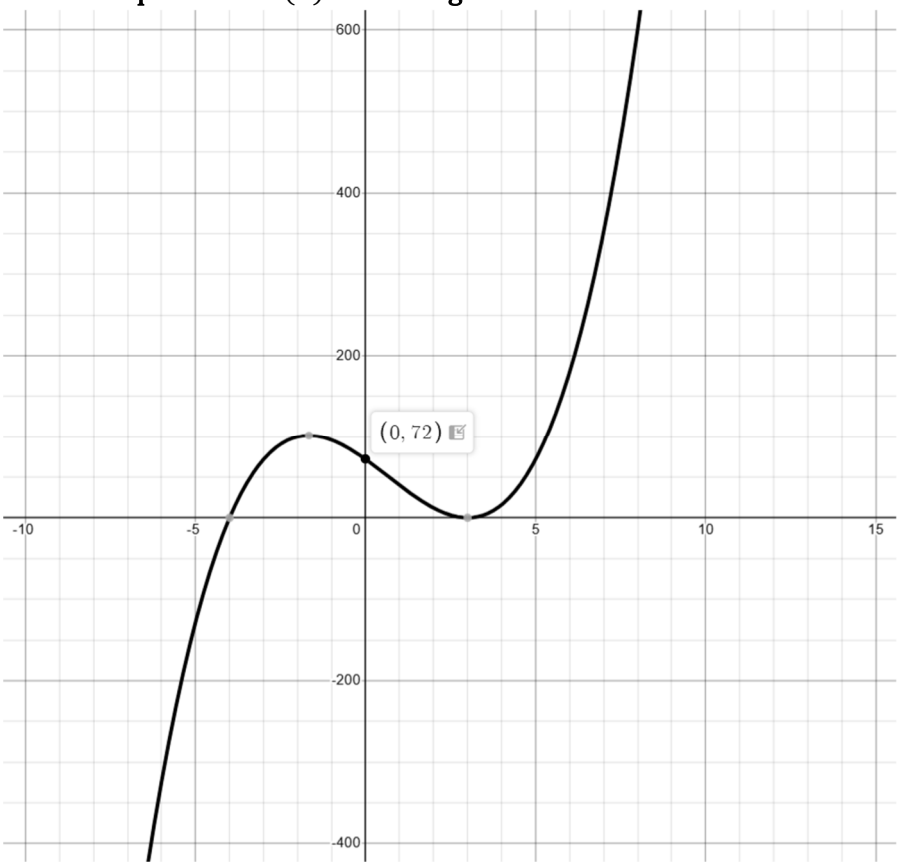
6. $y = 3x^3 - 10x^2 - 8x$. Find the x-intercepts.

7. Solve $h(t) = 27 - 17t^2$
   a. When land in water?

   b. Initial height?

   c. How long after you jump are you above a height of 15 m?

8. Find the equation of $P(x)$ in the diagram below:

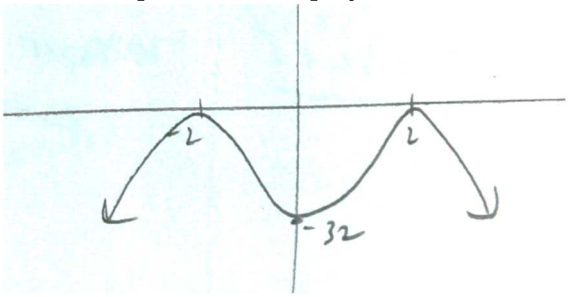


9. Solve $3x^2 = 12x$.

10. Factor and sketch $P(x) = x^4 + 2x^3 - 3x^2 - 4x + 4$.

11. Factor and sketch $y = x^3 - 27x + 54$.

12. Find the equation of the polynomial below:



13. Sketch $y = -(2 - x)^2(x - 4)^3(x)$.

14. Find the degree of the polynomial:

a. $P(x) = 2x^3 + 5x^2 - x^7 + 10x$

b. $y = 2x^2y^3 + 4x^4 - 3x^2 + 7$

15. $f(x) = \frac{x^5+2x^4+3x^2+4x+1}{x-2}$

a. Find the remainder using the Remainder Theorem.

b. Find the remainder using Long Division.

c. Find the remainder using Synthetic Division.

d. Express this function as a Quotient and its Remainder and Divisor.

16. Defeat tough ChatGPT Question:

Question:

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

When $f(x)$ is divided by $(x - 2)$, the remainder is 6.

Find the value of k.

17. What are some characteristics of a polynomial function?

18. $y = ax^5 + bx^4 + cx^3 + dx^2 + ex + f$. Number of possible solutions?

19. $y = ax^4 + bx^3 + cx^2 + dx + f$. Number of possible solutions?