

1. Simplify, write in standard form, and classify:  $(2x^4 + 16x^3 + 4) - (-5x^5 + 2x^4 + 8)$

2. Find the **zeros** of  $y = x(2x - 3)^2(x^2 + 4)$

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

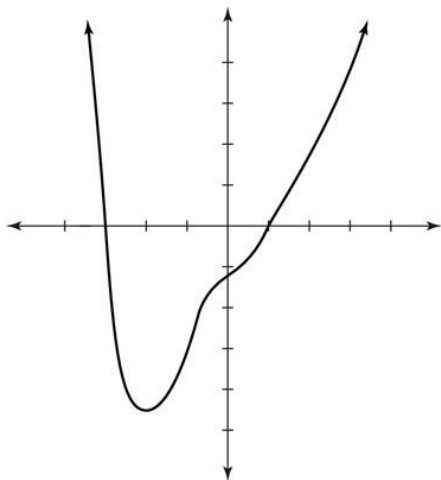
Zeros: \_\_\_\_\_

Standard form: \_\_\_\_\_

Classify by Degree: \_\_\_\_\_

Classify by # of term(s): \_\_\_\_\_

4. Write a statement that best describes the zeroes of the **quartic** function shown.



**Factor the following for #5-6. Show ALL work.**

5.  $2x^3 + 3x^2 - 9x$

6.  $2x^2 - 32$

**Solve by factoring for #7-9. Show ALL work and give EXACT answers.**

7.  $x^4 - 8x^2 = 48$

8.  $x^3 - 2x^2 + 9x - 18 = 0$

9.  $343a^3 - 27 = 0$

10. Factor:  $x^2 - y^2$

11. Determine which binomial is a factor of:  $x^3 - x^2 + 4x - 12$ .

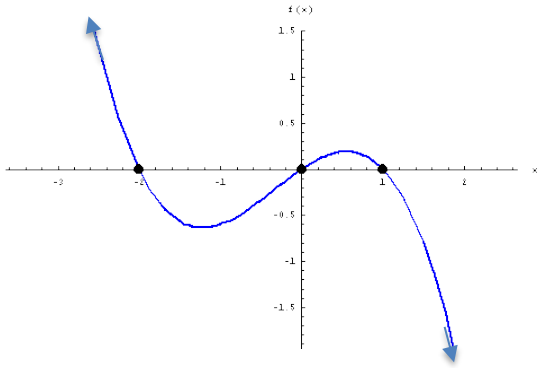
a)  $(x + 2)$

c)  $(x - 2)$

b)  $(x + 8)$

d)  $(x - 8)$

12. (a) What are the zeros of the polynomial. (b) Write the equation of the polynomial in standard form.



13. Write the polynomial in standard form that has zeros of  $0$ ,  $\frac{2}{3}$ , and  $4$ .

14. Write the polynomial in standard form that has zeros of  $-2$  and  $3 + 2i$ .

Divide using synthetic or long division.

15.  $(50x^3 + 10x^2 - 35x - 7) \div (5x - 4)$

16.  $\frac{x^3 - 13x^2 + 40x + 18}{x - 7}$

**17. Find the EXACT roots using division.**

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

How many **total** solutions? \_\_\_\_\_

How many **real-rational** solutions? \_\_\_\_\_

How many **imaginary** solutions? \_\_\_\_\_

**18.** Expand using Pascal's Triangle:  $(2a - b^3)^5$

18. \_\_\_\_\_

**19.** Find the 6<sup>th</sup> term of  $(2x + 3)^8$  using Pascal's Triangle.

19. \_\_\_\_\_

**20.** A rectangle has the dimensions of  $(x - 2)$  and  $(-x + 10)$ .

a) Write an equation to model the area in factored form of the rectangle.

b) At what x-value does the maximum area occur?

c) What is the maximum area of the box?