

Advanced Algebra

Disguised Quadratics Assignment #5

Factor the following problems, state the roots, and then use the derivative to state whether this graph will be a smooth parabola like graph or a W type graph. Then based on your information, make the sketch of the graph. You can then check in your calculator.

1) $y = x^4 - 8x^2 + 12$

$(x^2 - 6)(x^2 - 2)$

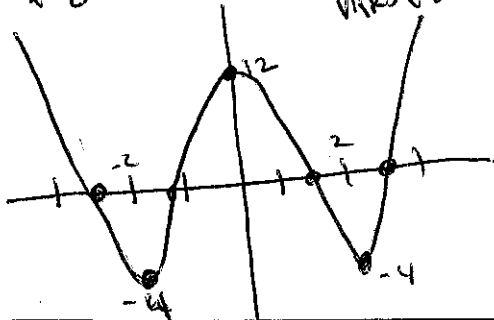
Roots: $x = \pm\sqrt{6} \approx \pm 2.4$ $x = \pm\sqrt{2} \approx \pm 1.41$

Derivative: $4x^3 - 16x$

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

$x = 0$ $x = \pm 2$

$\text{VARs}(2) = -4$
 $\text{VARs}(-2) = -4$



3) $y = x^4 - 5x^2 - 24$

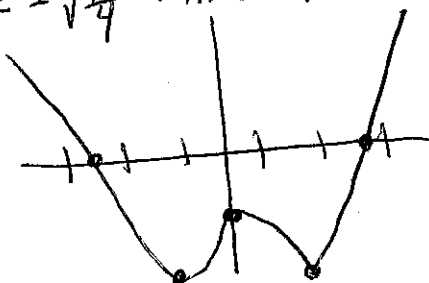
Factored: $(x^2 - 8)(x^2 + 3)$

Roots: $\pm\sqrt{8} \approx \pm 2.83$

Derivative: $4x^3 - 10x = 0$

$x(4x^2 - 10) = 0$

$x = 0$ $x = \pm\sqrt{10/4} \approx \pm 1.58$ $\text{VARs}(1.58) = -30.25$



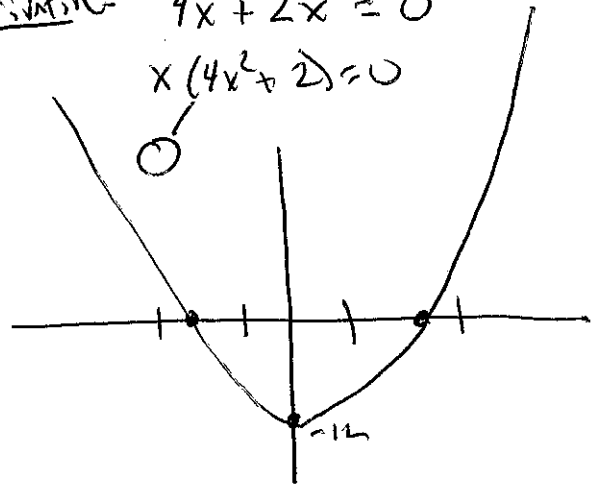
2) $y = x^4 + x^2 - 12$

Factored: $(x^2 + 4)(x^2 - 3)$

Roots: $x = \pm\sqrt{3} \approx \pm 1.73$

Derivative: $4x^3 + 2x = 0$

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



4) $y = x^4 + 7x^2 + 12$

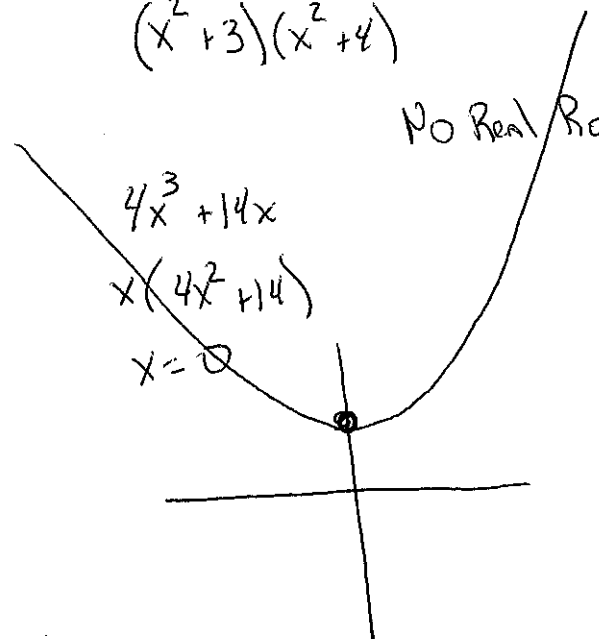
$(x^2 + 3)(x^2 + 4)$

No Real Roots

$4x^3 + 14x$

$x(4x^2 + 14)$

$x = 0$

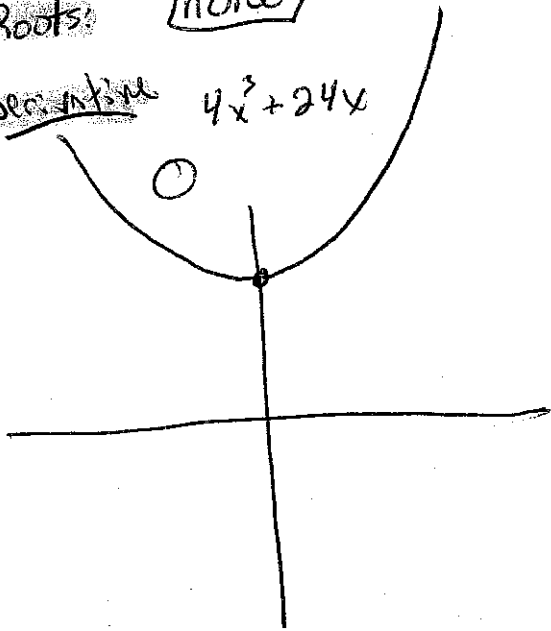


5) $y = x^4 + 12x^2 + 27$

Factorial $(x^2 + 9)(x^2 + 3)$

Roots: none

Derivative $4x^3 + 24x$



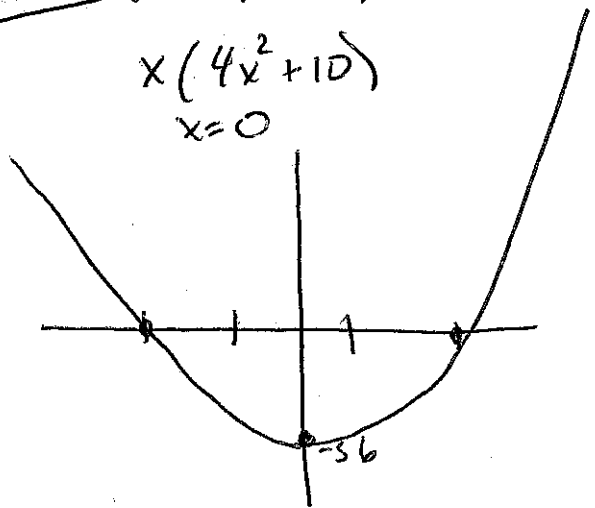
6) $y = x^4 + 5x^2 - 36$

Factorial $(x^2 + 9)(x^2 - 4)$

Roots $x = \pm 2$

Derivative $4x^3 + 10x$

$x(4x^2 + 10)$
 $x = 0$



7) $y = 2x^4 - 3x^2 - 18$

Does not factor

~~$\frac{-36}{-3}$~~

I can tell y intercept is below x axis and 'a' is positive so it opens up.. so the roots are decimals

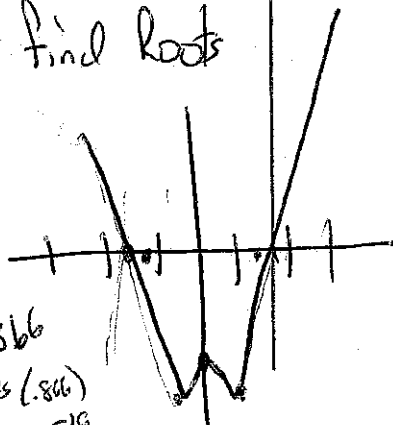
Use your calculator to find roots

± 1.96 ~~± 1.78~~

Derivative

$8x^3 - 6x$
 $2x(4x^2 - 3)$
 $0 \quad x = \pm \sqrt{\frac{3}{4}} \approx \pm 0.866$

± 0.866
Mps (.866)
-19



8) $y = 3x^4 - 1x^2 - 10$

$(3x^2 + 5)(x^2 - 2)$

$x = \pm \sqrt{2} \approx \pm 1.41$

Derivative $12x^3 - 2x$

$12x^3 - 2x = 0$

$2x(6x^2 - 1) = 0$

$x = 0 \pm .41$

