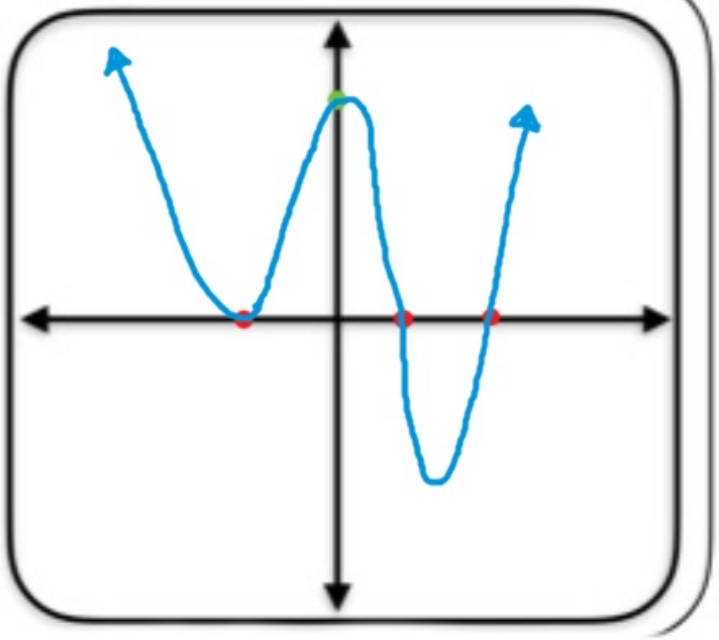
Math III More Zeros of Polynomials and Sketching

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



Zeros

$\sqrt{(x+2)^2}=\sqrt{0}$

$x+2=0$

$x=-2$ mult 2

$x-2=0$

$x=2$

$x-4=0$

$x=4$

x-int = $(-2,0)$ $(2,0)$

y-int = $(0+2)^2(0-2)(0-4)$

$(4)(-2)(-4)$

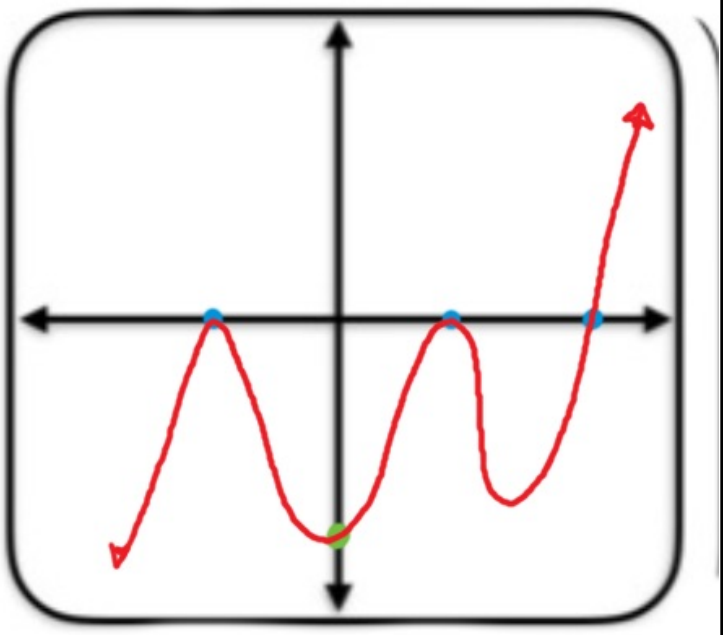
32

Ends

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

$x \to \infty$ $y \to \infty$

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



Zeros

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

$x=-2$; mult 2	$x=2$ mult 2	$x=4$

x-int = $(-2,0)$ $(2,0)$ $(4,0)$

y-int = $(0+2)^2(0-2)^2(0-4)$

$(4)(4)(-4)$

-64

$(0,-64)$

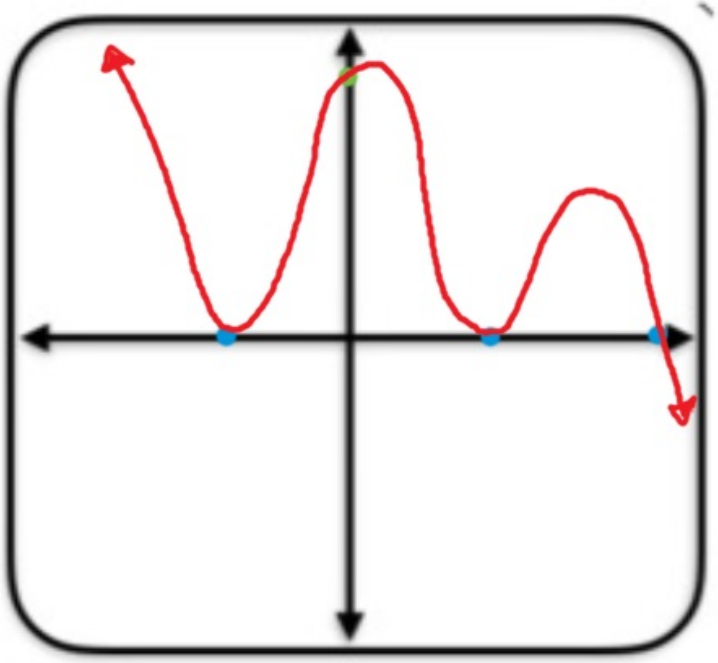
Ends

$x^2 \cdot x^2 \cdot x = x^5$

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

$x \to \infty$ $y \to \infty$

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



Zeros

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

$x=-2$ mult 2	$x=2$ mult 2	$x=4$

x-int = $(-2,0)(2,0)(4,0)$

y-int = $-(0+2)^2(0-2)^2(0-4)$

$-(4)(4)(-4)$ $(0,64)$

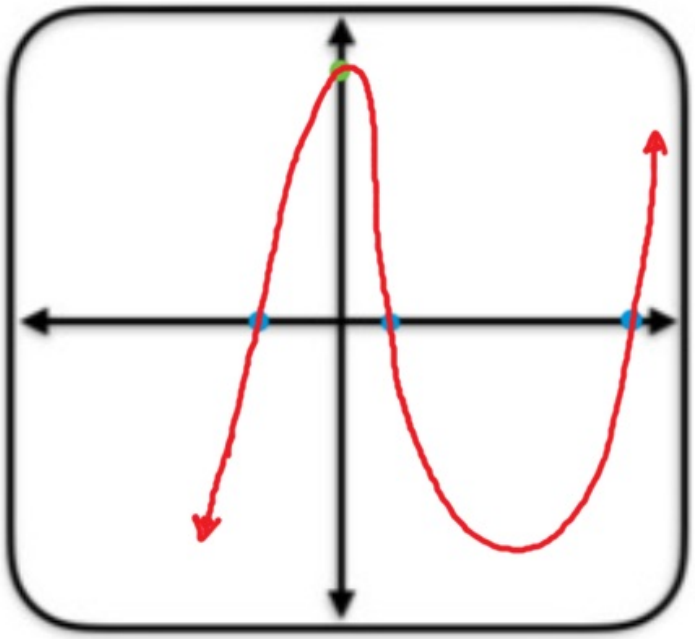
64

Ends $-(x^2)(x)^2(x) = -x^5$

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

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

$$f(x)=(2x+3)(4x-3)(x-5)$$



Zeros

$2x+3=0$ $\quad -3\ -3$

$\frac{2x}{2}=\frac{-3}{2}$

$x=-1.5$

$4x-3=0$ $\quad +3\ +3$

$\frac{4x}{4}=\frac{3}{4}$

$x=.75$

$x-5=0$

$x=5$

x-int = $(-1.5,0)\ (.75,0)\ (5,0)$

y-int = $[2(0)+3][4(0)-3](0-5)$

$(3)(-3)(-5)$ $\quad (0,45)$

45

Ends $(2x)(4x)(x)=8x^3$

$x \to -\infty \quad y \to -\infty$

$x \to \infty \quad y \to \infty$

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

Zeros

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

$x=-2$ mult 3 $x=3$ mult 2

x-int = $(-2,0)$ $(3,0)$

y-int = $(0+2)^3(0-3)^2$

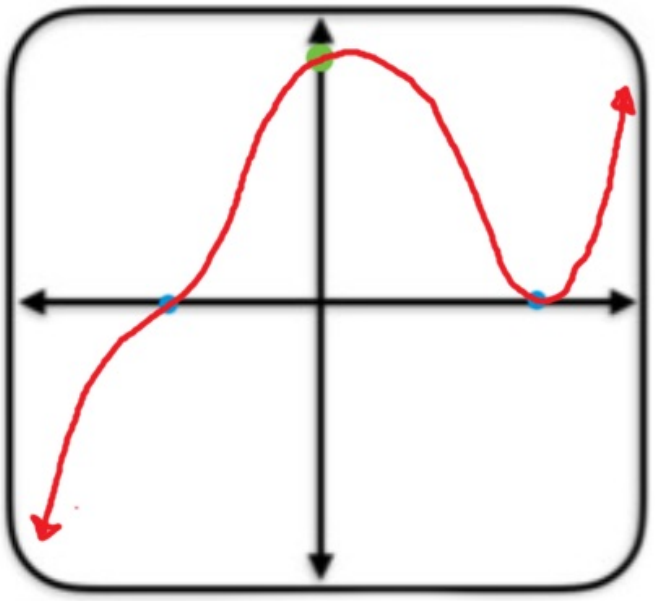
$(8)(9)$ $(0,72)$

72

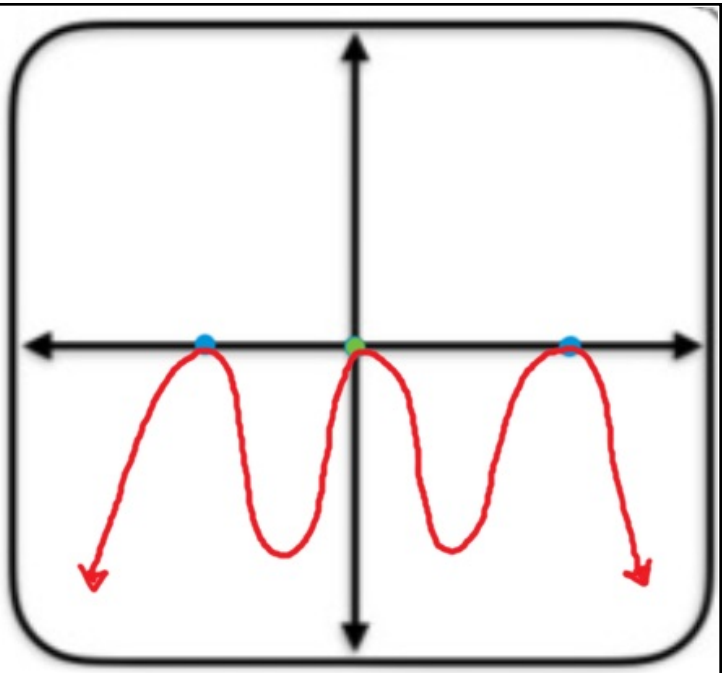
Zeros $(x^3)(x^2)=x^5$

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

$x \to \infty$ $y \to \infty$



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



Zeros

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

$x=0$ mult 2	$x=-2$ mult 2	$x=3$ mult 2

x-int $(0,0)\ (-2,0)\ (3,0)$

y-int $-(0)^2(0+2)^2(0-3)^2$

$(0)(4)(9)$

0

$(0,0)$

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

$x \to -\infty \quad y \to -\infty$

$x \to \infty \quad y \to -\infty$