

Bell



Ringer

Multiplicity is the number of times a root is represented in a polynomial

Me 2 List the multiplicities of the zeroes of each of the following polynomials.

(a) $P(x) = x^2 + 2x - 15 = (x - 3)(x + 5)$

(b) $P(x) = x^2 - 14x + 49 = (x - 7)^2$

(c) $P(x) = 5x^5 - 20x^4 + 5x^3 + 50x^2 - 20x - 40 = 5(x+1)^2(x-2)^3$

(d) $Q(x) = x^8 - 4x^7 - 18x^6 + 108x^5 - 135x^4 = x^4(x-3)^3(x+5)$

(e) $R(x) = x^7 + 10x^6 + 27x^5 - 57x^3 - 30x^2 + 29x + 20 = (x+1)^3(x-1)^2(x+5)(x+4)$

Oct 8-3:04 PM

$$y = x^4 - 5x^2 + 4$$

$$0 = x^4 - 5x^2 + 4$$

$$0 = (x^2 - 1)(x^2 - 4)$$

$$0 = (x+1)(x-1)(x+2)(x-2)$$

Nov 16-12:48 PM

OK, now what if we start with a function...how can we find the roots of an equation that correspond to the zeros of the graph of this function?

$$\text{ex) } f(x) = x^3 + 5x^2 - 4x - 20$$

remember factoring by grouping?

$$0 = \frac{x^2(x+5) - 4(x+5)}{}$$

$$0 = (x+5)(x^2-4)$$

DOPS

$$0 = (x+5)(x-2)(x+2)$$

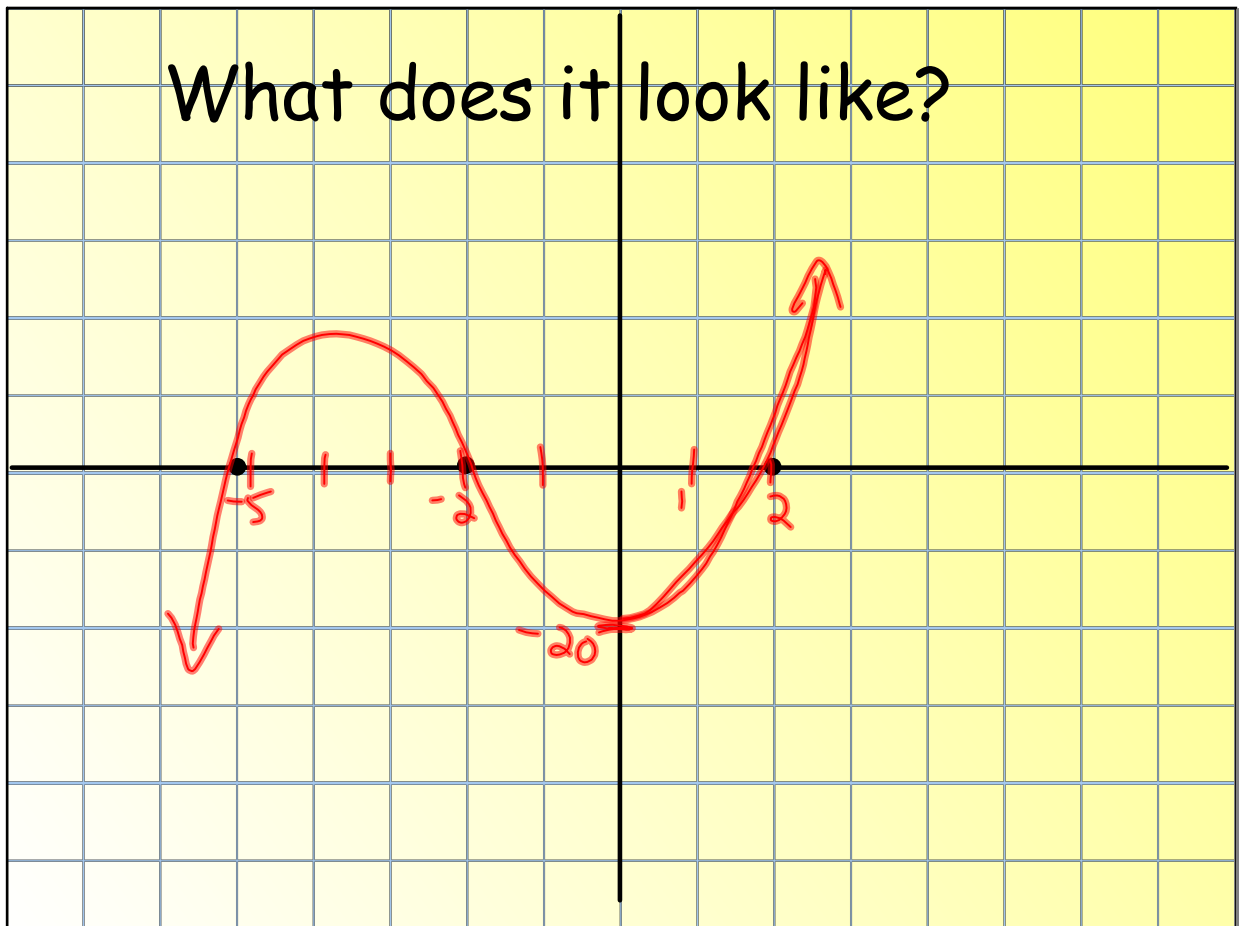
$$x = -5 \quad | \quad x = 2 \quad | \quad x = -2$$

So this means $f(x)=0$ when

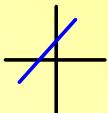
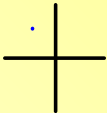
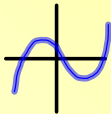
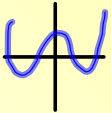
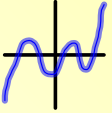
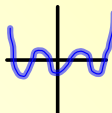
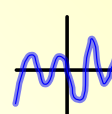
$$x = -5, -2 \text{ and } 2$$

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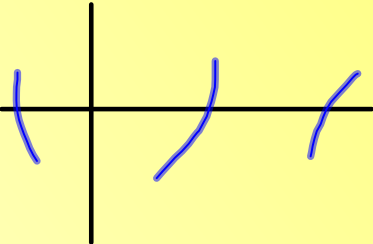
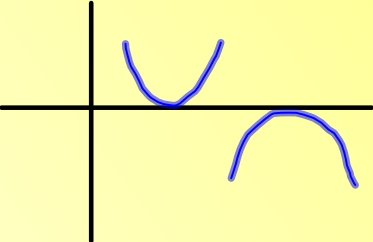
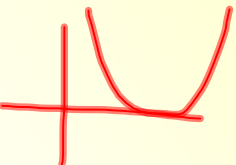
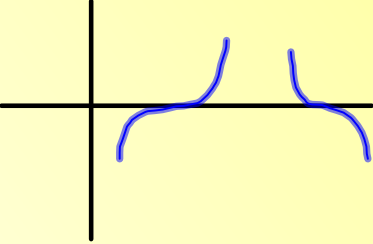
What does it look like?



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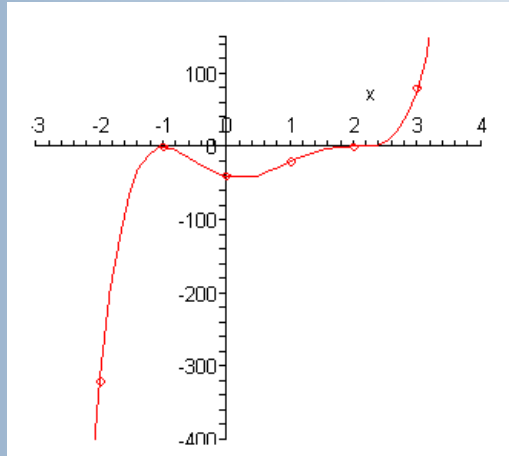
linear ①		1 possible root
quadratic ②		2 possible roots
cubic ③		3 possible roots
quartic ④		4 possible roots
5th degree		5 possible roots
6th degree		6 possible roots
7th degree		7 possible roots

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single roots	
double roots	
	triple roots
	

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What could this one's equation be?



$$y = (x+1)^2(x-2)^3$$

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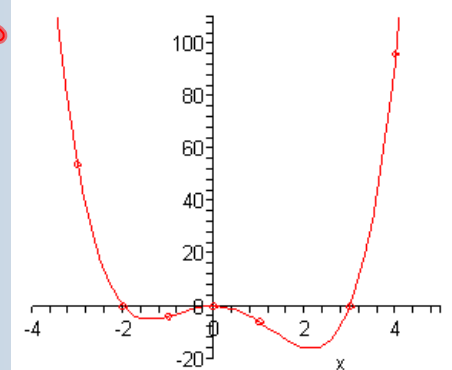
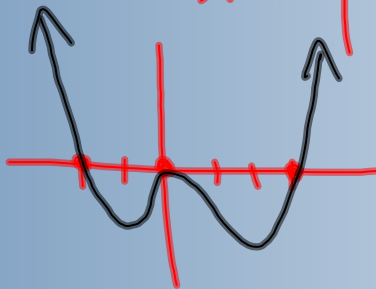
Sketch the graph of $P(x) = x^4 - x^3 - 6x^2$

$$0 = x^4 - x^3 - 6x^2$$

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

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

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



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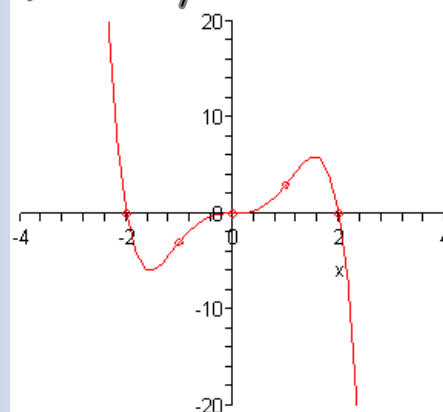
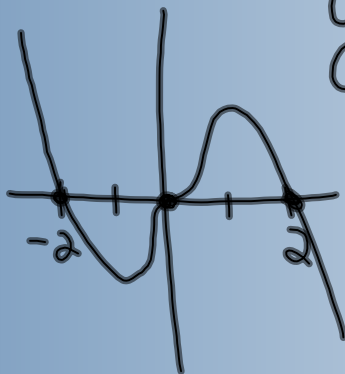
Sketch the graph of $P(x) = -x^5 + 4x^3$.

$$0 = -x^5 + 4x^3$$

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

$$0 = x^3(-1)(x^2 - 4)$$

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



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