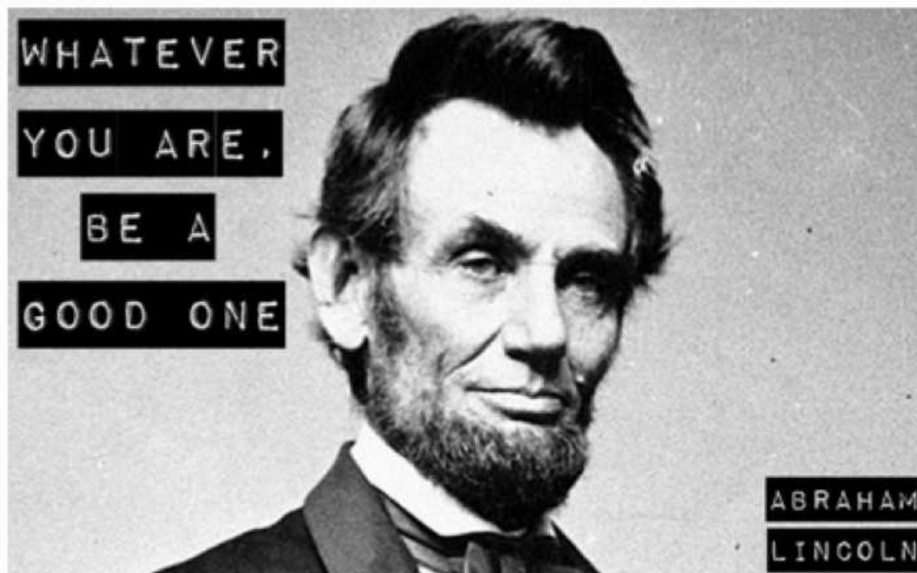


## Sketching Polynomial Functions



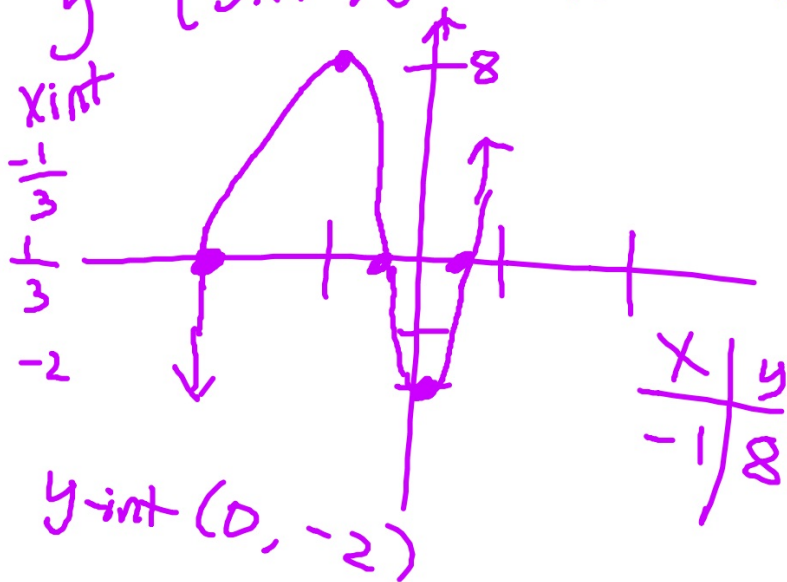
To sketch a polynomial function you will need...

1. x-intercepts
2. y-intercept
3. end behavior
4. table of values

ex: Sketch.

a)  $y = 9x^3 + 18x^2 - x - 2$

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



ex: Sketch.

$$b) f(x) = -x^4 + 6x^2 - 5$$

x-int:

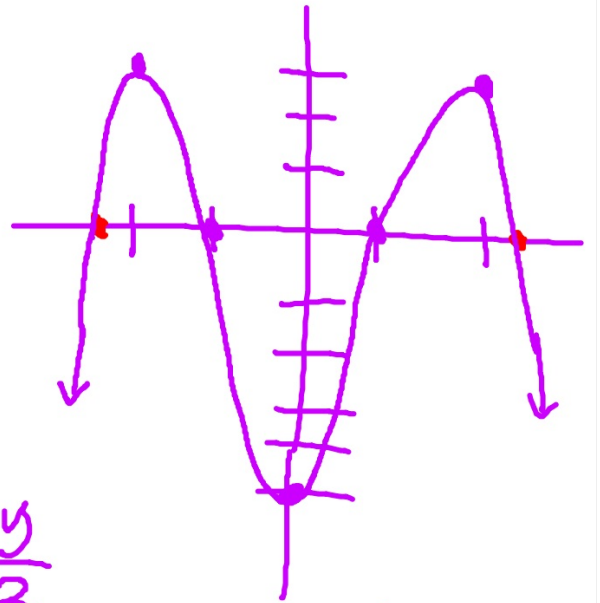
$$0 = -(x^4 - 6x^2 + 5)$$

$$0 = -(x^2 - 5)(x^2 - 1)$$

$$x = \pm\sqrt{5}, \pm 1$$

$$y\text{-int: } (0, -5)$$

x	y
-2	3
2	3



multiplicity  
(crossing zeros)

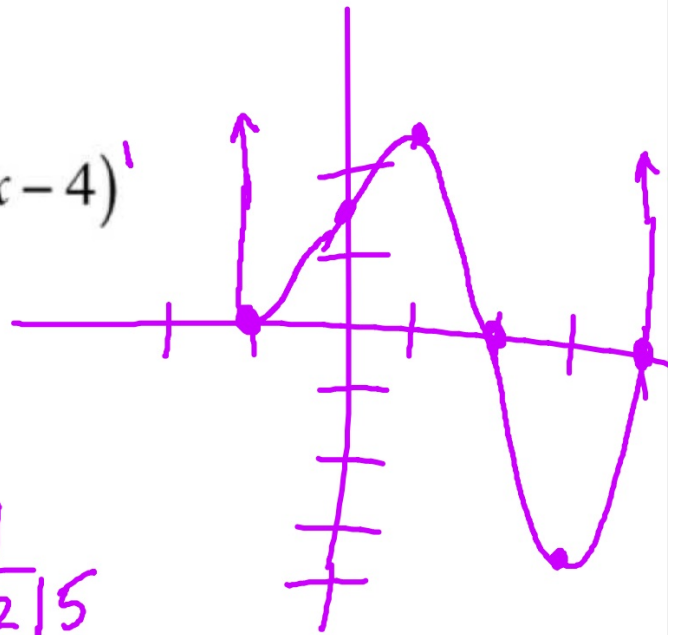
ex: Sketch.

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

x-int:  $x = -1, 2, 4$   
          bance cr cr

y-int:  $(0, \frac{8}{5})$

x	y
1	12/5
3	-16/5



ex: Sketch.

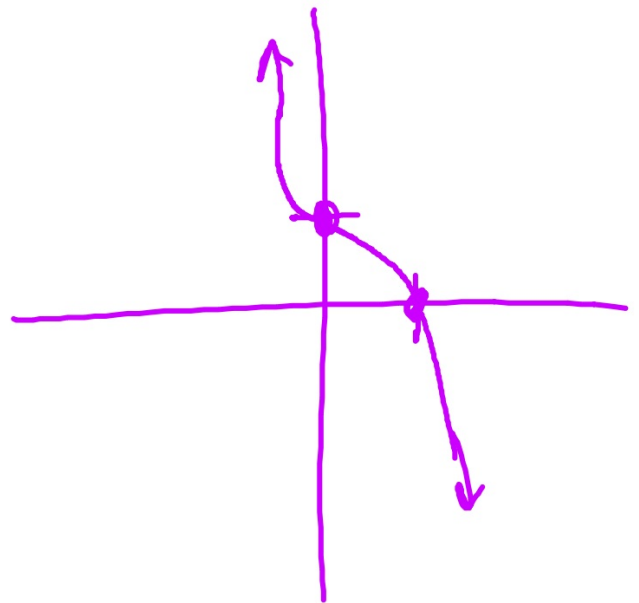
d)  $y = -x^3 + 1$

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

$$x = 1$$

y-int

$$(0, 1)$$



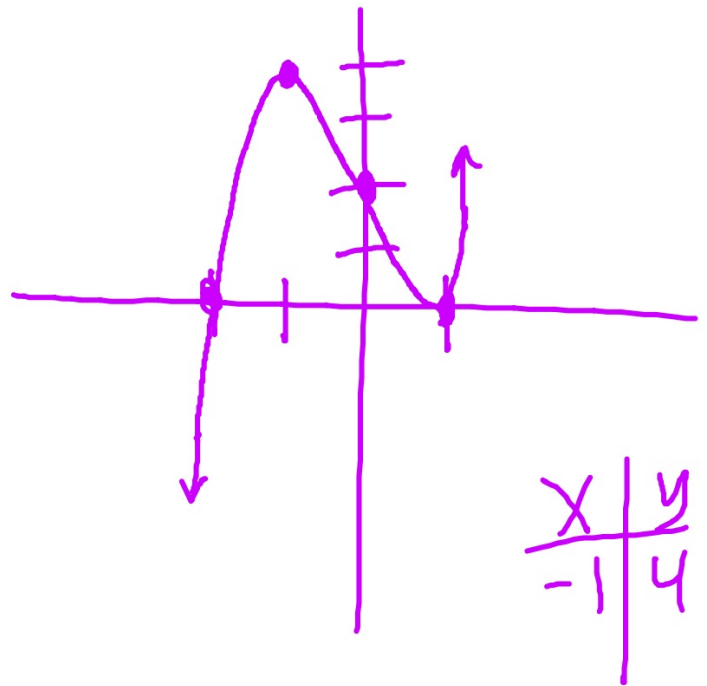
ex: Sketch.

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

$$(x+2)(x-1)^2$$

x-int:  $-2, 1$   
          ↑      ↑  
          C<sub>r</sub>   B

y-int:  $(0, 2)$



ex: Sketch.

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



ex: Sketch a polynomial function with the given characteristics.

- $x \rightarrow -\infty, y \rightarrow -\infty$
- $x \rightarrow \infty, y \rightarrow \infty$
- 1 negative crossing zero
- 1 positive bouncing zero

## REVIEW

ex: Solve.

a)  $3 - 81x^3 = 0$

## REVIEW

ex: Solve.

b)  $x^3 - 8x^2 + 5x + 14 = 0$

REVIEW

ex: Solve.

c)  $4x^4 + 34x^2 + 16 = 0$

## REVIEW

ex:  $f(x) = x^3 - 7x^2 + 7x$

Find  $5f(4)$  using synthetic substitution.

## REVIEW

ex:  $f(x) = x^4 - 2x^3 + 3x^2 - 8x - 4$

If  $f(1 + \sqrt{2}) = 0$  find all zeros of  $f(x)$ .

## REVIEW

ex: Simplify.

$$\frac{(3x^2y^4z^0)^{-1}}{(2xy^0z)^{-2}(3x^{-1}y^2)}$$

## REVIEW

ex: Sketch.

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



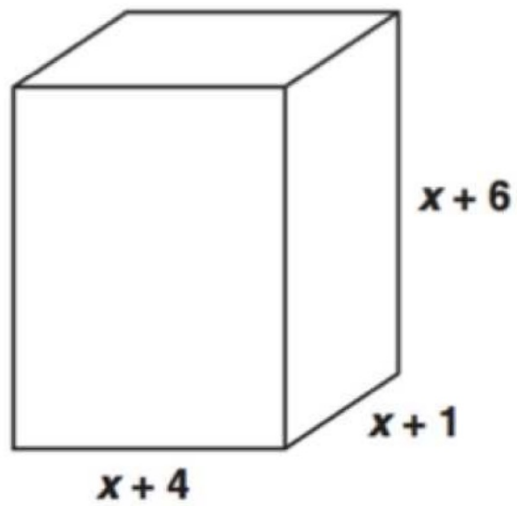
## REVIEW

ex:  $7^8 - 5x^4 - 6x$

- a) Write in standard form.
- b) Classify by degree and number of terms.
- c) State the end behavior.

## REVIEW

ex: What is the volume of the figure below?



REVIEW

ex:  $2x + 7 \overline{) 2x^4 + 21x^3 + 35x^2 - 37x + 46}$

REVIEW

ex:

**Which polynomial represents  
 $(3x^2 + x - 4)(2x - 5)$ ?**

**A**  $6x^3 - 13x^2 - 13x - 20$

**B**  $6x^3 - 13x^2 - 13x + 20$

**C**  $6x^3 + 13x^2 + 3x - 20$

**D**  $6x^3 + 13x^2 + 3x + 20$

REVIEW

ex:

$$(-2x^2 + 6x + 1) - 2(4x^2 - 3x + 1) =$$

**A**  $6x^2 - 1$

**B**  $-10x^2 - 1$

**C**  $6x^2 + 12x - 1$

**D**  $-10x^2 + 12x - 1$

## REVIEW

ex:

$$8a^3 + c^3 =$$

- A**  $(2a + c)(2a + c)(2a + c)$
- B**  $(2a - c)(4a^2 + 2ac + c^2)$
- C**  $(2a - c)(4a^2 + 4ac + c^2)$
- D**  $(2a + c)(4a^2 - 2ac + c^2)$

REVIEW

ex:

**What is the simplest form of**  
$$\frac{5x^3y + 20x^2y^2 + 20xy^3}{5xy} ?$$

- A**  $(x + 2)^2$
- B**  $(x + 2y)^2$
- C**  $x^2 + y^2$
- D**  $x^2 + 4y^2$