

For number 1, (a) Simplify and write in standard form and classify by (b) degree and (c) number of terms.
 (NC.M3.A-SSE.2 DOK 2)

1. $(-2x^4 - x^2 + 8) + (3x^4 - 2x - 5)$ combine like terms

- 1a. $x^4 - x^2 - 2x + 3$
 1b. Quartic
 1c. polynomial

2. Find the zeros of $y = 3x(x - 9)(x + 4)$
 $3x = 0 \mid x - 9 = 0 \mid x + 4 = 0$
 $x = 0 \mid x = 9 \mid x = -4$

2. $x = 0, 9, -4$

For question 3 (1) find the zeros of the function, (2) simplify and write in standard form and (3) classify using the degree and # of terms. (NC.M3.A-APR.3 DOK 2)

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

Zeros: $x = -1, 2, 2$

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

Standard form: $x^3 - 3x^2 + 4$

$x = -1 \quad x = 2 \quad x = 2$

Classify- Degree: Cubic

$(x + 1)(x - 2)(x - 2)$
 $(x + 1)(x^2 - 4x + 4)$

	x^2	$-4x$	4
x	x^3	$-4x^2$	$4x$
1	x^2	$-4x$	4

Classify- # of term(s): Trinomial

Factor the following for #4-5. Show ALL work. (NC.M3.A-APR.3 DOK 1)

B 4. $x^3 - 7x^2 - 8x$

D 5. $3x^2 - 60x + 300$

$x(x^2 - 7x - 8)$

$3(x^2 - 20x + 100)$

- a) $(2x - 1)(x + 4)$
 b) $x(x + 1)(x - 8)$
 c) $x(2x - 1)(x + 4)$
 d) $(x + 1)(x - 8)$

$x(x - 8)(x + 1)$

	-8
x	$-8x$
1	x

- a) $(x + 10)(x - 10)$
 b) $3(x + 10)(x - 10)$
 c) $(x + 30)(x - 30)$
 d) $3(x - 10)^2$

$3(x - 10)(x - 10)$
 $3(x - 10)^2$

	100
-10	-10
-20	

Solve by factoring for #6-7. Show ALL work and give exact answers. (NC.M3.A-APR.3 DOK 1)

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

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

$x^4 - 8x^2 - 48 = 0$

	x	-2
x^2	x^3	$-2x^2$
9	$9x$	-18

$(x^2 - 12)(x^2 + 4) = 0$

$(x^2 + 9)(x - 2) = 0$

$x^2 - 12 = 0$

$x^2 + 4 = 0$

$x^2 = 12$
 $x = \pm 2\sqrt{3}$

$x^2 = -4$
 $x = \pm 2i$

$x^2 = -9$
 $x = \pm 3i$
 $x = 2$

8. Factor: $\sqrt{x^2 - y^2} \rightarrow y$
 $(x+y)(x-y)$

Graph
in your TI-84

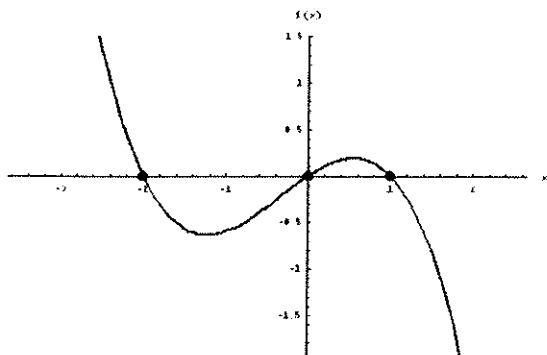
2nd Trace
#2

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

- a) $(x+2)$ $X=2$
 b) $(x+8)$ $-2 - 2$
 c) $(x-2)$ $(x-2) = 0$
 d) $(x-8)$

10. What are the zeros of the following graph? (NC.M3.A-APR.3 DOK 1)

10. $x = -2, 0, 1$



11. Solve by completing the square: $x^2 - 6x + 41 = 0$. (NC.M3.A-APR.3 DOK 3)

$$x^2 - 6x + 9 = -41 + 9$$

$$\sqrt{(x-3)^2} = \sqrt{-32}$$

$$\frac{32}{16 \cdot 2}$$

$$x - 3 = \pm 4\sqrt{2}i$$

$$x = 3 \pm 4\sqrt{2}i$$

Step 1: Factor and GCF

Step 2: Add or subtract the "c" part to the right side

Step 3: Complete the sq. & Simplify

Step 4: Square it both sides

Step 5: solve for x

12. Write the polynomial in standard form that has zeros of $0, -\frac{2}{3},$ and 2 . (NC.M3.F-BF.1a DOK 2)

$$x = 0$$

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

$$x = 2$$

$$3x = -2$$

$$(x-2) = 0$$

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

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

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

$$3x^3 - 4x^2 - 4x$$

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

Write the polynomial in standard form that has zeros of 2 and $-4i$. (NC.M3.F-BF.1b DOK 2)

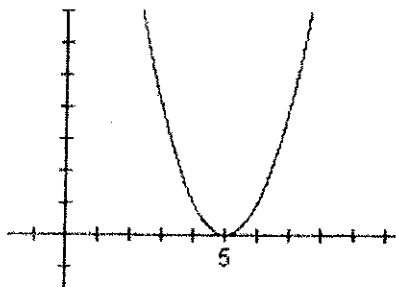
$$\begin{aligned}
 x &= 2 & x &= +4i \\
 (x-2) &= 0 & (x)^2 &= (+4i)^2 \\
 & & x^2 &= -16 \\
 & & (x^2+16) &= 0 \\
 (x-2)(x^2+16) & & &
 \end{aligned}$$

i 's and $\sqrt{\quad}$'s come in conjugate pairs!

$$x^3 - 2x^2 + 16x - 32$$

	x^2	16
x	x^3	$16x$
-2	$-2x^2$	-32

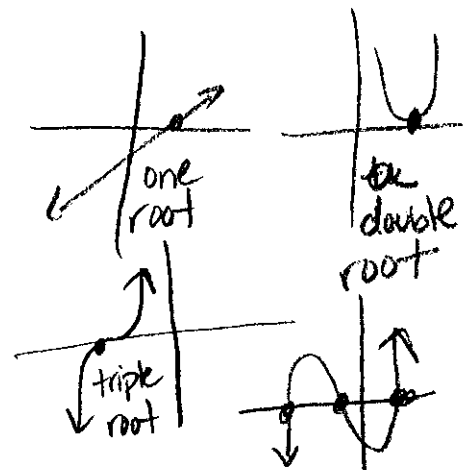
14. Write the polynomial in standard form given the graph. (NC.M3.F-BF.1a DOK 2)



$$(x-5)^2 \text{ bounce}$$

$$(x-5)(x-5)$$

$$x^2 - 10x + 25$$



Divide using synthetic or long division. (NC.M3.A-APR.2 DOK 1)

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

$$\begin{array}{r}
 10x^2 + 10x + 1 \\
 \hline
 5x - 4 \overline{) 50x^3 + 10x^2 - 35x - 7} \\
 \underline{-(50x^3 - 40x^2)} \\
 50x^2 - 35x \\
 \underline{-(50x^2 - 40x)} \\
 5x - 7 \\
 \underline{-(5x - 4)} \\
 -3
 \end{array}$$

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

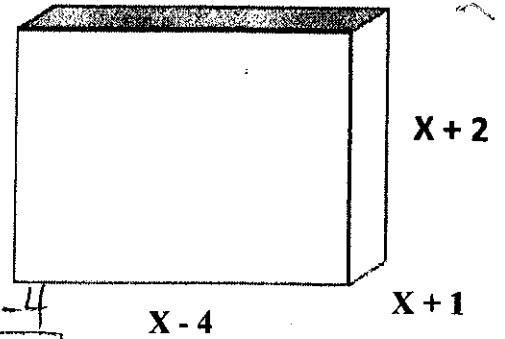
$$\begin{array}{r}
 7 \overline{) 1 \quad -13 \quad 40 \quad 18} \\
 \underline{ 7 \quad -42 \quad -14} \\
 -2 \quad 4
 \end{array}$$

not a triple root it's 3 individual roots

15. $10x^2 + 10x + 1 - \frac{3}{5x-4}$

16. $x^2 - 6x - 2 + \frac{4}{x-7}$

17. The dimensions of this rectangular prism are given algebraically. Write a polynomial function that represents the volume of this prism in **standard** form. (NC.M3.G-GMD.3 DOK 3)



$$(x+2)(x-4)(x+1)$$

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

$$V(x) = \underline{x^3 - x^2 - 10x - 8}$$

	x^2	$-3x$	-4
x	x^3	$-3x^2$	$-4x$
z	$2x^2$	$-6x$	-8

$$V = l \times w \times h$$

18. A rectangle has the dimensions of $(x-2)$ and $(-x+10)$. (NC.M3.A-SSE.1a DOK 3)

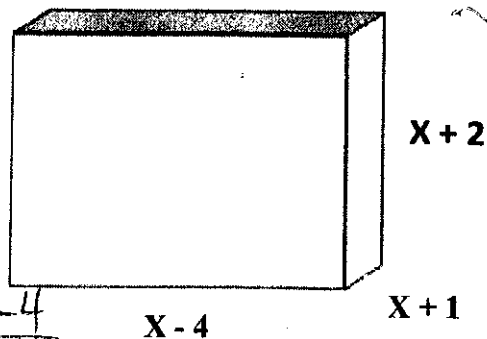
a) Write an equation to model the area in factored form of the rectangle. $A = l \times w$
 $f(x) = (x-2)(-x+10)$

b) At what x-value does the maximum area occur? 2nd TRACE #4
 $x = 6$

c) What is the maximum area of the box?

maximum area of the box is 16

17. The dimensions of this rectangular prism are given algebraically. Write a polynomial function that represents the volume of this prism in **standard** form. (NC.M3.G-GMD.3 DOK 3)



$$(x+2)(x-4)(x+1)$$

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

$$V(x) = \underline{x^3 - x^2 - 10x - 8}$$

	x^2	$-3x$	-4
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$$V = l \times w \times h$$

18. A rectangle has the dimensions of $(x-2)$ and $(-x+10)$. (NC.M3.A-SSE.1a DOK 3)

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

$$f(x) = (x-2)(-x+10)$$

$$A = l \times w$$

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

2nd TRACE #4

$$x = 6$$

c) What is the maximum area of the box?

maximum area of the box is 16