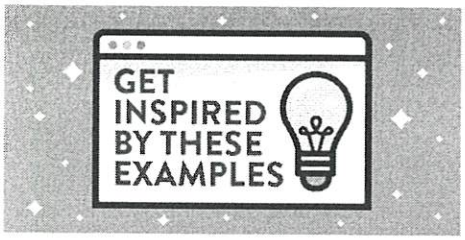
Key

The 5 Verbs of Algebra 2 Review For Unit 4- BM #1

SIMPLIFY

- **Polynomials (add, subtract, multiply)**
- **Radicals**
- **Powers of i**



1. Simplify the expression $(3-7i)^2$.

$(3-7i)(3-7i)$

$9-21i-21i+49i^2$

$9-42i+49(-1)$

$9-42i-49$

$-40-42i$

$i^2=-1$

2. Express $\sqrt{-300x^2y^3}$ in simplest form.

$i\sqrt{100\cdot3}\ \sqrt{x^2}\ \sqrt{y^2}\ y$

$10xyi\sqrt{3y}$

3. Simplify the expression $\left(2-3\sqrt{x}\right)^2$.

$(2-3\sqrt{x})(2-3\sqrt{x})$

$4-6\sqrt{x}-6\sqrt{x}+9\sqrt{x}^2$

$4-12\sqrt{x}+9x$

4. Express $6xi^3(-4xi+5)$ in simplest $a+bi$ form.

$-24x^2i^4+30xi^3$

$-24x^2(1)+30x(-i)$

$-24x^2+-30xi$

$i^0=i^4$

i^1

i^2

i^3

5. Express the product of $\left(\frac{2}{3}x^2-\frac{1}{2}x\right)$ and $\left(9x+\frac{6}{5}\right)$ as a trinomial in simplest form.

$\left(\frac{2}{3}x^2-\frac{1}{2}x\right)\left(9x+\frac{6}{5}\right)$

$6x^3+\frac{4}{5}x^2-\frac{9}{2}x^2-\frac{3}{5}x$

$6x^3-\frac{37}{10}x^2-\frac{3}{5}x$

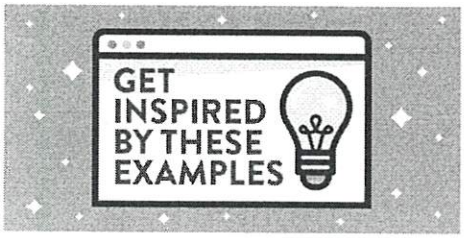
6. Simplify the expression $\sqrt{-180x^{16}}$.

$i\sqrt{36\cdot5}\ \sqrt{x^{16}}$

$6x^8i\sqrt{5}$

FACTOR

- Greatest Common Factor
- Difference of Two Perfect Squares
- Trinomials (Bigger/ Both)
- Grouping



1. Factored $m^5 + m^3 - 6m$ completely.

$m(m^4 + m^2 - 6)$

$m(m^2+3)(m^2-2)$

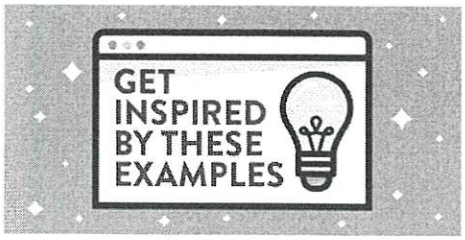
2. Over the set of integers, factor the expression $(4x^3 - x^2) + (16x - 4)$ completely.

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

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

SOLVE

- Radical Equations
- Quadratic Equations
- Higher Order Polynomial Equations
- Systems of Equations
  - Linear/ Quad
  - Quad/ Circle
  - Linear/ Circle
  - 3x3 Linear



1. Find the solution set of the equation $5\sqrt{3x-2} - 4 = 36$.

$+4 \quad +4$

$\frac{5\sqrt{3x-2}}{5} = \frac{40}{5}$

$\sqrt{3x-2}^2 = (8)^2$

$3x-2 = 64$

$3x = 66$

$x = 22$

check!

$\{22\}$

2. The equation $V = 20\sqrt{C+273}$ relates speed of sound, V, in meters per second, to air temperature, C, in degrees Celsius. What is the temperature, in degrees Celsius, when the speed of sound is 320 meters per second?

$\frac{320}{20} = \frac{20\sqrt{C+273}}{20}$

$16^2 = \sqrt{C+273}^2$

$256 = C+273$

$C = -17$ check! $\{-17\}$

3. Find the solution to the equation $18x^2 - 24x + 87 = 0$.

$a=18 \quad b=-24 \quad c=87$

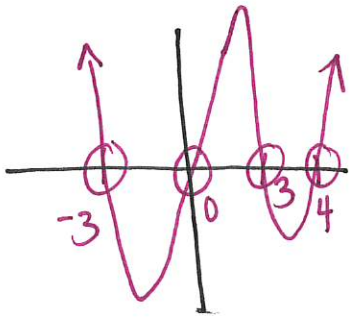
$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{+24 \pm \sqrt{(-24)^2-4(18)(87)}}{2(18)} = \frac{24 \pm \sqrt{-5688}}{36} = \frac{24 \pm i\sqrt{36 \cdot 158}}{36}$

$= \frac{24 \pm 6\sqrt{158}}{36} \quad \frac{36}{36}$

$= \frac{2}{3} \pm \frac{\sqrt{158}}{6} i$

4. Determine the zeros for $f(x) = (x^4 - 4x^3) + (9x^2 + 36x)$.



$x^3(x-4) - 9x(x-4) = 0$

$(x^3 - 9x)(x-4) = 0$

$x(x^2-9)(x-4) = 0$

$x = \{0, \pm 3, 4\}$

5. Solve for the roots of the equation $x^2 + 2x + 5 = 0$ in simplest $a + bi$ form.

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$a=1 \quad b=2 \quad c=5$

$x = \frac{-2 \pm \sqrt{(2)^2-4(1)(5)}}{2(1)} = \frac{-2 \pm \sqrt{-16}}{2} = \frac{-2}{2} \pm \frac{4i}{2}$ ($4i$)

$= -1 \pm 2i$

6. Solve algebraically for all values of x: $\sqrt{x-4} + x = 6$.

$-x \quad -x$

$\sqrt{x-4}^2 = (6-x)^2$

$x-4 = 36 - 12x + x^2$

$-x+4 \quad +4 \quad -x$

$0 = x^2 - 13x + 40$

$0 = (x-8)(x-5)$

$x = 8, 5$

$\{5\}$

7. Solve the equation $2x^3 - x^2 - 8x + 4 = 0$ algebraically for all values of x.

$(2x^3 - x^2) + (-8x + 4) = 0$

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

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

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

$x = \{\pm 2, \frac{1}{2}\}$

8. Which point is the solution to this system?

$x + y - z = 4$

$y = 2x$

$3x + y - 4z = -5$

1) (2, 4, 2)
2) (3, 6, 5)
3) (4, 8, 8)
4) (1, 2, -1)

$2+4-2=4$ ✓
$4=2\cdot 2$ ✓
$3\cdot 2+4-4\cdot 2=-5$
$3+6-5=4$ ✓
$6=2\cdot 3$ ✓
$3\cdot 3+6-4\cdot 5=-5$ ✓

9. Solve the following systems of equations algebraically:

$(x-3)^2+(y+2)^2=16$
$2x+2y=10$
$\frac{2x}{2}+\frac{2y}{2}=\frac{10}{2}$
$x+y=5$
$x=5-y$

$(5-y-3)^2+(y+2)^2=16$
$(2-y)^2+(y+2)^2=16$
$(2-y)(2-y)\quad(y+2)(y+2)$
$4-4y+y^2+y^2+4y+4-16=0$
$2y^2-8=0$
$\frac{2y^2}{2}-\frac{8}{2}=0$
$y^2-4=0$
$y=\pm 2$

$y=2$: $2x+2(2)=10$, $2x=6$, $x=3$
$y=-2$: $2x+2(-2)=10$, $2x=14$, $x=7$

(3,2), (7,-2)

10. Solve the following system of equations algebraically for all values of x, y, and z:

① $x+3y+5z=45$
② $6x-3y+2z=-10$
③ $-2x+3y+8z=72$

Step 1: Eq 1+2

$x+3y+5z=45$
$+\ 6x-3y+2z=-10$
$7x+7z=35$

Step 2: 2+3

$6x-3y+2z=-10$
$+\ -2x+3y+8z=72$
$4x+10z=62$

(-2,4,7)

Eq 4: $x+z=5$

Eq 5: $2x+5z=31$

Step 3: 4+5

$-2(x+z=5) \rightarrow -2x-2z=-10$
$2x+5z=31 \rightarrow +2x+5z=31$
$3z=21$
$z=7$

Step 4: Eq 4

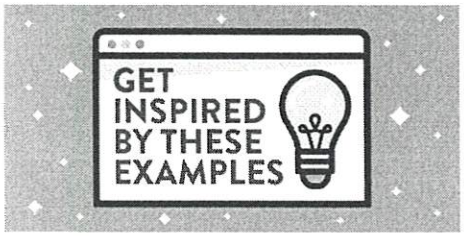
$x+7=5$
$x=-2$

Step 5: Eq 1

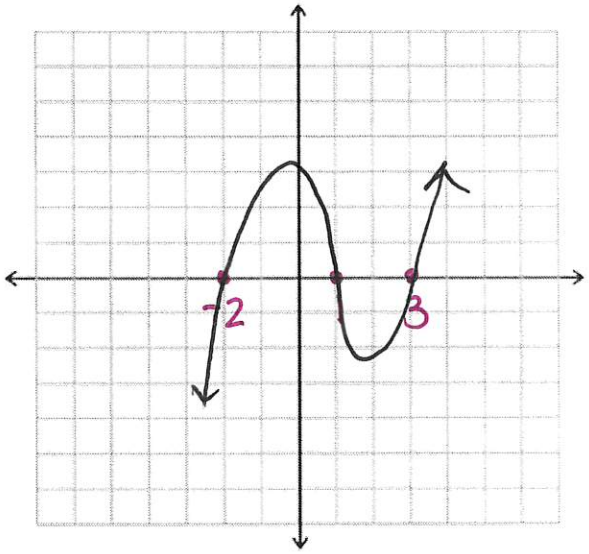
$-2+3y+35=45$
$3y=12$
$y=4$

GRAPH

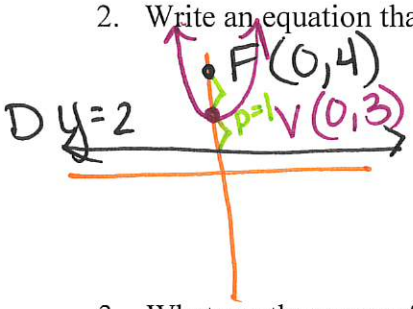
- **Parabolas (Focus & Directrix)**
- **Higher Order Polynomials**
- **System of Equations**
  - **Intersection Point- 2nd TRACE 5**
- **Parabola (given focus and directrix)**



1. On the grid, sketch a cubic polynomial whose zeros are 1, 3, and -2.



2. Write an equation that represents a parabola with a focus of $(0,4)$ and a directrix of $y=2$.

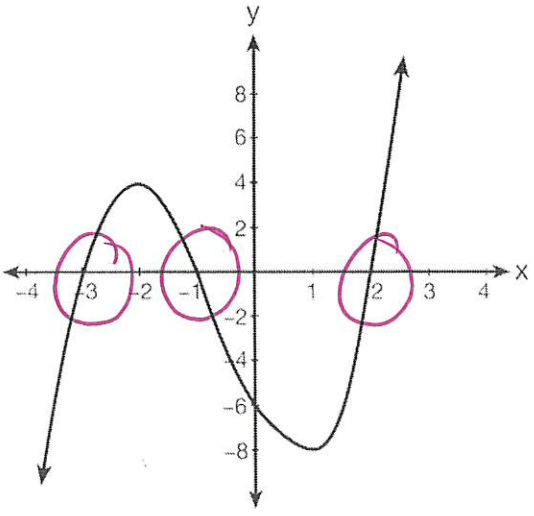


$y = \frac{1}{4p}(x-h)^2+k$

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

$y = \frac{1}{4}x^2+3$

3. What are the zeros of the polynomial function graphed shown?



$\{-3,-1,2\}$