Write your questions and thoughts here!

7.4 – Factor and Solving Polynomials

Recall Factoring:

Factoring out a GCF:

a.

Factoring trinomials:

b.

Factoring out a GCF, then trinomial:

c.

Factoring Special Cases:

d.

Factoring by Grouping

Sometimes if you have a polynomial with no common factor in EVERY term, factor by grouping can work….

Examples:

a.

b.

c. $10r^3 + 6r^2 - 5r - 3$

d. $28x^3 + 49x^2 - 16x - 28$

Factoring Polynomials in Quadratic Form

Examples:

a.

b.

c. $x^3 + 7x^2 - 9x - 63$

d. $16g^4 - 625$

Factoring with Cube Patterns

Sum of Two Cubes

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$ $\quad 64x^3 + 27 =$

Difference of Two Cubes

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$ $\quad 8x^3 - 125 =$

Examples:

a. $3y^5 - 75y^3$ $\quad$ b. $16b^5 + 686b^2$

CHOOSE THE APPROPRIATE METHOD!!!!

a. $\quad$ b.

c. $z^5 - 3z^4 - 16z + 48$ $\quad$ d. $32w^5 - 108w^2$

Solving Polynomial Equations

We can use the zero product property to solve polynomial equations as well:

a. $\quad$ b.

c. $y^3 - 5y^2 = 0$ $\quad$ d. $d^6 - 4d^4 - 9d^2 + 36 = 0$

Now summarize what you have learned!

Practice 7.4

Factor completely by factoring out a GCF, then factoring the remaining trinomial.

1) $x^3 + x^2 - 6x$

2) $2x^4 - 12x^3 + 18x^2$

3) $10x^4 - 90x^2$

4) $x^3 - 7x^2 + 12x$

Factor each sum of cubes.

5) $27x^3 + 125$

6) $8x^3 + 27$

Factor each difference of cubes.

7) $8x^3 - 1$

8) $27x^3 - 125$

Factor each completely by grouping.

9) $x^3 + 5x^2 - 6x - 30$

10) $7r^3 - 42r^2 - 3r + 18$

11) $5n^3 + 40n^2 - n - 8$

12) $6x^3 - x^2 - 42x + 7$

Factor each quadratic form polynomial completely.

13) $x^4 + 6x^2 - 16$

14) $m^4 - 1$

15) $5a^5 + 55a^3 + 150a$

16) $4x^5 - 16x^3 + 12x$ Hint: Take out a GCF!!

Solve for x.

17) $x^3 - 2x^2 - 5x + 10 = 0$

18) $x^4 - 7x^2 - 18 = 0$

19) $x(3x - 5)(x - 4) = 0$

20) $9x^4 - 30x^2 + 25 = 0$

21) $8x^4 - 54x^2 + 81 = 0$

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

This problem is optional. Only the Jedi Knights of factoring should attempt it.

23) $x^9 - 25x^5 + 144x = 0$

7.4 – Factor and Solving Polynomials

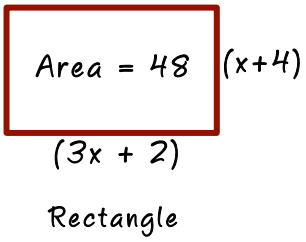
Application 7.4

1. Factor: $z^5 - 3z^4 - 16z + 48$

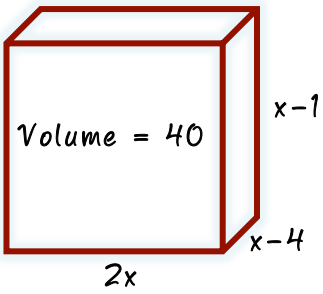
2. Solve: $48y^5 = 27y^3$

Find the possible value(s) of x.

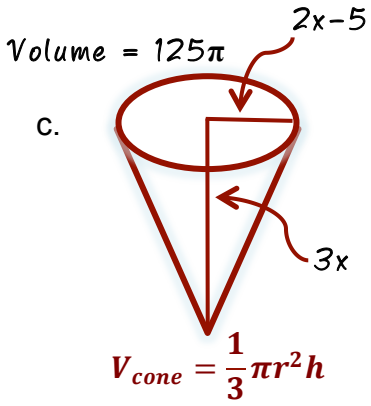
3. a.



b.



c.



4. Ramstein HS decides that the foyer needs a giant bust of Mr. Brust's head: a "Bust-o-Brust," you could say. The Bust-o-Brust is to be made from 250 cubic inches of clay in the shape of a rectangular prism (see # 3b above). The height and the width of the prism each have to be 5 inches less than the length. Draw a picture and solve a polynomial equation to find the dimensions of the prism.

7.4 – Factor and Solving Polynomials

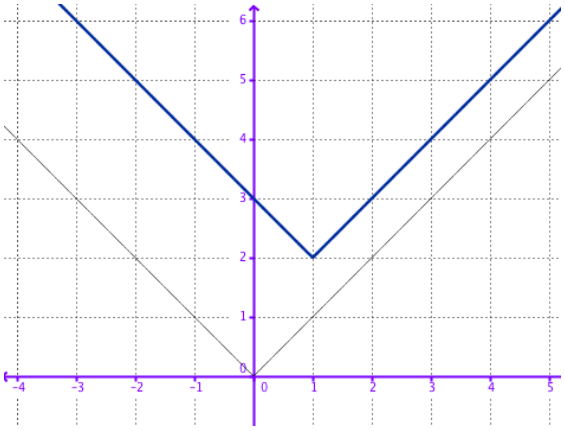
Algebra Skillz

GRAPH

Below, the graph of $f(x) = |x - 1| + 2$ is sketched in bold. Its parent function $f(x) = |x|$ is represented by the thin curve.

1. Describe the translation of the parent graph.

2. How does the translation relate to the equation?



SIMPLIFY

3. $\sqrt{25} + \sqrt{40} + \sqrt{90}$

4. $\sqrt{6}(12 - 2\sqrt{2})$

SOLVE

5. Solve:
$x^2(x + 14) = 0$

6. Factor and solve.
$x^2 - 25x + 24 = 0$

SAT Review

MUTIPLE CHOICE

For what value of x is the statement below false?

$$5x^2 < (5x)^2$$

(A) -5
(B) 0
(C) $\frac{1}{5}$
(D) 1
(E) For no value of x

Free Response

Let $\boxed{x}$ be defined as $\boxed{x} = x^2 - x$ for all values of x. If $\boxed{a} = \boxed{a - 2}$, what s the value of a?