

7.3 - Factor and Solving Polynomials

Two-Step Factoring

Always look for a GCF to factor out first!

a. $ux^{4\cancel{2}} - 3\cancel{6}x^2$

b. $4x^3 - 36x$

Factoring by Grouping

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

Examples: a. $12x^3 - 10x^2 - 18x + 15$

b. $24x^3 - 16x^2 - 3x + 2$

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

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

Factoring Polynomials in Quadratic Form

Examples: a. $25x^4 - 49$

b. $2x^8 + 10x^5 + 12x^2$

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

d. $16g^4 - 625$

Factoring with Cube Patterns

Sum of Two Cubes

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

Rewrite differences with as a negative b term.

Examples: a. $64x^3 + 27 =$

b. $8x^3 - 125 =$

"Smartphone, take me to the lesson!"

Write your questions and thoughts here!

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c. $3y^5 - 75y^3$

d. $16b^5 + 686b^2$

CHOOSE THE APPROPRIATE METHOD!!!!

a. $16x^3 - 44x^2 - 42x$

b. $n^4 - 4n^2 - 60$

c. $z^5 - 3z^4 - 16z + 48$

d. $32w^5 - 108w^2$

Solving Polynomial Equations

Now we can use the zero product property to **solve** polynomial equations as well!

a. $y^3 - 5y^2 = 0$

b. $-27x^3 + 15x^2 = -6x^4$

c. $18x^3 = 3x^5 + 15x$

d. $d^6 - 4d^4 - 9d^2 + 36 = 0$

Now summarize what
you have learned!

Factor each expression completely.

Practice 7.3

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

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

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

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

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Factor each expression using the sum of cubes formula.

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

5. $27x^3 + 125$

6. $8x^3 + 27$

7. $8x^3 - 1$

8. $64 - x^3$

Factor each expression 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.

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

14. $m^4 - 1$

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

16. $4x^5 - 16x^3 + 12x$

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Solve each quadratic equation.

17. $x^3 - 2x^2 - 5x = -10$

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

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

20. $9x^4 + 25 = 30x^2$

21. $8x^4 + 81 = 54x^2$

22. $x^3 = 2x^2 - x$

23. $x^9 = 25x^5 - 144x$

OPTIONAL: ONLY FOR JEDIS OF FACTORING!!!

MUTIPLE CHOICE

SAT Review

FREE RESPONSE

For what value of x is the statement below false?

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

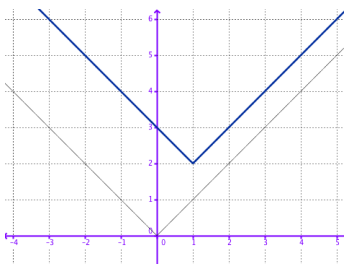
- (A) -5
- (B) 0
- (C) $\frac{1}{5}$
- (D) 1
- (E) For no value of x

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

•	•	•	•
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

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Algebra Skillz

GRAPH	SIMPLIFY	SOLVE
<p>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</p> <p>1. Describe the translation of the parent graph.</p> <p>2. How does the translation relate to the equation?</p> <div style="text-align: center; margin-top: 20px;">  </div>	<p>3. $\sqrt{25} + \sqrt{40} + \sqrt{90}$</p> <p>4. $(x^2 - 25x) + (x^2 + 25x)$</p>	<p>5. Solve: $x^2(x + 14) = 0$</p> <p>6. Factor and solve. $x^2 - 25x + 24 = 0$</p>

Application 7.3

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

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

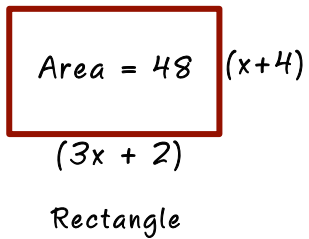
3. Ramstein HS decides that the foyer needs a giant bust of Mr. Brust's head: a "*Bust-o-Brust*," you could say. The *Bust-o-Brust* is to be made from 250 cubic inches of clay in the shape of a rectangular prism (see # 3b above). The height and the width of the prism each have to be 5 inches less than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

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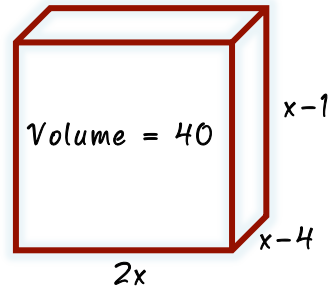
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4. Find the possible value(s) of x .

a.



b.



c.

$$\text{Volume} = 125\pi$$

