Warm-Up

Unit 7 Day 7

1. A school purchases boxes of candy bars.

   - Each box contains 50 candy bars.
   - Each box costs $30.

   How much does the school have to charge for each candy bar to make a profit of $10 per box?

   $\frac{\$40 \text{ per box}}{50} = 0.80¢$

   A $0.40
   B $0.50
   C $0.80
   D $1.25

2. Energy and mass are related by the formula $E = mc^2$

   - m is the mass of the object.
   - c is the speed of light.

   Which equation finds m, given E and c?

   A $m = E - c^2$

   B $m = Ec^2$

   C $m = \frac{c^2}{E}$

   D $m = \frac{E}{c^2}$

Perfect Squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, ...

Difference of Two Perfect Squares Notes

Factoring the Difference of Two Squares → Always binomials
→ Always subtraction
→ Always perfect squares

Factor $x^2 - 16$.

Think $x^2 - 4^2$

Because $x^2 - 16$ is a difference of squares, we have

$x^2 - 16 = (x + 4)(x - 4)$

- take √ of 1st term
- take √ of 2nd term
- use a + and −

CHECK YOURSELF 2

Factor $m^2 - 49$. $(m + 7)(m - 7)$

$\sqrt{m^2} = m$ $\sqrt{49} = 7$

Any time an expression is a difference of two squares, it can be factored.

Factoring the Difference of Two Squares

Factor $4a^2 - 9$. $\sqrt{4a^2} = 2a$ $(2a+3)(2a-3)$

Think $(2a)^2 - 3^2$ $\sqrt{9} = 3$

So

$4a^2 - 9 = (2a)^2 - (3)^2$

$= (2a + 3)(2a - 3)$ ✓

$(3b+5)(3b-5)$

CHECK YOURSELF 3

Factor $9b^2 - 25$. $\sqrt{9b^2} = 3b$ $\sqrt{25} = 5$

The process for factoring a difference of squares does not change when more than one variable is involved.

Factoring the Difference of Two Squares

Factor $25a^2 - 16b^4$. $\sqrt{25a^2} = 5a$ $\sqrt{16b^4} = 4b^2$

$25a^2 - 16b^4 = (5a + 4b^2)(5a - 4b^2)$ ✓ $(5a+4b^2)(5a-4b^2)$

$(7c^2+3d)(7c^2-3d)$

CHECK YOURSELF 4

Factor $49c^4 - 9d^2$.

$\sqrt{49c^4} = 7c^2$ $\sqrt{9d^2} = 3d$ $\sqrt{c^{10}} = c^5$

$\sqrt{d^{12}} = d^6$

Removing the GCF First

Factor $32x^2y - 18y^3$.

Note that $2y$ is a common factor, so

$32x^2y - 18y^3 = 2y(16x^2 - 9y^2)$

Difference of squares

$= 2y(4x + 3y)(4x - 3y)$

$32x^2y$: $8 \cdot 4$; $4 \cdot 2$, $2 \cdot 2$; $2, 2, 2, 2$; $x \cdot x \cdot y$

$18y^3$: $2 \cdot 9$; $3 \cdot 3$; $y \cdot y$

GCF $2y$

$2y(16x^2 - 9y^2)$

$\sqrt{16x^2} = 4x$

$\sqrt{9y^2} = 3y$

$2y(4x+3y)(4x-3y)$ factored completely

CHECK YOURSELF 5

Factor $50a^3 - 8ab^2$. $2a(5a+2b)(5a-2b)$

$50a^3$: $5 \cdot 10$; $5, 2 \cdot 5$; $a \cdot a$

$8ab^2$: $2 \cdot 4$; $2 \cdot 2$; $b \cdot b$

GCF $2a$

$2a(25a^2 - 4b^2)$ not factored completely

$\sqrt{25a^2} = 5a$

$\sqrt{4b^2} = 2b$

$2a(5a+2b)(5a-2b)$ factored completely

$m^2 - n^2$ $\sqrt{m^2} = m$, $\sqrt{n^2} = n$

$(m+n)(m-n)$

$r^2 - 9$

$(r+3)(r-3)$

$x^2 - 49$ $\sqrt{x^2} = x$

$(x+7)(x-7)$ $\sqrt{49} = 7$

$c^2 - d^2$

$(c+d)(c-d)$

$49 - y^2$ $\sqrt{49} = 7$

$(7+y)(7-y)$ $\sqrt{y^2} = y$

$81 - b^2$

$(9+b)(9-b)$

$9b^2 - 16$

$(3b+4)(3b-4)$

$36 - x^2$

$(6+x)(6-x)$

$16w^2 - 49$

$(4w+7)(4w-7)$

$4x^2 - 25$

$(2x+5)(2x-5)$

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