

R.4 Group Work
Honors Algebra 2 with Trig

1. Factor the following:

$$\begin{aligned} \text{a. } & (10ab - 6b) + (35a - 21) \\ & 2b(5a - 3) + 7(5a - 3) \\ & (2b + 7)(5a - 3) \end{aligned}$$

$$\begin{aligned} \text{b. } & (8r^3 - 64r^2) + (r - 8) \\ & 8r^2(r - 8) + (r - 8) \\ & (r - 8)(8r^2 + 1) \end{aligned}$$

$$\begin{aligned} \text{c. } & 16q^2 - 25 \\ & (4q - 5)(4q + 5) \end{aligned}$$

$$\begin{aligned} \text{d. } & 36z^2 - 81y^4 \\ & (6z - 9y^2)(6z + 9y^2) \end{aligned}$$

$$\begin{aligned} \text{e. } & a^3 + 64 = a^3 + 4^3 \\ & (a + 4)(a^2 - 4a + 16) \end{aligned}$$

$$\begin{aligned} \text{f. } & 27c^3 - 8 = (3c)^3 - 2^3 \\ & (3c - 2)(9c^2 + 6c + 4) \end{aligned}$$

Novel Problem Solving:

1. Factor the following:

$$\begin{aligned} \text{a. } & x^2 + 4x - a^2 + 4 \\ & (x^2 + 4x + 4) - a^2 \\ & (x + 2)(x + 2) - a^2 \\ & (x + 2)^2 - a^2 \end{aligned}$$

$$\begin{aligned} & \text{diff. 2 perfect squares} \\ & [(x + 2) - a][(x + 2) + a] \\ & \boxed{(x + 2 - a)(x + 2 + a)} \end{aligned}$$

$$\begin{aligned} \text{b. } & x^6 - 2x^5 + 2x^4 - 4x^3 + x^2 + 2 \\ & \text{can't group as is} \\ & x^6 + 2x^4 - 2x^5 - 4x^3 + x^2 + 2 \\ & x^4(x^2 + 2) - 2x^3(x^2 + 2) + (x^2 + 2) \\ & \boxed{(x^2 + 2)(x^4 - 2x^3 + 1)} \end{aligned}$$

R.4 Group Work
Honors Algebra 2 with Trig

c. $x^4 - 2x^2y^2 + y^4 - y^2$
 $(x^4 - 2x^2y^2 + y^4) - y^2$

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

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

$$[(x^2 - y^2) - y] [(x^2 - y^2) + y]$$

diff of 2 perfect squares

d. $x^4 - 6x^2y^2 + y^4$

$$(x^2 - y^2 - y)(x^2 - y^2 + y)$$

$$x^4 - 2x^2y^2 + y^4 - 4x^2y^2$$

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

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

diff of 2 perfect squares

$$[(x^2 - y^2) - 2xy] [(x^2 - y^2) + 2xy]$$

$$(x^2 - y^2 - 2xy)(x^2 - y^2 + 2xy)$$

2. The quadratic function $f(x) = 2x^2 - 24x + c$ has two real zeros that differ by 18. Find the value of c . (NCTM Dec 2015 #29)

$$f(x) = 2x^2 - 24x + c$$

let r and $r - 18$ be the 2 zeros

$$= (x - r)(x - (r - 18))$$

$$= x^2 - rx - x(r - 18) + r(r - 18)$$

$$= x^2 - rx - rx - 18x + r(r - 18)$$

$$= x^2 - 2rx - 18x + r(r - 18)$$

3. Create your own novel problem with answer key! If others in your group or around the room complete their own as well we will swap problems and try them out. continue on other page

e. $x^3 + 3x^2 + 3x + 1$

$$x^3 + 1 + 3x^2 + 3x$$

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

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

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

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

$$(x + 1)(x + 1)(x + 1)$$

$$(x + 1)^3$$

$$= x^2 - (2r - 18)x + r(r - 18)$$

$$0 = 2x^2 - 24x + C$$

$$0 = 2(x^2 - 12x + \frac{1}{2}C)$$

$$0 = x^2 - 12x + \frac{1}{2}C$$

$$\textcircled{1} \quad 2r - 18 = 12$$

$$2r = 30$$

$$r = 15$$

$$\textcircled{2} \quad r(r - 18) = \frac{1}{2}C$$

$$15(15 - 18) = \frac{1}{2}C$$

$$-45 = \frac{1}{2}C$$

$$\boxed{-90 = C}$$

