Date: _____

$2wx + 10w + 7x + 35$
(factor) (factor)

$= 2w(x+5) + 7(x+5)$
$= (x+5)(2w+7)$ done!

4.1 Continued

1) Common Factoring with a Twist ☆

Remember that factors can be monomials, binomials, or polynomials.

ex/ Common factor $2(x+1) - 3x(x+1)$.

$= (x+1)(2-3x)$ Factored form

This idea allows us to common factor by grouping when we have four terms. To do this, common factor pairs of numbers!

ex/ Factor by grouping. No CF for all terms.

$3x^2 - 6x + 4x - 8$

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

$= (x-2)(3x+4)$ ← factored form

2) Problem Solving

Use what you know to solve word problems!

ex/ The area of a rectangle is modelled by the expression $A = -4x^2 + 16x$. What dimensions will maximize the area of the rectangle?

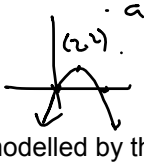
↳ vertex

$A = -4x(x-4)$ AofS: $x = 2$

- zeros
- a of s
- max.

Zeros: $-4x = 0$ $x - 4 = 0$

$x = 0$ $x = 4$



∴ The max area happens when $x = 2$.

ex/ The path of a ball after it is thrown is modelled by the relation $h = -5t^2 + 35t$.

a) When will the ball hit the ground? $h = 0$ (zeros)

$-5t(t-7) = 0$

$-5t = 0$ $t - 7 = 0$

$t = 0$ $t = 7$ ← The ball hits the ground after 7s.

b) When does the ball reach its maximum height?

time ← $t = \frac{0+7}{2}$ → vertex

$= 3\frac{1}{2}$ ∴ The ball reaches its max height at 3.5 seconds.

c) What is the maximum height of the ball?

y-coordinate

$h = -5(3.5)^2 + 35(3.5)$

$= 61.25$ m

∴ The max height is 61.25 m.