Name: *Caleb McWhorter — Solutions*
MATH 101
Fall 2021
HW 10: Due 11/05

"Our virtues and our failures are inseparable, like force and matter. When they separate, man is no more."

–Nikola Tesla

Problem 1. (10pt) Factor $x^2 + 7x - 30$. Show all your work.

Solution.

$\underline{30}$	
$1 \cdot -30$	-29
$-1 \cdot 30$	29
$2 \cdot -15$	-13
$-2 \cdot 15$	13
$3 \cdot -10$	-7
$\boxed{-3 \cdot 10}$	$\boxed{7}$
$5 \cdot -6$	-1
$-5 \cdot 6$	1

Therefore,

$$x^2 + 7x - 30 = (x - 3)(x + 10)$$

Problem 2. (10pt) Factor $x^2 - 12x + 36$. Show all your work.

Solution.

$\underline{\mathbf{36}}$	
$1 \cdot 36$	37
$-1 \cdot -36$	-37
$2 \cdot 18$	20
$-2 \cdot -18$	-20
$3 \cdot 12$	15
$-3 \cdot -12$	-15
$4 \cdot 9$	13
$-4 \cdot -9$	-13
$6 \cdot 6$	12
$\boxed{-6 \cdot -6}$	$\boxed{-12}$

Therefore,

$$x^2 - 12x + 36 = (x - 6)(x - 6) = (x - 6)^2$$

Problem 3. (10pt) Factor $x^2 + 2x - 24$. Show all your work.

Solution.

$\underline{\mathbf{24}}$	
$1 \cdot -24$	-23
$-1 \cdot 24$	23
$2 \cdot -12$	-10
$-2 \cdot 12$	10
$3 \cdot -8$	-5
$-3 \cdot 8$	5
$4 \cdot -6$	-2
$\boxed{-4 \cdot 6}$	$\boxed{2}$

Therefore,

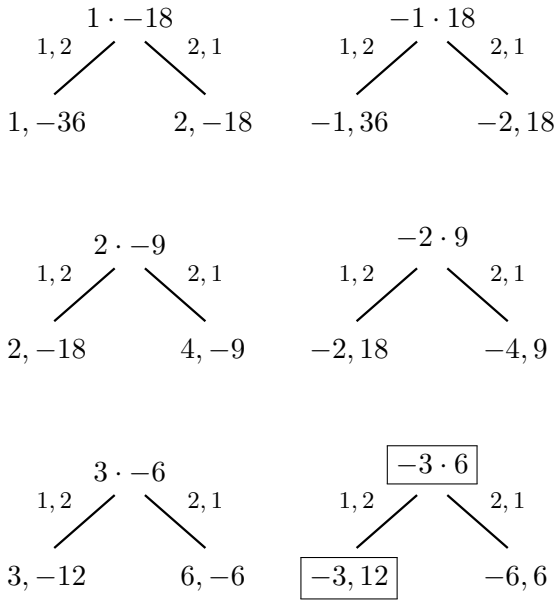
$$x^2 + 2x - 24 = (x - 4)(x + 6)$$

Problem 4. (10pt) Factor $2x^2 + 9x - 18$. Show all your work.

Solution.

$$\underline{\mathbf{18}}$$
$$1 \cdot -18$$
$$-1 \cdot 18$$
$$2 \cdot -9$$
$$-2 \cdot 9$$
$$3 \cdot -6$$
$$-3 \cdot 6$$

Then as $2 = 1 \cdot 2$, we have...



Therefore,

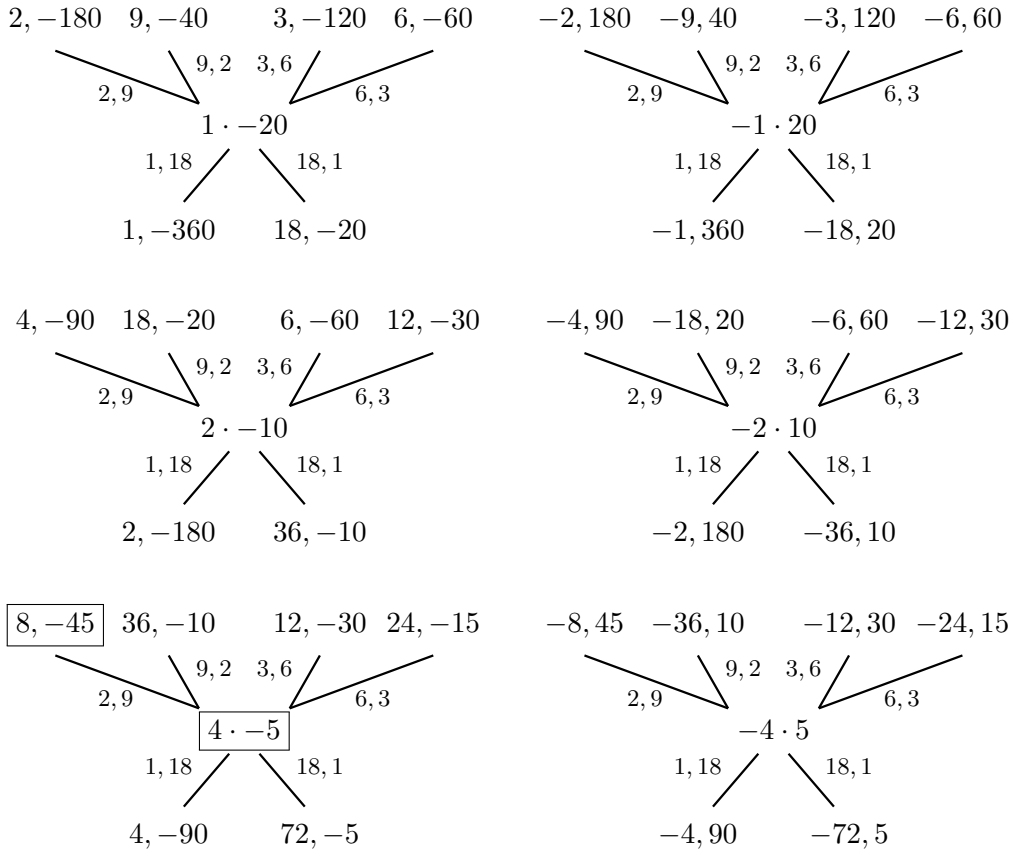
$$2x^2 + 9x - 18 = (2x - 3)(x + 6)$$

Problem 5. (10pt) Factor $18x^2 - 37x - 20$. Show all your work.

Solution.

$$\underline{\mathbf{20}}$$
$$1 \cdot -20$$
$$-1 \cdot 20$$
$$2 \cdot -10$$
$$-2 \cdot 10$$
$$4 \cdot -5$$
$$-4 \cdot 5$$

Then as $18 = 1 \cdot 18$, $18 = 2 \cdot 9$, or $18 = 3 \cdot 6$, we have...



Therefore,

$$18x^2 - 37x - 20 = (2x - 5)(9x + 4)$$