# Lesson 8.3.1

**8-113.** This is a discussion question. Students may or may not suggest that dividing by $x - 2$ will yield a quadratic factor that they can set equal to zero and solve.

**8-114. See below:**

a. $-2(-x^2) = 2x^2$

b. $-3x^3 + -4x^3$

c. See completed puzzle below.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| A | × | $4x^3$ | $+ 6x^2$ | $- 2x$ | $- 5$ |
| B | $2x$ | $8x^4$ | $12x^3$ | $-4x^2$ | $-10x$ |
| C | $- 3$ | $-12x^3$ | $-18x^2$ | $6x$ | 15 |
| | | $\mathbf{8x^4}$ | $\mathbf{+0x^3}$ | $\mathbf{-22x^2}$ | $\mathbf{-4x}$ | $\mathbf{+15}$ |

**8-115.** See completed puzzle below. $(x - 4)(2x^3 - 3x^2 - 2x + 4) = 2x^4 - 11x^3 + 10x^2 + 12x - 16$

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| A | × | $2x^3$ | $-3x^2$ | $- 2x$ | $+4$ |
| B | $x$ | $2x^4$ | $-3x^3$ | $-2x^2$ | $4x$ |
| C | $- 4$ | $-8x^3$ | $12x^2$ | $8x$ | $-16$ |
| | | $\mathbf{2x^4}$ | $\mathbf{-11x^3}$ | $\mathbf{+10x^2}$ | $\mathbf{+12x}$ | $\mathbf{-16}$ |

a. B2 is the same as the first term in the answer

b. $B4 + C3$, $-2x^2 + 12x^2$

c. Answer term #4 = $12x$ and $C4 = 8x$, $B5 + (8x) = 12x$, $B5 = 4x$

**8-116.** See completed puzzle below.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| A | × | $3x^2$ | $-4x$ | $+2$ |
| B | $2x$ | $6x^3$ | $-8x^2$ | $4x$ |
| C | $+ 5$ | $15x^2$ | $-20x$ | 10 |
| | | $\mathbf{6x^3}$ | $\mathbf{+7x^2}$ | $\mathbf{-16x}$ | $\mathbf{+10}$ |

$\frac{6x^3+7x^2-16x+10}{2x+5} = 3x^2 - 4x + 2$ and $(2x + 5)(3x^2 - 4x + 2) = 6x^3 + 7x^2 - 16x + 10$

**8-117. See below:**

a. It is the remainder

b. $3x^2 - 4x + 2 + \frac{8}{2x+5}$

c. $2x^2 + 3x - 5 + \frac{4}{3x+1}$

**8-118. See below:**

a. $2x^3 - x^2 + 3x - 5$

b. $x^3 - 4x^2 - 8x + 2$

c. $x^2 + 4x - 2 - \frac{3}{x-3}$

d. $x^4 + x^3 + x^2 + x + 1$

**8-119.** $2, -2 + \sqrt{3}, -2\sqrt{3}$


**8-120. See below:**

a. $-7$

c. $(x + 7)$

d. $(x^2 - 2x - 2)$

e. Students factor given equation.

f. $-7, 1 \pm \sqrt{3}$

**8-121.** $x = 1$, $x = \frac{1}{2}$, or $x = -3$

**8-122.** Part (c), because $(-2)(3)(-5) = 30$ and $(x)(x)(x) = x^3$ not $2x^3$.

**8-123.** (b), because 5 is a factor of the last term, but 2 and 3 are not.

**8-124.** $(x - 5)(x^2 - 4x - 1)$ ; zeros: $5,\ 2 \pm \sqrt{5}$

**8-125. See below:**

a. $(x-2)(5x+3)$

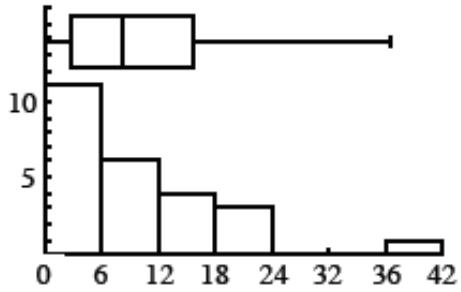
b. $-\frac{3}{5}, 2$

c. Explanations vary

d. 3 and 2 are factors of 6, while 5 is a factor of the lead coefficient.

**8-126. See below:**

a. See the combination histogram boxplot below. The five number summary (for the box plot) is 0, 2.75, 8, 15.7, 36.5.




b. The distribution has a right skew and an outlier at 36.5 pounds so the center is best described by the median of 8.0 pounds and the spread by the IQR of 12.95 pounds.

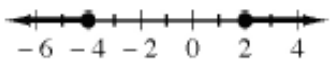
c. The median is better in this case because it is not affected by skewing and outliers.

d. The IQR is better in this case because it is less affected by skewing and outliers than the standard deviation.

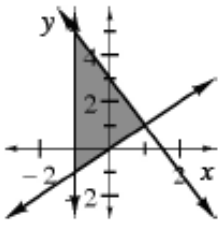
e. If you remove the outlier from the data the mean drops to 8.7 pounds which is below the profitable minimum. You could suggest running the test a few more weeks because perhaps as people get used to the composting program they will participate even more.

**8-127.** See graphs below.

a.

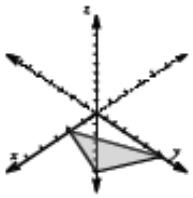



b.




**8-128. See below:**

a. See graph below.



b. Yes, it is a solution to the equation.