Lesson 4.1.4

4-47. The path of Jamal's cupcake can be described by $y = -\frac{9}{100}(x-10)^2 + 9$. The path of Dinah's sandwich can be described by $y = -\frac{1}{24}(x-12)^2 + 6$. Depending on how students place the axes, other possibilities might be $y = -\frac{9}{100}x^2 + 9$ and

$y = -\frac{1}{24}(x-2)^2 + 6$ or $y = -\frac{9}{100}(x+10)^2 + 9$ and $y = -\frac{1}{24}(x+12)^2 + 6$. The point of intersection is approximately (16.55, 5.14), so he is about 5.14 feet tall, or 5 feet, 1.7 inches.

4-48. Let a represent chocolate truffles and b represent caramel turtles; $4.25 = 5a + 2b$ and $3.50 = 2a + 8b$; $a = \$0.75$ and $b = \$0.25$.

4-49. See below:

a. For the first 6 years, Job A offers a higher salary. Starting with the 7th year, Job B offers a higher salary.

b. If Job B is changed to start at a salary that is more than \$52,000, it will always be higher than the salary at Job A. However, regardless of the rate of increase of Job A, the exponential growth of Job B will always surpass it, so Job A cannot be changed to always be the better choice. Some students could argue though, that if the rate of growth of Job B is changed to a very low value, such as 1%, then Job A will remain higher for more years than most people would stay at one job.

Review & Preview

4-51. $4c + 5p = 32$, $c + 8p = 35$, cylinders weigh 3 oz. and prisms weigh 4 oz.

4-52. Yes. No. Any value of x such that $-3 \le x \le 2$ is a solution.

4-53. See below:

a. $x = 4$

b. $x = 6$

c. $x = 6$
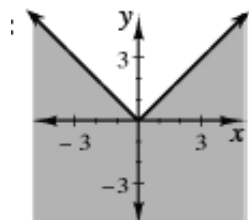
d. $x = \frac{3}{2}$

4-54. See below:

a. $(4, -6)$

b. $(4, -6)$

c. $\left(\frac{3}{2}, -\frac{9}{4}\right)$
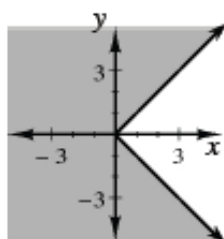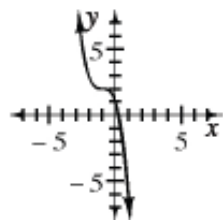
4-55. See graphs below:

a.

b.

4-56. B

4-57. See below:

a. See graph below.

b. $x \approx 0.71$