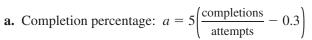
Football Statistics

EXAMPLE 3 Calculating Quarterback Ratings

The NFL uses a complicated formula to rate a quarterback's passing efficiency. It involves the following four categories.



b. Average yards per attempt:
$$b = 0.25 \left(\frac{\text{yards}}{\text{attempts}} - 3 \right)$$

c. Touchdown pass percentage:
$$c = 20 \left(\frac{\text{touchdowns}}{\text{attempts}} \right)$$

d. Interception percentage:
$$d = 2.375 - 25 \left(\frac{\text{interceptions}}{\text{attempts}} \right)$$

If the result of any of these is greater than 2.375, the result is lowered to 2.375. If the result is negative, it is raised to 0. The quarterback's passer rating is

Passer rating =
$$100 \left(\frac{a+b+c+d}{6} \right)$$
.

On November 25, 2010, Tom Brady completed a game with a perfect passer rating. He had 21 completions, 27 attempts, 341 yards, 4 touchdowns, and 0 interceptions. What was Brady's passer rating in that game?



Tom Brady is a quarterback for the New England Patriots. As of 2011, he played in four Super Bowls, winning three of them. In 2005, he was named *Sports Illustrated's* Sportsman of the Year.

SOLUTION

$$a = 5\left(\frac{\text{completions}}{\text{attempts}} - 0.3\right) = 5\left(\frac{21}{27} - 0.3\right) \approx 2.39$$
 Lowered to 2.375

$$b = 0.25 \left(\frac{\text{yards}}{\text{attempts}} - 3 \right) = 0.25 \left(\frac{341}{27} - 3 \right) \approx 2.41$$
 Lowered to 2.375.

$$c = 20 \left(\frac{\text{touchdowns}}{\text{attempts}} \right) = 20 \left(\frac{4}{27} \right) \approx 2.96$$
 Lowered to 2.375.

$$d = 2.375 - 25 \left(\frac{\text{interceptions}}{\text{attempts}} \right) = 2.375 - 25(0) = 2.375$$

Passer rating =
$$100 \left(\frac{2.375 + 2.375 + 2.375 + 2.375}{6} \right) \approx 158.3$$

So, Brady's rating was 158.3. This is the highest possible rating in this rating system. That is why it is called a perfect passer rating.





Which of the following had perfect passer ratings? Explain.

		CMP	AII	YDS	TD	INT
Ben Roethlisberger	December 20, 2007	16	20	261	3	0
Kurt Warner	September 14, 2008	19	24	361	3	0
Eli Manning	October 11, 2009	8	10	173	2	0
Drew Brees	November 30, 2009	18	23	371	5	0