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2004 Q6

6. After Sally takes 20 shots, she has made 55% of her shots. After she takes 5 more shots, she raises her percentage to 56%. How many of the last 5 shots did she make?

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **(E)** 5

6. **(C)** If Sally makes 55% of her 20 shots, she makes $0.55 \times 20 = 11$ shots. If Sally makes 56% of her 25 shots, she makes $0.56 \times 25 = 14$ shots. So she makes $14 - 11 = 3$ of the last 5 shots.

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2004 Q7

7. An athlete's target heart rate, in beats per minute, is 80% of the theoretical maximum heart rate. The maximum heart rate is found by subtracting the athlete's age, in years, from 220. To the nearest whole number, what is the target heart rate of an athlete who is 26 years old?

(A) 134 **(B)** 155 **(C)** 176 **(D)** 194 **(E)** 243

7. **(B)** A 26-year-old's target heart rate is $0.8(220 - 26) = 155.2$ beats per minute. The nearest whole number is 155.

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1990 Q8

8. A dress originally priced at \$80 was put on sale at 25% off. If 10% tax was added to the sale price, then the total selling price of the dress was

A) \$45 B) \$52 C) \$54 D) \$66 E) \$68

8. D The sale price was $\frac{3}{4}(\$80) = \$60$. Thus the tax was \$6 and the total selling price was \$66.

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2006 Q8

8. The table shows some of the results of a survey by radio station KAMC. What percentage of the males surveyed listen to the station?

	Listen	Don't Listen	Total
Male	?	26	?
Female	58	?	96
Total	136	64	200

(A) 39 **(B)** 48 **(C)** 52 **(D)** 55 **(E)** 75

8. **(E)** Because $200-96=104$ of those surveyed were male, $104-26=78$ of those surveyed are male listeners.

	Listen	Don't Listen	Total
Male	78	26	104
Female	58	38	96
Total	136	64	200

The percentage of males surveyed who listen to KAMC is $\frac{78}{104} \times 100\% = 75\%$.

2008 Q9

9. In 2005 Tycoon Tammy invested \$100 for two years. During the first year her investment suffered a 15% loss, but during the second year the remaining investment showed a 20% gain. Over the two-year period, what was the change in Tammy's investment?

(A) 5% loss **(B)** 2% loss **(C)** 1% gain **(D)** 2% gain **(E)** 5% gain

9. **Answer (D):** At the end of the first year, Tammy's investment was 85% of the original amount, or \$85. At the end of the second year, she had 120% of her first year's final amount, or 120% of $\$85 = 1.2(\$85) = \$102$. Over the two-year period, Tammy's investment changed from \$100 to \$102, so she gained 2%.

2009 Q8

8. The length of a rectangle is increased by 10% and the width is decreased by 10%. What percent of the old area is the new area?

(A) 90 **(B)** 99 **(C)** 100 **(D)** 101 **(E)** 110

8. **Answer (B):** A rectangle with length L and width W has area LW. The new rectangle has area $(1.1)L \times (0.9)W = 0.99LW$. The new area $0.99LW$ is 99% of the old area.

2012 Q8

8. A shop advertises that everything is "half price in today's sale." In addition, a coupon gives a 20% discount on sale prices. Using the coupon, the price today represents what percentage discount off the original price?

(A) 10 **(B)** 33 **(C)** 40 **(D)** 60 **(E)** 70

8. **Answer (D):** The price of an item costing $\$d$ after both discounts are applied is $.80(.50d) = .40d$, a discount of 60% off the original price.

1989 Q9

9. There are 2 boys for every 3 girls in Ms. Johnson's math class. If there are 30 students in her class, what percent of them are boys?

A) 12% B) 20% C) 40% D) 60% E) $66\frac{2}{3}\%$

9. C We see that 2 out of every 5 students or $\frac{2}{5}$ or 40% are boys.
Note: The number of students in the class is not needed to solve the problem.

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1990 Q9

9. The grading scale shown is used at Jones Junior High. The fifteen scores in Mr. Freeman's class were: 89, 72, 54, 97, 77, 92, 85, 74, 75, 63, 84, 78, 71, 80, 90.

A:	93 -100
B:	85 - 92
C:	75 - 84
D:	70 - 74
F:	0 - 69

In Mr. Freeman's class, what percent of the students received a grade of C?

A) 20% B) 25% C) 30% D) $33\frac{1}{3}\%$ E) 40%

9. D Five of the fifteen scores [77, 75, 84, 78, 80] are in the "C range", so the desired percent is $\frac{5}{15} = \frac{1}{3} = 33\frac{1}{3}\%$

1994 Q9

9. A shopper buys a \$100 coat on sale for 20% off. An additional \$5 is taken off the sale price by using a discount coupon. A sales tax of 8% is paid on the final selling price. The total amount the shopper pays for the coat is

(A) \$81.00 **(B)** \$81.40 **(C)** \$82.00 **(D)** \$82.08 **(E)** \$82.40

9. **(A)** The 20% discount lowers the price to \$80.
Then the \$5 coupon reduces the price to \$75.
The sales tax is 8% of \$75, or $0.08 \times \$75 = \$6$.
Thus, the final cost is $\$75 + \$6 = \$81.00$.

OR

The discounted price is $0.8(\$100) - \$5 = \$75$.
The final price with tax is $1.08(\$75) = \$81.00$.

1998 Q9

9. For a sale, a store owner reduces the price of a \$10 scarf by 20%. Later the price is lowered again, this time by one-half the reduced price. The price is now

(A) \$2.00 **(B)** \$3.75 **(C)** \$4.00 **(D)** \$4.90 **(E)** \$6.40

9. **Answer (C):** First reduction: $10 - 0.2(10) = 10 - 2 = 8$.
Second reduction: $8 - 0.5(8) = 8 - 4 = 4$.

OR

The sale price is 80% of the original price. After the next reduction, the final price is one-half the sale price, or one-half of 80% or 40%. Therefore, $0.4(10) = 4$.

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2010 Q9

9. Ryan got 80% of the problems correct on a 25-problem test, 90% on a 40-problem test, and 70% on a 10-problem test. What percent of all the problems did Ryan answer correctly?

(A) 63 **(B)** 75 **(C)** 80 **(D)** 84 **(E)** 86

9. **Answer (D):** The three tests contain a total of 75 problems. Ryan received 80% of $25 = 20$, 90% of $40 = 36$, and 70% of $10 = 7$. Ryan correctly answered $20 + 36 + 7$ problems, for a total of 63 problems. The percent of problems Ryan answered correctly was:

$$\frac{63}{75} = \frac{21}{25} = \frac{21 \cdot 4}{25 \cdot 4} = \frac{84}{100} = 84\%$$

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1995 Q10

10. **A jacket and a shirt originally sold for \$80 and \$40, respectively. During a sale Chris bought the \$80 jacket at a 40% discount and the \$40 shirt at a 55% discount. The total amount saved was what percent of the total of the original prices?**

(A) 45% **(B)** $47\frac{1}{2}\%$ **(C)** 50% **(D)** $79\frac{1}{6}\%$ **(E)** 95%

10. **(A)** For the jacket, 40% of \$80 is a savings of \$32. For the shirt, 55% of \$40 is a savings of \$22. The total savings is \$32 + \$22 = \$54. The total of the original prices is \$120. Thus, \$54/\$120 = 0.45 = 45%.

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2000 Q10

10. Ara and Shea were once the same height. Since then Shea has grown 20% while Ara has grown half as many inches as Shea. Shea is now 60 inches tall. How tall, in inches, is Ara now?

(A) 48 **(B)** 51 **(C)** 52 **(D)** 54 **(E)** 55

10. **Answer (E):** Shea is 60 inches tall. This is 1.2 times the common starting height, so the starting height was $\frac{60}{1.2} = 50$ inches. Shea has grown $60 - 50 = 10$ inches. Therefore, Ara grew 5 inches and is now 55 inches tall.

2001 Q10

10. A collector offers to buy state quarters for 2000% of their face value. At that rate how much will Bryden get for his four state quarters?

(A) \$20 (B) \$50 (C) \$200 (D) \$500 (E) \$2000

10. (A) $2000\% = 20.00$, so the quarters are worth 20 times their face value. That makes the total value $20(4)(\$0.25) = \$20$.