

1. A survey was given to 12th-grade students of West High School to determine the location for the senior class trip. The results are shown in the table below.

	Niagara Falls	Darien Lake	New York City
Boys	56	74	103
Girls	71	92	88

To the *nearest percent*, what percent of the boys chose Niagara Falls?

1. 12

2. 24

3. 44

4. 56

$$\frac{56}{233} = .2403 \dots 100\%$$

2. The value, $V(t)$, of a baseball card increases $\rightarrow 104.5\%$ according to the function $V(t) = P(1.045)^t$, where P is the purchase price of the baseball card and t is the time, in years since the card was purchased. By what percent does the value of the card increase each year?

1. 4.5%

2. 45%

3. 95.5%

4. 145%

$$A = P(1 + \underline{r})^t$$

3. Burt purchased a theater ticket on a website. The original price of the ticket was \$65.00. He used a coupon code to receive a 20% discount. The website applied a 10% service fee. The cost of the ticket Burt bought was less than the original price by what percent?

1. 10% 2. 12%

3. 15% 4. 88%

$$\begin{array}{l} (1.1(.8)(65)) \\ \leftarrow \text{disc. } 12\% \end{array}$$

The handwritten work shows the calculation of the final price after a 20% discount and a 10% service fee. The original price is \$65.00. A 20% discount is applied, resulting in a price of $0.8 \times 65 = 52$. Then, a 10% service fee is applied, resulting in a final price of $1.1 \times 52 = 57.2$. The discount is calculated as $\frac{65 - 57.2}{65} = 0.12$, or 12%.

4. Which of the following situations could be modeled using the expression $1.05(0.90p)$?

1. The total cost of a shirt that is on sale for 10% off including 5% tax
2. The price of a shirt marked up 5%
3. The price of a pair of sneakers marked down 5%
4. The total cost of a concert ticket discounted 90% plus a 5% fee

$1.05 \rightarrow 5\%$
tax

$.9p = 10\%$ discount

5.



$$\frac{.8P}{.8} = \frac{59}{.8}$$

Jeans are on sale for \$59.00 at a popular store in the mall. This is 80% of the regular price. What is the regular price of the jeans?

1. \$73.75 2. \$139.00
3. \$47.20 4. \$80.00

$$x = 73.75$$

6. The expression $(1 + i)^2$ is equivalent to

1. 1 2. 2

3. i 4. $2i$

The handwritten solution shows the expansion of $(1+i)^2$. It starts with $(1+i)(1+i)$ in purple. Red arrows indicate the FOIL method: from the first 1 to the first i, from the first 1 to the second 1, from the first i to the second i, and from the second i to the second i. Below this, the expansion is written in red: $= 1 + i + i + i^2 = 1 + 2i$. A red checkmark is next to this line. The final result is $= 2i$, where the $2i$ is circled in red.

$$(1+i)(1+i)$$
$$= 1 + i + i + i^2 = 1 + 2i \quad \checkmark$$
$$= 2i$$

7. Simplify and express in $a + bi$ form: $(12 + 3i) - (3 - i)$

1. $9 + 2i$

2. $9 + 4i$

3. $15 + 2i$

4. $15 - 2i$

$$\begin{aligned} & 12 + 3i - 3 + i \\ & = 9 + 4i \end{aligned}$$

8. For which equation will $f(-2) = -6$?

1. $f(x) = x^3 + x = (-2)^3 + (-2) = -10$

2. $f(x) = x^4 - 5x = (-2)^4 - (5)(-2) = 36$

3. $f(x) = 4x^3 + 6x^2 - x = 4(-2)^3 + 6(-2)^2 - (-2)$

4. $f(x) = -3x^3 - 4x^2 + 4x$

$$= -32 + 24 + 2 = -6$$