

MATHEMATICS TIPS (OCTOBER 2020)

Leo Ramirez Sr. (The Wizard Maker)

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1. The point $(-7, 8)$ is reflected over the y -axis and then over the x -axis. What are the point's new coordinates?

(A) $(7, 8)$ (B) $(-7, 8)$ (C) $(8, -7)$ (D) $(7, -8)$ (E) $(-7, -8)$

When the point (x, y) is reflected over the y -axis the result will be the point $(x, -y)$. If the point $(-7, 8)$ is reflected over the y -axis, the result will be the point $(-7, -8)$.

When the point (x, y) is reflected over the x -axis the result will be the point $(-x, y)$. If the point $(-7, -8)$ is reflected over the x -axis, the result is the point $(7, -8)$.

Answer: $(7, -8)$

2. Anita decreased her daily intake of water from 64 ounces to 56 ounces. By what percentage did Anita decrease the amount of water she drank?

(A) 24% (B) 12.5% (C) 8.5% (D) 18.25% (E) 10.5%

$$\frac{\text{New} - \text{Old}}{\text{Old}} \times 100 = \text{Percent change}$$

$$\frac{56 - 64}{64} \times 100 = 100 \left(-\frac{8}{64} \right) = 100 \left(-\frac{1}{8} \right) = -12.5\%$$

Since the answer is negative it means that it is a decrease.

Answer: 12.5%

3. What is the 17th term of the arithmetic sequence
- 51, - 32, -13, ...?

(A) 234 (B) 253 (C) 272 (D) 215 (E) 197

n th term = $a + (n - 1)d$, where a is the first term, n is the number of the term and d is the common difference.

$$\begin{aligned} 17^{\text{th}} \text{ term} &= -51 + (17 - 1)(19) \\ &= -51 + (16)(19) \\ &= -51 + 304 = 253 \end{aligned}$$

4. Erin walks passed a pet shop and in the window sees puppies and birds. She counted 20 heads and 48 legs of all the puppies and birds she saw. How many birds did Erin see than puppies?

(A) 12 (B) 16 (C) 8 (D) 10 (E) 4

Let P = number of puppies ; B = number of birds

$$\begin{aligned} P + B &= 20 \\ 4P + 2B &= 48 \end{aligned}$$

To solve for P , multiply the top equation by -2 , which when added to the bottom equation eliminate the B terms.

$$\begin{aligned} -2P - 2B &= -40 \\ 4P + 2B &= 48 \end{aligned}$$

$$2P = 8 \quad ; \quad P = 4 \quad (\text{there are 4 puppies})$$

Substituting in the first equation you can find the number of birds.

$$4 + B = 20 \quad ; \quad B = 16$$

Since there are 16 birds and 4 puppies, then there are 12 more birds than puppies.

5. Factor completely: $x^4 - 8x^2 - 9$

- (A) $(x + 1)(x - 9)$
(B) $(x^2 + 1)(x^2 - 9)$
(C) $x^2(x + 1)(x - 9)$
(D) $(x + 10)(x - 1)(x + 3)(x - 3)$
(E) $(x^2 + 1)(x + 3)(x - 3)$

$$x^4 - 8x^2 - 9$$

$$(x^2 + 1)(x^2 - 9)$$

$$(x^2 + 1)(x + 3)(x - 3)$$