

## MATHEMATICS TIPS (SEPTEMBER 2023)

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1. What is the sum of the 18<sup>th</sup> and 24<sup>th</sup> terms of the sequence?  
- 21, - 17, - 13, - 9, ...

(A) 112      (B) 116      (C) 118      (D) 120      (E) 122

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

$$18^{\text{th}} \text{ term} = -21 + (18 - 1)(4) = 47$$

$$24^{\text{th}} \text{ term} = -21 + (24 - 1)(4) = 71$$

$$47 + 71 = 118$$

2. What is the circumference of a circle with an equation of  
 $2(x + 4)^2 + 2(y - 7)^2 = 338$ ?

(A)  $26\pi$  units      (B)  $160\pi$  units      (C)  $26\sqrt{2}\pi$  units  
(D)  $13\sqrt{2}\pi$  units      (E)  $2\sqrt{26}\pi$  units

Divide both sides of the given equation by 2.

$$(x + 4)^2 + (y - 7)^2 = 169$$

$(x - h)^2 + (y - k)^2 = r^2$ , where  $(h, k)$  is the center of the circle and  $r$  = length of the radius.

$$r = \sqrt{169} = 13 ; \quad C = 2\pi r = 2(\pi)(13) = 26\pi$$

3. The geometric mean of the numbers 32 and 18 is how much greater than  $-7$ ?

(A) 32      (B) 18      (C) 43      (D) 11      (E) 31

The geometric mean of 32 and 18 =  $\sqrt{(32)(18)}$  =  $\sqrt{(16)(2)(18)}$  =  $\sqrt{(16)(36)}$  =  $4(6)$  = 24.

The geometric mean, 24, is 31 greater than  $-7$ . Answer is 31.

4. What are the roots of the equation  $y = x^2 + 6x - 14$ ?

- (A)  $-3 \pm \sqrt{23}$  (B)  $3 \pm \sqrt{23}$  (C)  $-3 \pm 2\sqrt{23}$   
 (D)  $3 \pm 2\sqrt{23}$  (E)  $-6 \pm 2\sqrt{23}$

Use the quadratic formula :  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$\frac{-6 \pm \sqrt{6^2 - 4(1)(-14)}}{2(1)} = \frac{-6 \pm \sqrt{36 + 56}}{2} = \frac{-6 \pm \sqrt{92}}{2} = \frac{-6 \pm 2\sqrt{23}}{2} = -3 \pm \sqrt{23}$$

5. The equation  $|2x - 11| = 89$  has two solutions, A and B.  
 If  $A < B$ , what is the value of  $B - A$ ?

- (A) 11 (B) 100 (C) 50 (D) 89 (E) 78

$$2x - 11 = 89 \text{ or } 2x - 11 = -89$$

$$2x = 100 \text{ or } 2x = -78$$

$$x = 50 \text{ or } x = -39$$

Since  $-39$  is less than  $50$ , then  $50 - (-39) =$