

REGIONAL COMPETITION

Choose the correct answer and bubble that letter on your scantron answer sheet. If none of the answers (NOTA) are correct, then choose the letter E. NOTA

1: Factor completely: $w^2v^2 - v^2 + w^2 - 1$

A: $(v+1)(v-1)(w+1)(w-1)$

B: $(v+1)(v+1)(w-1)(w-1)$

C: $(v^2+1)(w^2-1)$

D: $(v^2+1)(w+1)(w-1)$

E: NOTA

2: Write the following equation in the form of $Ax + By = C$, where A, B and C are all integers.

$$\frac{1}{5}x = \frac{7}{10}y - \frac{3}{4}$$

A: $4x = 14y - 15$

B: $\frac{1}{5}x - \frac{7}{10}y = -\frac{3}{4}$

C: $4x - 14y = -15$

D: $y = \frac{2}{7}x + \frac{15}{14}$

E: NOTA

3: Evaluate if $j = 4$, $k = 9$, $m = 20$ and $x = 3$:

$$(xj)^2 + km^2$$

A: 3648

B: 3744

C: 32448

D: 32544

E: NOTA

4: Evaluate if $p = 6$, $q = -8$ and $s = -24$:

$$\frac{4(p^2 + q^2)}{2q} - s$$

A: -49

B: -17

C: -1

D: 31

E: NOTA

5: On December 13, 1983, the Denver Nuggets and the Detroit Pistons broke the record for the highest score in a basketball game. The two teams scored a total of 370 points. If the Nuggets scored 2 less points than the Pistons, what was the Nuggets' final score?

A: 182

B: 184

C: 186

D: 188

E: NOTA

6: Evaluate: $4 - 3(2 + 1(3 - 2(2 + 3) + 2) + 2) + 4$

A: -4

B: 0

C: 2

D: 8

E: NOTA

7: Find the product: $(12x - 4y)(5x + 8y)$

A: $60x^2 + 76xy - 32y^2$

B: $60x^2 + 116xy - 32y^2$

C: $4(3x - y)(5x + 8y)$

D: $4(15x^2 + 19xy - 8y^2)$

E: NOTA

8: Suppose that y varies inversely as x . If $y = 7$ when $x = \frac{2}{3}$, find y when $x = 7$.

- A: $y = \frac{98}{3}$ B: $y = 73.5$ C: $y = \frac{2}{3}$ D: $y = \frac{3}{2}$ E: NOTA

9: If a sum of money is equally divided among n children, each child will receive \$60. If another child is added to the group, then when the sum is divided equally among all the children, each child will receive a \$50 share. What is the sum of money?

- A: \$3000 B: \$300 C: \$110 D: \$10 E: NOTA

10: Simplify: $\frac{-15h^4j^{-2}k^4}{-10h^{-6}j^3k^8}$

- A: $-5h^{-2}jk^4$ B: $\frac{3h^{10}}{2j^5k^4}$ C: $\frac{3}{2h^{-2}jk^4}$ D: $1.5h^{10}j^5k^4$ E: NOTA

11: Solve: $\sqrt{b^2+16} + 2b = 5b$

- A: $b = 2$ B: $b = -2$ C: $b = \sqrt{2}$ D: $b = \pm\sqrt{2}$ E: NOTA

12: The number of seconds it takes the thunder sound to reach you is 5 times the number of miles between you and the lightning. If the sound takes 23 seconds to reach you, how far are you from the lightning?

- A: 2.3m B: 4.6m C: 28m D: 1.5m E: NOTA

13: Simplify: $\sqrt{15m^2}\sqrt{6n^3}$

- A: $\sqrt{90m^2n^3}$ B: $30m\sqrt{n^3}$ C: $9mn^{1.5}$ D: $3mn\sqrt{10n}$ E: NOTA

14: Find the product: $\frac{t^2-2t-15}{t-5} \cdot \frac{t+5}{t+3}$

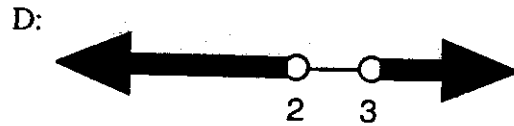
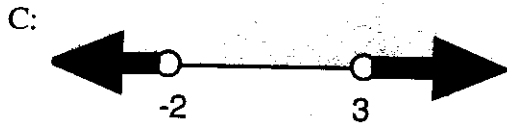
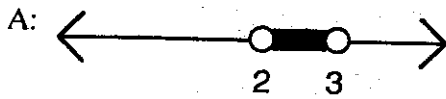
- A: $t-5$ B: $5-t$ C: $-t-5$ D: $t+5$ E: NOTA

15: Find the product: $(a^4b)^6(-1a^3b^2)^8$

- A: b^{-18} B: $a^{21}b^{16}$ C: $-a^{48}b^{22}$ D: $a^{48}b^{22}$ E: NOTA

- 16: Find the difference: $\frac{25}{5-x} - \frac{x^2}{5-x}$
- A: $(25 - x^2)(5 - x)$ B: $5 + x$ C: $\frac{25 - x^2}{5 - x}$
D: $(5 + x)(5 - x)$ E: NOTA
- 17: Simplify: $\frac{2m^2 + 10m + 12}{m + 3}$
- A: $2m + 14$ B: $2m^2 + 14$ C: $2m + 4$ D: $12m + 4$ E: NOTA
- 18: Write the equation of the line that passes through the pair of points (5,1) and (3, -2). Use slope-intercept form.
- A: $y = \frac{3}{2}x - \frac{13}{2}$ B: $2y - 3x = 7$ C: $y = \frac{2}{3}x - \frac{7}{2}$
D: $3x - 2y = 13$ E: NOTA
- 19: A girl at point X walks 1 mile east, then 2 miles north, then 1 mile east, then 1 mile north, then 1 mile east, then 1 mile north to arrive at point Y. From point Y, what is the shortest distance to point X?
- A: 5 miles B: 6 miles C: 7 miles D: 25 miles E: NOTA
- 20: A missile is fired with an initial upward velocity of 2320 feet per second. Use the formula $h = vt - 16t^2$ to determine when it will reach 84,100 feet.
- A: 7.25 seconds B: 72.5 seconds C: 725 seconds
D: 72.5 minutes E: NOTA
- 21: If W, X, Y and Z are real numbers, each of the following equals $W(X+Y+Z)$ EXCEPT
- A: $WX + WY + WZ$ B: $(X + Y + Z)W$ C: $WX + W(Y + Z)$
D: $W(X + Y) + WZ$ E: NOTA
- 22: If $x = 3$ and $(x - y)^2 = 4$ then y could be:
- A: -5 B: -1 C: 0 D: 5 E: NOTA
- 23: All of the following are prime numbers EXCEPT
- A: 7 B: 41 C: 79 D: 91 E: NOTA

24: Which of the following is the graph of $7 - 3x < 13 \cap 7x < 3x + 12$:



E: NOTA

25: Find the solutions: $6g^2 + 10g = 24$

A: $\left\{\frac{4}{3}, -3\right\}$

B: $\left\{-\frac{4}{3}, 3\right\}$

C: $\left\{\frac{-5 \pm \sqrt{119}}{6}\right\}$

D: No solution

E: NOTA

26: The pages of a typewritten report are numbered from 1 to 100 by hand. How many times will it be necessary to write the number 5?

A: 10

B: 11

C: 12

D: 19

E: NOTA

27: Find the quotient: $\frac{3f^2 - 10f + 3}{5} \div \frac{3f - 1}{15f}$

A: $\frac{3f}{f - 3}$

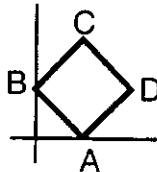
B: $\frac{f - 3}{3f}$

C: $3f^2 - 9f$

D: $\frac{9f^3 - 33f^2 + 19f - 3}{75f}$

E: NOTA

28: In the figure below, the coordinates of the vertices A and B are (2,0) and (0,2) respectively. What is the area of square ABCD?



A: 4

B: $4\sqrt{2}$

C: 8

D: $8\sqrt{2}$

E: NOTA

29: A woman owns $\frac{3}{4}$ of a business. She sells half of her share for \$30,000.

What is the total value of the business?

A: \$40,000

B: \$75,000

C: \$80,000

D: \$112,000

E: NOTA

30: Solve the system of equations:
$$\begin{cases} -3x + 2y = 10 \\ -2x - y = -5 \end{cases}$$

A: (5,0)

B: (0,5)

C: (0,-5)

D: Inconsistent E: NOTA