

Honors Algebra 2/Trig. Challenge Sample Test

50 questions – 60 minutes

Multiple Choice

Use the answer "NOTA" (which stands for None Of The Above) if the answer is not listed

1. Solve: $x - (15x - 6) = 104$
A) $-\frac{55}{7}$ B) $-\frac{49}{8}$ C) $-\frac{55}{8}$ D) -7 E) NOTA

2. If $y = 3$, then $-y^2 =$
A) -36 B) -18 C) -9 D) 9 E) 6

3. Solve for r : $A = p + prt$
A) $\frac{A}{1+tp}$ B) $t(A - p)$ C) $\frac{A - p}{pt}$
D) $\frac{pt}{A - p}$ E) NOTA

4. $(4x - 3)(x - 4) =$
A) $4x^2 + 19x + 12$ B) $4x^2 - 7$ C) $4x^2 + 12$
D) $4x^2 - 19x - 12$ E) NOTA

5. Find the distance between P(-4, 6) and Q(-2,-8)
A) $2\sqrt{58}$ B) $2\sqrt{10}$ C) $10\sqrt{2}$ D) $4\sqrt{58}$ E) NOTA

6. Factor: $16x^2 - a^2 =$
A) $(4x - a)^2$ B) $(4x + a)^2$ C) $(16x - a)^2$
D) $(4x - a)(x + a)$ E) $(4x - a)(4x + a)$

7. Given the measure of angle A is 33° . Find the sum of the measures of the complementary angle, supplementary angle and vertical angle for angle A.

- A) 257° B) 237° C) $\frac{247^\circ}{3}$ D) 279°
E) NOTA

8. One of the solutions of the equation $x^2 - x = 12$ is:

- A) -12 B) -4 C) 4 D) 3 E) NOTA

9. Find the area of a circle with circumference 32π

- A) 228π B) 256π C) 16π D) 16 E) NOTA

10. The value of $3^{-2} + 2^{-3}$ is:

- A) -1 B) $\frac{1}{17}$ C) $\frac{17}{72}$ D) $\frac{1}{72}$ E) NOTA

11. Solve: $15 + 10x > -4x + 3$

- A) $x > -\frac{9}{7}$ B) $x < -\frac{6}{7}$ C) $x < -6$
D) $x > -\frac{6}{7}$ E) NOTA

12. Find the coordinates of K, the midpoint of \overline{MN} , if the endpoints of \overline{MN} are $M(-4,6)$ and $N(2,5)$

- A) $(-2,6)$ B) $\left(3,5\frac{1}{2}\right)$ C) $\left(-1,5\frac{1}{2}\right)$ D) $\left(0,4\frac{3}{2}\right)$ E) NOTA

13. Solve the equations $2(m + 5) = -25$ and $4(2 - n) - 2 = 41$.
What is the sum of the solutions for m and n ?

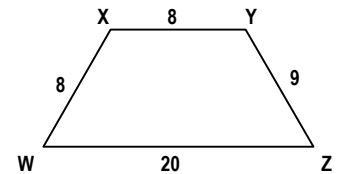
A) 17 B) -35 C) $-\frac{35}{2}$ D) $-\frac{35}{4}$ E) $-\frac{105}{4}$

14. If $x + y = 6$ and $x = y + 2$, then find the numerical value of y .

A) 1 B) 2 C) 3 D) 4 E) NOTA

15. If you choose a random point on a side of the trapezoid, what is the probability that it is on WZ?

A) $\frac{1}{45}$ B) $\frac{4}{5}$ C) $\frac{8}{45}$ D) $\frac{4}{9}$ E) $\frac{5}{9}$



16. Find the equation of the line containing the point $(-3, -12)$ and having slope: -4 .

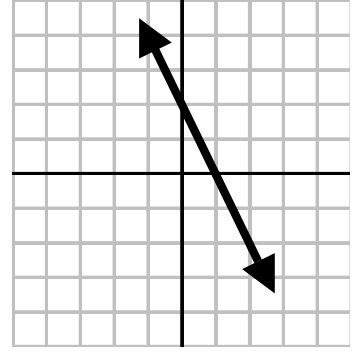
A) $y = -4x$ B) $y = 4x$ C) $y = -4x - 24$
D) $y = 3x - 4$ E) NOTA

17. Find the middle term to make this polynomial factorable:

$$x^2 + \underline{\hspace{2cm}} + 10$$

A) $12x$ B) $13x$ C) $7x$ D) $3x$ E) $-10x$

18. Which equation is graphed to the right?
- A) $x + y = 2$ B) $2x - y = 3$ C) $2x + y = 3$
- D) $2x - y = 5$ E) NOTA



19. A boy is mowing a rectangular lawn 40 ft. long and 30 ft. wide. He has cut all of it except for a rectangle that is 20 ft. long and 15 ft. wide. What fractional part of the lawn remains uncut?

- A) $\frac{1}{4}$ B) $\frac{9}{40}$ C) $\frac{7}{240}$ D) $\frac{1}{2}$ E) NOTA

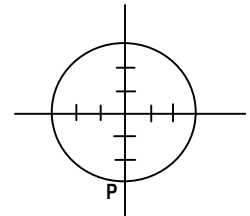
20. Factor completely: $18x^3 - 63x^2 + 9x =$

- A) $9(2x^3 - 7x^2 + x)$ B) $9x(2x^2 - 7x)$
- C) $9x(2x^2 - 7x + x)$ D) $9x(2x^2 - 7x + 1)$
- E) $9x(2x - 1)(x - 3)$

21. Find the equation of the perpendicular bisector between K(3, -6) and L(10, 17)

- A) $23x - 7y = 138$ B) $7x + 23y = 461$
- C) $23x - 7y = 54$ D) $11x - 7y = -9$
- E) NOTA

22. In the figure to the right, the circle is centered at the origin and passes through point P (0, -3). Which of the following points does it also pass through?



- A) (3, 3) B) $(-2\sqrt{2}, -1)$ C) (2, 6)
- D) (1.5, 1.3) E) (-3, 4)

23. Find the center and radius of the circle whose equation is:
 $x^2 + (y - 3)^2 = 10$

- A) center (0, -3) radius = 10
- B) center (1, 3) radius = 5
- C) center (0, 3) radius = $\sqrt{10}$
- D) center (0, -3) radius = $\sqrt{10}$
- E) center (0, 3) radius = 5

24. Find the geometric mean between 8 and $\frac{1}{4}$

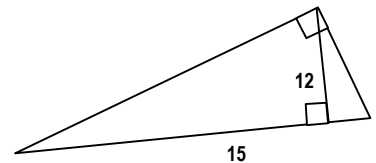
- A) $\sqrt{2}$
- B) $\frac{1}{2}$
- C) $\frac{\sqrt{2}}{2}$
- D) 2
- E) 16

25. The number ten is raised to a power between 0 and 1. The answer has to be between which two numbers?

- A) 0 and 1
- B) 1 and 10
- C) 10 and 100 but not 5
- D) 0 and 100 but not 50
- E) - 10 and 0

26. Find the area of a right triangle with hypotenuse 15 in. and altitude 12 in. (to the hypotenuse).

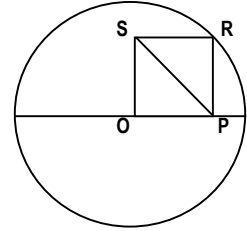
- A) 90 in²
- B) 180 in²
- C) 54 in²
- D) 108 in²
- E) NOTA



27. Given A(0, 2), B(5, 5), and C(7, 2). Reflect $\triangle ABC$ over the x-axis. Give the coordinates of the vertices of the image.

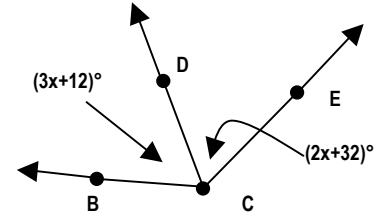
- A) A'(0, 2) B'(-5, 5) C'(-7, 2)
- B) A'(-2, 0) B'(-5, 5) C'(-2, 7)
- C) A'(0, -2) B'(5, -5) C'(7, -2)
- D) A'(2, 0) B'(5, 5) C'(2, 7)
- E) NOTA

28. In the figure to the right, O is both the center of the circle with radius 2 and a vertex of the square $OPRS$. What is the length of diagonal PS ?



- (A) $1/2$ (B) 1 (C) 4 (D) 2 (E) $2/3$

29. In the diagram at the right, $m\angle BCE$ is 144° . Find $m\angle ECD$.



- A) 72° B) 20° C) 42° D) 144° E) NOTA

30. Define $p \sim q$ by the equation $p \sim q = p^2q^3 - 3q$. Then

$2 \sim 3 =$

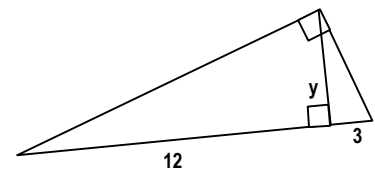
- A) 108 B) 27 C) 99 D) 117 E) 89

31. In isosceles $\triangle ABC$ with base \overline{AC} , $m\angle A = 3x + 9$ and $m\angle C = 5x - 13$. Find $m\angle B$

- A) 42 B) 52 C) 96 D) 34 E) NOTA

32. Find the exact value of y :

- A) $3\sqrt{3}$ B) 6 C) 36 D) $6\sqrt{5}$ E) NOTA

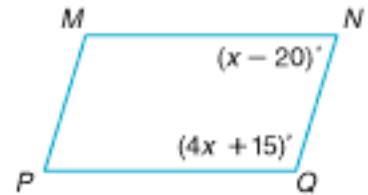


33. Find the equation of the line containing the point $(-3, 5)$ and having slope: 4

A) $y = 4x - 7$ B) $y = 4x$ C) $y = -4x - 24$
D) $y = 4x + 17$
E) NOTA

34. Find the value of x so that $\overline{MN} \parallel \overline{PQ}$

A) 11 B) 35 C) 19 D) 37 E) NOTA



35. Give the most specific name for the polygon with vertices $(5,-2)$, $(4,2)$, $(0,3)$, and $(1,-1)$

A) parallelogram B) rectangle
C) square D) rhombus
E) quadrilateral

36. What is the value of b in the equation $b = -4\frac{3}{8} - 7\frac{6}{8}$

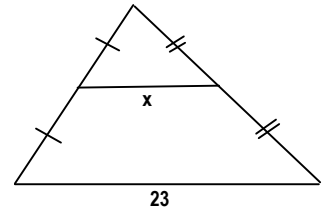
A) $2\frac{3}{8}$ B) $-11\frac{1}{8}$ C) $-12\frac{1}{8}$
D) $-11\frac{3}{8}$ E) NOTA

37. Suppose $\triangle ABC \sim \triangle PQR$ with $AB:PQ = 5:9$
What is the ratio of the area of $\triangle ABC$ to $\triangle PQR$?

A) 125:729 B) 5:9 C) 25:81 D) 2:3 E) NOTA

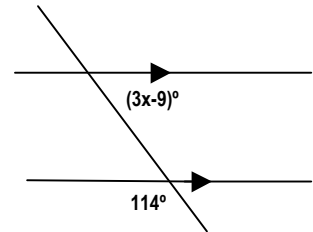
38. Find the value of x.

- A) 11.5 B) 23 C) 46 D) $\frac{23}{3}$ E) Not enough information



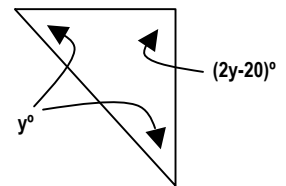
39. Find the value of x.

- A) 16 B) 41 C) 5 D) 25 E) 66



40. Find the value of y.

- A) 50 B) 55 C) 40 D) $\frac{200}{3}$ E) 45



41. The sum of 3 consecutive integers is 102. Find the largest integer.

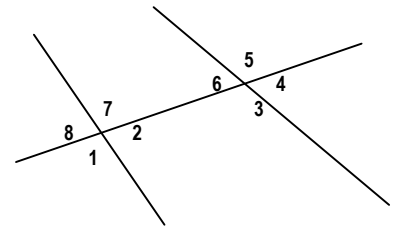
- A) 33 B) 35 C) 37 D) 39 E) NOTA

42. Solve: $\frac{x-8}{5} = \frac{2}{4}$

- A) $\frac{9}{2}$ B) $\frac{5}{2}$ C) $\frac{21}{2}$ D) 18 E) NOTA

43. Which of these are a pair of same-side interior angles?

- A) 7, 3 B) 2, 3 C) 1, 3 D) 5, 3 E) NOTA

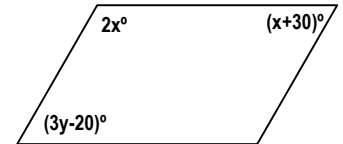


44. Find the value of x and y that will make this a parallelogram.

- A) $x = 45, y = \frac{110}{3}$ B) $x = 50, y = \frac{100}{3}$

- C) $x = 50, y = 20$ D) $x = 50, y = 60$

E) NOTA



45. The lengths of two sides of a triangle are 6 and 3. What do you know about the third side?

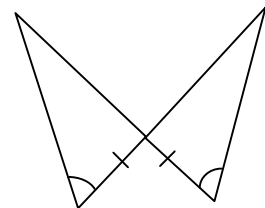
- A) It's between 6 and 9 B) It's less than 6

- C) It's between 3 and 9 D) It's less than 9

E) NOTA

46. Which method can be used to prove that these two triangles are congruent?

- A) HL B) SAS C) SSS D) ASA E) NOTA



47. What kind of polygon has angle measures that add up to 1440° ?

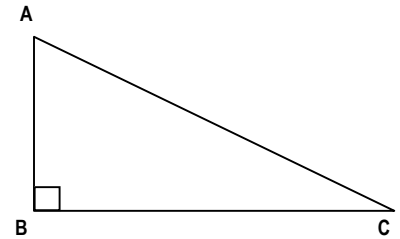
- A) Hexagon B) Heptagon C) Decagon
D) Dodecagon E) NOTA

For problems 48-50:

Fill-in the blanks for a two-column proof of the theorem:
The two acute angles of a right triangle are complementary.

Given: In $\triangle ABC$, $\angle B$ is a right angle

Prove: $\angle A$ and $\angle C$ are complementary



Statements:

Reasons:

- | | |
|--|-------------------------------|
| 1. In $\triangle ABC$, $\angle B$ is a right angle. | 1. Given |
| 2. $m\angle B = 90^\circ$ | 2. <u> #48 </u> |
| 3. $m\angle A + m\angle B + m\angle C = 180^\circ$ | 3. <u> #49 </u> |
| 4. $m\angle A + 90^\circ + m\angle C = 180^\circ$ | 4. Substitution (steps 2 & 3) |
| 5. $m\angle A + m\angle C = 90^\circ$ | 5. Subtraction Property |
| 6. $\angle A$ and $\angle C$ are complementary | 6. <u> #50 </u> |

48. Choose from:

- A) Triangle Sum Theorem
B) Definition of a right angle
C) Definition of congruent angles
D) Linear Pair Theorem
E) Definition of complementary angles

49. Choose from:

- A) Triangle Sum Theorem
B) Definition of a right angle
C) Definition of congruent angles
D) Linear Pair Theorem
E) Definition of complementary angles

50. Choose from:

- A) Triangle Sum Theorem
- B) Definition of a right angle
- C) Definition of congruent angles
- D) Linear Pair Theorem
- E) Definition of complementary angles

Answers

1	D	26	A
2	C	27	C
3	C	28	D
4	E	29	A
5	C	30	C
6	E	31	C
7	B	32	B
8	C	33	D
9	B	34	D
10	C	35	D
11	D	36	C
12	C	37	C
13	E	38	A
14	B	39	D
15	D	40	A
16	C	41	B
17	C	42	C
18	E	43	B
19	A	44	B
20	D	45	C
21	E	46	D
22	B	47	C
23	C	48	B
24	A	49	A
25	B	50	E