M2H Practice Final ANSWER KEY

1. What are the zeros of the quadratic function $f(x) = 12x^2 + 9x + 15$?

$$\frac{-3 \pm i\sqrt{71}}{8}$$

2. Divide:

$$\frac{2+i}{5+6i}$$

$$\frac{16}{61} - \frac{7}{61}i$$

3. Find the product of $(6 - 8i)$ and its complex conjugate

$$100$$

4. Stefanie is in a freestyle aerial competition. The equation $h = -16t^2 + 30t + 10$ models Stefanie's height h, in feet, t seconds after leaving the ramp.
(a) How long is Stefanie in the air? About 2.2 seconds
(b) what is Stefanie's maximum height? About 24 feet

5. Simplify the expression.

$$8h(h+2) - 3(h-7)$$

$$8h^2 + 13h + 21$$

6. Factor the quadratic function $f(x) = 4x^2 + 17x + 15$ to determine the zeros of the function.

$$x = -\frac{5}{4}, x = -3$$

7. Let $f(x) = -x^2 - 4x - 1$.
Which statement is true regarding the function $f(x)$?
(hint: re-write in vertex form)

A. Since $f(x) = -(x+2)^2 + 3$, the function has a minimum value of 3
B. Since $f(x) = -(x+2)^2 + 3$, the function has a maximum value of 3
C. Since $f(x) = -(x+2)^2 - 3$, the function has a minimum value of -3
D. Since $f(x) = -(x+2)^2 - 3$, the function has a maximum value of -3

8. Which of the following polynomials is equivalent to $(3a + 7b)^2$?

A. $9a^2 + 49b^2$
B. $9a^2 + 42ab + 49b^2$
C. $6a^2 + 20ab + 14b^2$
D. $100ab^2$

9. Which of the following is the classification and description of the polynomial $-7x + 9x^2 - 2$.

A. The leading coefficient is -7; it is a linear trinomial
B. The leading coefficient is -7; it is a quadratic trinomial
C. The leading coefficient is 9; it is a quadratic trinomial
D. The leading coefficient is 9; it is a quadratic binomial

10. Solve for x.

$$-x^2 + 2x + 24 = 0$$

$$x = 6 \text{ and } -4$$

11. Which of the following equations has 2 real roots?

A. $3x^2 + 8x + 2 = 0$
B. $-16x^2 + 8x - 1 = 0$
C. $5x^2 + 2x + 4 = 0$
D. $12x^2 + 9x + 15 = 0$

12. Solve $4x^2 - 9 = -7x - 4$ using the quadratic formula

$$\frac{-7 \pm \sqrt{129}}{8}$$

13. Find the solutions for $x^2 + 6x - 1 = 0$ by completing the square.

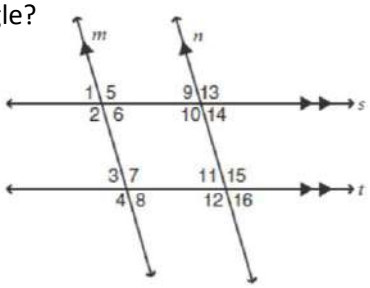
$$x = -3 \pm \sqrt{10}$$

14. Describe the shift in the parabola of $y = (x - 4)^2 + 4$ to the parabola of $y = (x - 6)^2 + 2$. (Hint: draw a sketch to help you see the difference)

2 units down and 2 units to the right

15. Which of the angles would **NOT** be congruent to Angle 6 assuming it is not a right angle?

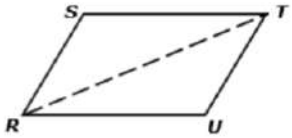
A. 14
B. 8
C. 9
D. 16
E. 3
F. 15



16. In the isosceles triangle shown, $\angle Q$ and $\angle N$ are congruent, and the measure of the exterior angle $\angle HMN$ is $100°$. What is the measurement of $\angle N$?

$$m\angle N = 50$$

17. Quadrilateral $RSTU$ is shown below with diagonal $\overline{RT}$.



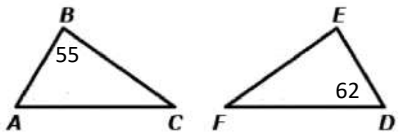
Kera knows that the opposite sides of the quadrilateral are congruent. She also claims that the quadrilateral is a parallelogram. She writes the two-column proof below to justify his claim. Fill in the missing pieces in the proof

	Statement	Reason
1	$\overline{RS} \cong \overline{TU}$; $\overline{ST} \cong \overline{UR}$	Given
2	$\overline{RT} \cong \overline{RT}$	Reflexive Property
3	$\Delta STR \cong \Delta URT$	SSS
4	$\angle STR \cong \angle URT$ $\angle SRT \cong \angle UTR$	CPCTC
5	$\overline{RS} \parallel \overline{TU}$ $\overline{ST} \parallel \overline{UR}$	Converse of the alternate interior angle theorem
6	RSTU is a parallelogram	Opposite sides of a parallelogram are parallel

18. In rectangle $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ are drawn to intersect and point E. Which of the following statements *must* be true?

A. $\Delta AEB \cong \Delta AED$
B. $\Delta AEB \cong \Delta CEB$
C. ΔAEB must be a right triangle
D. $\Delta AEB \cong \Delta CED$

19. if $\Delta ABC \cong \Delta DEF$, find the measure of $\angle C$.



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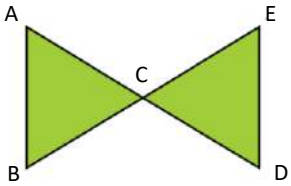
20. A quadrilateral is drawn on a coordinate plane with vertices $K(2,3), L(8,4), M(7,-2) and\ N(1,-3)$.

Andrea wants to prove that the quadrilateral is a parallelogram. Which of the following actions could she take? Select *all* that apply.

A. Use the slope formula to see if both pairs of opposite sides have the same slope
B. Use the distance formula to see if the diagonals are congruent
C. Use the midpoint formula to see if the diagonals bisect each other
D. Use the distance formula to see if both pairs of opposite sides have the same measure
E. Use the distance formula to see if there is exactly one pair of congruent consecutive sides
F. Use the slope formula to see if the sides are perpendicular

21. Which theorem(s) or postulate(s) can be used to prove $\Delta ACB \cong \Delta ECD$ Given $\overline{AD}\ and\ \overline{BE}$ bisect each other?



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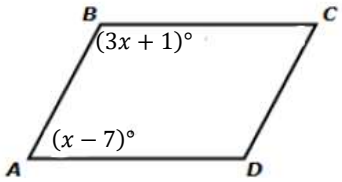
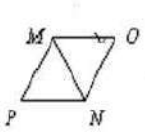
22. Examine the parallelogram $ABCD$ below.
Find $x, m\angle A, m\angle B, m\angle C\ and\ m\angle D$



$x = 46.5$
$m\angle A = m\angle C = 39.5$
$m\angle B = m\angle D = 140.5$

23. Triangles ΔMNP and ΔOMN are congruent equilateral triangles, $m\angle O = 5y + 10, MP = \frac{1}{5}x\ and\ ON = 3x - 2$. Find x and y.

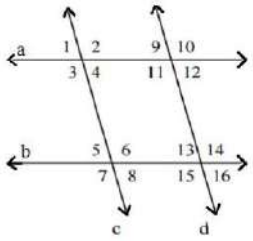


$x = \frac{5}{7}, y = 10$

24. Which of the following represents the symmetric property?

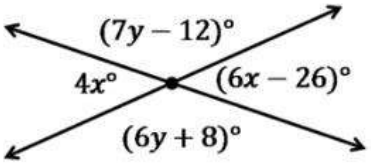
A. $HG = HG$
B. If $a = b, b = c, then\ a = c$
C. If $a + b = c, then\ c = a + b$
D. If $AB = DE$ and $AB + BC = AC$, then $DE + BC = AC$

25. Given that line a and line b are parallel, which pair of angles must be congruent and why?



A. Angle 10 and angle 11, by the Same Side Interior Angle Theorem (Consecutive Interior Angle Theorem)
B. Angle 4 and Angle 11, by the Alternate Interior angle Theorem
C. Angle 1 and Angle 8, by the Alternate Exterior Angle Theorem
D. Angle 6 and Angle 16, by the Alternate Corresponding Angle Theorem

26. Find the values of x and y.



$x = 13, y = 20$

27. How many times will the graph of $y = (x - 5)^2 + 3$ intersect the x-axis?

0 times

28. Find the axis of symmetry and the vertex of the graph of $g(x) = 4x^2 - 8x + 2$

Axis of Symmetry: $x = 1$
Vertex: $(1, -2)$

29. Find the y- intercept of the graph
$y = 10x^2 - 4x + 3$

3

30. Perform the operation:
$(6x^4 + 3x^3 - 5x^2 + x + 2) - (5x^3 + 8x^2 - 9)$

$6x^4 - 2x^3 - 13x^2 + x + 11$

31. Simplify
$(-6x - y)(9x + 3y)$

$-54x^2 - 27xy - 3y^2$

32. Factor the expression completely
$48x^2 - 75$

$3(4x - 5)(4x + 5)$

33. Factor each polynomial. Write prime if it's not factorable.

A. $x^2 - 8x - 20$ $(x + 2)(x - 10)$
B. $x^2 - 4x + 24$ prime
C. $15x^2 + 21x + 6$ $3(5x + 2)(x + 1)$
D. $5x^3 + 10x^2 - 7x - 14$ $(5x^2 - 7)(x + 2)$

34. Factor the trinomial
$7x^2 + 19x - 6$

$(7x - 2)(x + 3)$

35. What is the value of z in the equation
$0 = 32 + 98z^2$?

$\pm\frac{4}{7}i$