

GEOMETRY HONORS: SUMMER BRIDGE PACKET

****You will be assessed on this packet in the first week of school ****

TOPIC 1: THE ALGEBRA OF GEOMETRY

PART A: FACTORING MASTERY *Factor each expression completely.*

1. **GCF:** $3x^2 + 12x$

2. $5x^2 - 15x$

3. $12x^3 + 8x^2 - 4x$

4. $7x(x - 2) + 3(x - 2)$

5. **Trinomial (a=1):** $x^2 - 5x - 24$

6. $x^2 + 7x + 10$

7. $x^2 - 9x + 20$

8. $x^2 - 2x - 24$

9. **Difference of Squares:** $4x^2 - 49$

10. $x^2 - 64$

11. $9x^2 - 49$

12. $100 - x^2$

13. ***Trinomial (a>1):** $2x^2 + 7x + 3$

PART B: COMPLETING THE SQUARE *Find the value of 'c' to make a perfect square, then write the factored form $(x + h)^2$.*

5. $x^2 + 8x + c \implies$ Factored: _____

6. $x^2 - 10x + c \implies$ Factored: _____

7. Solve by completing the square: $x^2 + 12x + 11$

8. Solve by completing the square: $x^2 - 18x + 5$

PART C: SOLVING EQUATIONS

7. $3(x - 4) + 2x = 18$

8. $x^2 + 6x = 16$

9. $3(x - 4) + 2x = 18$

10. $10 - 3(2x - 4) = 4$

11. $2(3x + 5) - 7 = 15$

12. $2(x + 6) = 3(x - 4)$

13. $4(2x - 1) = 2(x + 10)$

14. $-5(x + 3) = 2(x - 10) + 1$

15. $(x / 3) + 5 = 11$

16. $(3/4)x + 2 = 14$

TOPIC 2: LINES AND GRAPHING

PART A: LINEAR EQUATIONS

1. **Slope-Intercept:** Write the equation of a line passing through (2, 5) and (-1, 11).
2. **Perpendiculars:** Write the equation of a line perpendicular to $y = 1/2x + 4$ that passes through (0, 6).

3. Write the equation of a line with a slope (m) of -3 and a y-intercept (b) of 5.

4. Write the equation of a line passing through (2, -4) and (5, 2).

5. Write the equation of a line **perpendicular** to $y = \frac{1}{2}x + 4$ that passes through (0, 6).

PART B: GRAPHING SKETCH *Identify the vertex for the parabolas and the slope for the lines.*

3. **Line:** $y = -2x + 3$

4. **Line:** $3x + 4y = 12$

5. **Parabola:** $y = (x - 3)^2 + 2$

6. **Parabola:** $y = x^2 + 4x - 5$

TOPIC 5: REDUCING RADICALS

1.

TOPIC 4: TRIANGLE PROPERTIES

PART A: PYTHAGOREAN THEOREM ($a^2 + b^2 = c^2$, $\text{leg}^2 + \text{leg}^2 = \text{hpy}^2$) Solve for x . Leave answers in square root form if necessary (e.g., $\sqrt{20}$).

1. Leg = 3, Leg = 4, Hypotenuse = x

2. Leg = 5, Hypotenuse = 13, Leg = x

3. Leg = 6, Leg = 6, Hypotenuse = x

4. $a = 5$, $b = 12$, $c = x$

5. $a = 8$, $b = x$, $c = 10$

PART B: CLASSIFICATIONS Classify by *SIDES* (Scalene, Isosceles, Equilateral) and *ANGLES* (Acute, Right, Obtuse).

4. Sides: 7, 7, 10 | Angles: 40° , 40° , 100° : _____

5. Sides: 5, 5, 5 | Angles: 60° , 60° , 60° : _____

6. Sides: 3, 4, 5 | Angles: 90° , 37° , 53° : _____

7. Sides: 10, 10, 15 | Angles: 40° , 40° , 100° _____

TOPIC 5: TRANSFORMATIONS & PARALLEL LINES

PART A: TRANSFORMATIONS *Apply the rule to the point $P(2, 5)$.*

1. **Translation:** Move P by the rule $(x - 3, y + 4)$. Result: _____

2. **Reflection:** Reflect P over the x-axis. Result: _____

3. **Rotation:** Rotate P 180° about origin. Result: _____

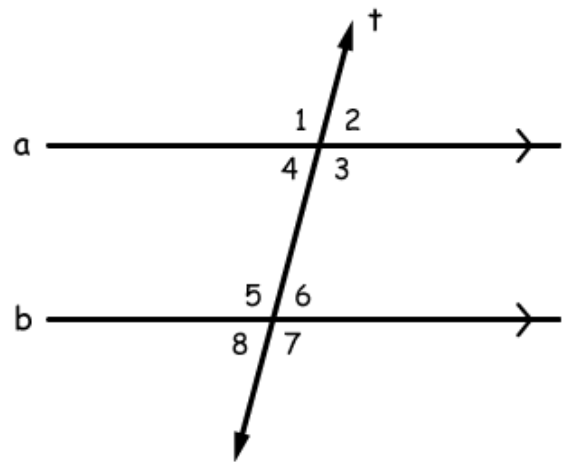
4. **Dilation:** Dilate P by a scale factor of $k = 2$. Result: _____

5. **Translation:** Move the point $(-1, 4)$ using the rule $(x + 3, y - 5)$.

6. **Reflection:** Reflect the point $(2, 7)$ over the y -axis. What is the new point?
7. **Rotation:** Rotate the point $(3, 0)$ by 180° around the origin.
8. **Dilation:** A triangle has vertices $(0,0)$, $(2,4)$, and $(6,2)$. Dilate it by a scale factor of $k = 0.5$ (multiply all numbers by 0.5).

PART B: PARALLEL LINE PROPERTIES *If two parallel lines are cut by a transversal, are the following pairs CONGRUENT or SUPPLEMENTARY?*

5. Alternate Interior Angles: _____



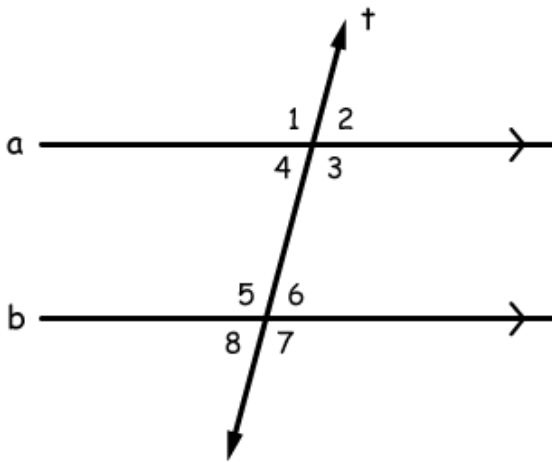
6. Consecutive Interior Angles: _____

7. Corresponding Angles: _____

8. Lines ***a*** and ***b*** are parallel. A transversal cuts through them.

If Angle 4 and Angle 6 are **Alternate Interior Angles**, and Angle 4 = $2x + 10$ and Angle 6 = $3x - 20$, solve for x .

If Angle 3 and Angle 6 are **Consecutive Interior Angles**, do they add up to 90° or 180° ?



TOPIC 6: Misc.

1. **The Rectangle Problem:** A rectangle has a height of ' x ' and a width of ' $x + 2$ '. If the diagonal is $\sqrt{20}$, find the value of x .
2. **The Coordinate Challenge:** Find the midpoint of the segment connecting $(-4, 2)$ and $(6, 10)$.
3. **Advanced Factoring:** Factor completely: $2x^3 - 18x$.

TOPIC 7: Simplifying Radicals: Reduce (simplify) the following radicals. Leave in simplest radical form.

1) $\sqrt{96}$

2) $\sqrt{216}$

3) $\sqrt{98}$

4) $\sqrt{18}$

5) $\sqrt{72}$

6) $\sqrt{144}$

7) $\sqrt{45}$

8) $\sqrt{175}$

9) $\sqrt{343}$

10) $\sqrt{12}$

11) $10\sqrt{96}$

12) $9\sqrt{245}$