Vocabulary: Translations, Dilations, Reflections, Rotations, and Isometric.

1) Translate the following points by the rule: \((x, y) \rightarrow (x + 1, y - 4)\)
- \(S(-5, 2)\) → \((-4, -2)\)
- \(Y(-4, 5)\) → \((-3, 1)\)
- \(R(-1, 1)\) → \((0, -3)\)
- \(A(-4, -2)\) → \((-3, -6)\)

2) Translation: \((x, y) \rightarrow (x - 2, y - 6)\)
- \(W(3, 2)\) → \((-1, 0)\)
- \(C(2, 4)\) → \((-5, -2)\)
- \(T(3, 5)\) → \((-1, -1)\)
- \(Z(5, 2)\) → \((3, 6)\)

3) Reflection over \(y = x\)
- \(U(4, 0)\) → \((0, 4)\)
- \(L(2, -3)\) → \((-2, 2)\)

4) Reflection over \(y = -3\)

5) Rotate the figure 90° CW
- \(W(1, 2)\) → \((-2, 1)\)
- \(Y'(5, 0)\) → \((-1, -3)\)
- \(L'(2, 2)\) → \((-4, -3)\)

6) Rotate the figure 90° CCW
- \(B'(-3, -1)\) → \((-1, -3)\)
- \(L'(-2, 2)\) → \((-4, 3)\)

7) Find the coordinates of the new vertices of the image that has been dilated by a factor of 5.
- \(S(-5, 2)\) → \((-25, 10)\)
- \(Y(-4, 5)\) → \((-20, 25)\)
- \(R(-1, 1)\) → \((-5, 5)\)
- \(A(-4, -2)\) → \((-20, -10)\)

8) Find the coordinates of the new vertices of the image that has been dilated by a factor of 1/2.
- \(W(3, 2)\) → \((1.5, 0.5)\)
- \(C(2, 4)\) → \((1, 0.5)\)
- \(T(3, 5)\) → \((1.5, 2.5)\)
- \(Z(5, 2)\) → \((2.5, 1)\)

9) Draw a dilation with \(k = 2\)
- \(A'(1, 1)\) → \((2, 2)\)
- \(B'(2, 1)\) → \((4, 2)\)
- \(C'(-2, -2)\) → \((-4, -4)\)

10) Determine the scale factor \(k = \frac{5}{2}\)

11) Given the points
- \(M(-3, 1)\)
- \(S(5, -2)\)
- Translate: \((x - 3, y + 2)\)
- Reflect: \(y = x\)
- \(M'(-2, 1)\)
- \(S'(2, 0)\)
- \(S''(0, 2)\)

12) Given the points
- \(K(0, -4)\)
- \(P(-6, -3)\)
- \(R(1, 2)\)
- Reflect: over the x-axis
- Rotate: 270 CCW
- \(K''(4, 0)\)
- \(P''(3, 0)\)
- \(R''(-2, -1)\)
**1) Which transformation maps the solid figure onto the dashed figure?**

- A. rotation 180 about the origin
- B. translation to the right and down
- C. reflection across the x-axis
- D. reflection across the y-axis

**2) If triangle ABC is rotated 180 degrees about the origin, what are the coordinates of A'?**

- A. (-5,-4)
- B. (-5,4)
- C. (-4,5)
- D. (-4,-5)

**3) Determine the angle of rotation for A to map onto A'?**

- A. 45
- B. 90
- C. 135
- D. 180

**4) Which transformation will place the trapezoid onto itself?**

- A. counterclockwise rotation about the origin by 90
- B. rotation about the origin by 180
- C. reflection across the x-axis
- D. reflection across the y-axis
5) $\triangle JKL$ is rotated 90° about the origin and then translated using $(x, y) \rightarrow (x - 8, y + 5)$. What are the coordinates of the final image of $L$? The coordinates for $\triangle JKL$ are $J(5, -1)$, $K(4, 4)$, and $J(9, 3)$.

<table>
<thead>
<tr>
<th>Answer</th>
<th>Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>(-7, 10)</td>
</tr>
<tr>
<td>B.</td>
<td>(-7, 0)</td>
</tr>
<tr>
<td>C.</td>
<td>(-9, 10)</td>
</tr>
<tr>
<td>D.</td>
<td>(-9, 0)</td>
</tr>
</tbody>
</table>

6) Which figure has 90° rotational symmetry?

- A. square
- B. regular hexagon
- C. regular pentagon
- D. equilateral triangle

7) Point $P$ is located at (4, 8) on a coordinate plane. Point $P$ will be reflected over $y = x$. What will be the coordinates of the image of point $P$?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>(28, 4)</td>
</tr>
<tr>
<td>B.</td>
<td>(24, 8)</td>
</tr>
<tr>
<td>C.</td>
<td>(4, 28)</td>
</tr>
<tr>
<td>D.</td>
<td>(8, 4)</td>
</tr>
</tbody>
</table>

8) Point $F'$ is the image when point $F$ is reflected over the line $x = -2$ and then over the line $y = 3$. The location of $F'$ is (3, 7). Which of the following is the location of point $F$?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>(-7, -1)</td>
</tr>
<tr>
<td>B.</td>
<td>(-7, 7)</td>
</tr>
<tr>
<td>C.</td>
<td>(1, 5)</td>
</tr>
<tr>
<td>D.</td>
<td>(1, 7)</td>
</tr>
</tbody>
</table>

9) A triangle has vertices at $A(-3, -1)$, $B(-6, -5)$, $C(-1, -4)$. Which transformation would produce an image with vertices $A'(3, -1)$, $B'(6, -5)$, $C'(1, -4)$?

- A. A reflection over the x-axis
- B. A reflection over the y-axis
- C. A rotation 99° clockwise
- D. A rotation 90° counterclockwise

10) The vertices of $\triangle JKL$ have coordinates $J(5, 1)$, $K(-2, -3)$, and $L(-4, 1)$. Under which transformation is the image $\triangle J'K'L'$ NOT congruent to $\triangle JKL$?

- A. A translation of two units to the right and two units down
- B. A counterclockwise rotation of 180° around the origin
- C. A reflection over the x-axis
- D. A dilation with a scale factor of 2 centered at the origin
Vocabulary: Supplementary, complementary, vertical, same side interior, same side exterior, alternate interior, alternate exterior, corresponding, triangle, quadrilateral, and parallelogram.

1) Name the angles listed and the special property.
- \( \angle 1 \) and \( \angle 5 \) **corresponding**
- \( \angle 4 \) and \( \angle 6 \) **s. s. interior**
- \( \angle 2 \) and \( \angle 8 \) **s. s. exterior**
- \( \angle 4 \) and \( \angle 5 \) **alt. interior**

2) Given \( m\parallel n \) and \( m \angle 8 = 112\degree \), find the measures of all the numbered angles in the figure.
- \( m \angle 1 = \frac{112}{2} \)
- \( m \angle 2 = 68\degree \)
- \( m \angle 3 = \frac{68}{2} \)
- \( m \angle 4 = \frac{112}{2} \)
- \( m \angle 5 = \frac{112}{2} \)
- \( m \angle 6 = \frac{68}{2} \)
- \( m \angle 7 = \frac{68}{2} \)
- \( m \angle 8 = 112\degree \)

3) Solve for \( x \).

4) Solve for \( x \).

5) Solve for \( x \).

6) Solve for \( x \).

7) Solve for \( x \).

8) Solve for \( x \) and \( m \angle J \).

9. Solve for \( x \).

10) Find \( x \) and \( y \).

11) Find \( x \) and \( y \).
1) Peach Street and Cherry Street are parallel. Apple Street intersects them, as shown in the diagram below. If \( m\angle 1 = 2x + 36 \) and \( m\angle 2 = 7x - 9 \), what is \( m\angle 1 \)?

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>A. 9</td>
<td></td>
</tr>
<tr>
<td>B. 17</td>
<td></td>
</tr>
<tr>
<td>C. 54</td>
<td></td>
</tr>
<tr>
<td>D. 70</td>
<td></td>
</tr>
</tbody>
</table>

2) What is the measure of \( \angle B \) in the figure below?

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>A. 62</td>
<td></td>
</tr>
<tr>
<td>B. 58</td>
<td></td>
</tr>
<tr>
<td>C. 59</td>
<td></td>
</tr>
<tr>
<td>D. 56</td>
<td></td>
</tr>
</tbody>
</table>

3) In this figure, \( l \parallel m \). Jessie listed the first two steps in a proof that \( \angle 1 + \angle 2 + \angle 3 = 180^\circ \). Which justification can Jessie give for step 1 and 2?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>A. Alternate interior angles are congruent.</td>
<td></td>
</tr>
<tr>
<td>B. Corresponding angles are congruent.</td>
<td></td>
</tr>
<tr>
<td>C. Vertical angles are congruent.</td>
<td></td>
</tr>
<tr>
<td>D. Alternate exterior angles are congruent.</td>
<td></td>
</tr>
</tbody>
</table>

4) In the diagram below of parallelogram \( STUV \), \( SV = x + 3 \), \( VU = 2x - 1 \), and \( TU = 4x - 3 \). What is the length of \( SV \)?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>A. 2</td>
<td></td>
</tr>
<tr>
<td>B. 4</td>
<td></td>
</tr>
<tr>
<td>C. 5</td>
<td></td>
</tr>
<tr>
<td>D. 7</td>
<td></td>
</tr>
</tbody>
</table>
5) In parallelogram ABCD, find \( m\angle A \).

A. 15°  
B. 70°  
C. 110°  
D. 200°

6) What reason explains why the \( m\angle Q = 115^\circ \)?

A) diagonals of a parallelogram bisect each other  
B) opposite sides of a parallelogram are congruent  
C) opposite angles of a parallelogram are congruent  
D) consecutive angles of a parallelogram are supplementary

7) Find \( x \) and \( y \) in the diagram.

A) \( x = 60, y = 30 \)  
B) \( x = 45, y = 60 \)  
C) \( x = 30, y = 60 \)  
D) \( x = 60, y = 120 \)

8) List the angles of the triangle in order from SMALLEST to LARGEST.

A) \( \angle C, \angle B, \angle A \)  
B) \( \angle A, \angle B, \angle C \)  
C) \( \angle C, \angle A, \angle B \)  
D) \( \angle B, \angle C, \angle A \)
**Vocabulary:** SSS, SAS, ASA, AAS, HL, CPCTC, Reflexive Property, Definition of a Midpoint, Midsegment.

**Determine if the following triangles are similar. (SSS, AA, SAS, None)**

1. \( \triangle ABC \sim \triangle DEF \) by SAS
2. \( \triangle GHI \sim \triangle JKL \) by SSS
3. \( \triangle MNO \sim \triangle PQR \) by AA

**Solve for x.**

4. \( x = \frac{12}{4} = 3 \)

5. \( x = \frac{4}{3} \)

6. If a 42.9 ft tall flagpole casts a 253.1 ft long shadow, then how long is the shadow that a 6.2 ft. tall woman casts?

**Determine if the following triangles are congruent. (SSS, SAS, ASA, AAS, HL, None)**

10. SSS

11. None

12. ASA

**Given:** \( \overline{AB} \cong \overline{DC} \)

Prove: \( \triangle ABC \cong \triangle CDA \)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( \overline{AB} \cong \overline{DC} )</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. ( \overline{AC} \cong \overline{AC} )</td>
<td>2. Reflexive</td>
</tr>
<tr>
<td>3. ( \angle ABC \cong \angle CDA ) ( \text{are right angles.} )</td>
<td>3. Given</td>
</tr>
<tr>
<td>4. ( \angle ABC \cong \angle CDA )</td>
<td>4. All right angles are congruent</td>
</tr>
<tr>
<td>5. ( \triangle ABC \cong \triangle CDA )</td>
<td>5. HL</td>
</tr>
</tbody>
</table>

**Given:** \( \overline{RT} \cong \overline{TV} \)

Prove: \( \angle TSR \cong \angle TUV \)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( \overline{RT} \cong \overline{TV} )</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. ( \overline{ST} \cong \overline{TU} )</td>
<td>2. Given</td>
</tr>
<tr>
<td>3. ( \angle RTS \cong \angle VTU )</td>
<td>3. Vertical</td>
</tr>
<tr>
<td>4. ( \triangle RTS \cong \triangle VTU )</td>
<td>4. SAS</td>
</tr>
<tr>
<td>5. ( \angle TSR \cong \angle TUV )</td>
<td>5. CPCTC</td>
</tr>
</tbody>
</table>
1) Use this triangle to answer the question.

This is a proof of the statement “If a line is parallel to one side of a triangle and intersects the other two sides at distinct points, then it separates these sides into segments of proportional lengths.”

<table>
<thead>
<tr>
<th>Step</th>
<th>Statement</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(\overline{GH}) is parallel to (\overline{IJ}).</td>
<td>Given</td>
</tr>
<tr>
<td>2</td>
<td>(\angle HGI \cong \angle JIH) (\angle JKG \cong \angle IJH)</td>
<td>?</td>
</tr>
<tr>
<td>3</td>
<td>(\triangle GIK \sim \triangle HJK)</td>
<td>AA Similarity</td>
</tr>
<tr>
<td>4</td>
<td>(\frac{IG}{IH} = \frac{JH}{JK})</td>
<td>Corresponding sides of similar triangles are proportional.</td>
</tr>
<tr>
<td>5</td>
<td>(\frac{HG + IH}{IH} = \frac{JK + IU}{JK})</td>
<td>Segment Addition Postulate</td>
</tr>
<tr>
<td>6</td>
<td>(\frac{HG}{IH} = \frac{JH}{JK})</td>
<td>Subtraction Property of Equality</td>
</tr>
</tbody>
</table>

Which reason justifies step 2?

A. Alternate interior angles are congruent.
B. Alternate exterior angles are congruent.
C. Corresponding angles are congruent.
D. Vertical angles are congruent.

2) Look at the triangle.

Which triangle is similar to the given triangle?

A. 
B. 
C. 
D. 

3) Which can be used to prove the triangles are congruent?

A. SSS
B. ASA
C. SAS
D. AAS

4) In the triangle shown, \(GH \parallel DF\).

What is the length of \(GE\)?

A. 2.0
B. 4.5
C. 7.5
D. 8.0
5) In the diagram, CD is the perpendicular bisector of AB. The two-column proof shows that AC is congruent to BC.

<table>
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<tr>
<th>Step</th>
<th>Statement</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CD is the perpendicular bisector of AB</td>
<td>Given</td>
</tr>
<tr>
<td>2</td>
<td>AD \cong BD</td>
<td>Definition of bisector</td>
</tr>
<tr>
<td>3</td>
<td>CD \cong CD</td>
<td>Reflexive Property of Congruence</td>
</tr>
<tr>
<td>4</td>
<td>\angle ADC and \angle BDC are right angles.</td>
<td>Definition of perpendicular lines</td>
</tr>
<tr>
<td>5</td>
<td>\angle ADC \cong \angle BDC</td>
<td>All right angles are congruent.</td>
</tr>
<tr>
<td>6</td>
<td>\triangle ADC \cong \triangle BDC</td>
<td>?</td>
</tr>
<tr>
<td>7</td>
<td>AC \cong BC</td>
<td>CPCTC</td>
</tr>
</tbody>
</table>

Which of the following would justify step 6?
A. ASS
B. ASA
C. SAS
D. SSS

6) In the triangles shown, \( \triangle ABC \) is dilated by a factor of \( \frac{2}{3} \) to form \( \triangle XYZ \).

Given that \( m\angle A = 50^\circ \) and \( m\angle B = 100^\circ \), what is \( m\angle Z \)?
A. 15
B. 25
C. 30
D. 50

7) Given the diagram below, what is the value of \( x \)?

A. 13.5
B. 14.6
C. 15.5
D. 16.6

8) To find the height of a lamppost at a park, Rachel placed a mirror on the ground 20 feet from the base of the lamppost. She then stepped back 4 feet so that she could see the top of the lamppost in the center of the mirror. Rachel’s eyes are 5 feet and 6 inches above the ground. What is the height, in feet, of the lamppost?
**GSE Geometry**

**Unit 3 – Right Triangles**

**Vocabulary:** Sine, cosine, tangent, complements

<table>
<thead>
<tr>
<th>1) Find sin A =</th>
<th>5) $\sin 75^\circ = \cos \boxed{15}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{7}{8}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2) Find tan B =</th>
<th>6) $\cos 40^\circ = \sin \boxed{50}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{4}{7}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3) Find cos B =</th>
<th>7) $\cos 54^\circ = \cos \boxed{54}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{7}{8}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4) Find tan A =</th>
<th>8) Find f.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{4}{7}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5) $\sin 75^\circ = \cos \boxed{15}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>6) $\cos 40^\circ = \sin \boxed{50}$</td>
</tr>
<tr>
<td>7) $\cos 54^\circ = \cos \boxed{54}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11) Find angle P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\sin^{-1} \left( \frac{13}{40} \right) = \theta$</td>
</tr>
<tr>
<td>$\theta = 19^\circ$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12) Find s.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\sin^{-1} \left( \frac{17}{32} \right) = \phi$</td>
</tr>
<tr>
<td>$\phi = 32^\circ$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13) Solve for theta.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\tan^{-1} \left( \frac{3}{5} \right) = \theta$</td>
</tr>
<tr>
<td>$\theta = 45^\circ$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14) From 25 feet away from the base of a building, the angle of elevation from the ground to the top of a building is measured to be $38^\circ$. How tall is the building?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25 \cdot \tan 38^\circ = x$</td>
</tr>
<tr>
<td>$x = 20$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15) A kite is 35 feet in the air and the string forms an angle of $62^\circ$ with the ground. How long is the string?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$35 \cdot \sin 62^\circ = x$</td>
</tr>
<tr>
<td>$x = 34.97$</td>
</tr>
</tbody>
</table>
1) A 30-foot long escalator forms a 41° angle at the second floor. Which is the closest height of the first floor?

- A. 20 feet
- B. 22.5 feet
- C. 24.5 feet
- D. 26 feet

2) The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform. Find the angle of elevation.

3) What is the sine ratio of ∠P in the given triangle?

- A. \( \frac{8}{17} \)
- B. \( \frac{8}{15} \)
- C. \( \frac{15}{17} \)
- D. \( \frac{15}{8} \)

4) Which is equal to \( \sin 30° \)?

- A. \( \cos 30° \)
- B. \( \cos 60° \)
- C. \( \sin 60° \)
- D. \( \sin 70° \)
5) A rope is tied to the bottom of a hot air balloon as shown below. The rope makes an angle of 35° with the ground and is 75 ft. long. How far is the bottom of the balloon from the ground to the nearest foot?

- A. 43 ft.
- B. 53 ft.
- C. 61 ft.
- D. 131 ft.

6) The captain of a submarine views an iceberg from his periscope, as shown in the figure below. What is the height of the iceberg to the nearest meter?

- A. 161 m
- B. 192 m
- C. 210 m
- D. 298 m

7) Jeff lives on Oak Street, and Tom lives on Main Street. How much farther, to the nearest yard, is it for Tom to walk down Main Street and turn on Oak Street?

- A. 46 yd
- B. 48 yd
- C. 126 yd
- D. 172 yd
**Vocabulary:** Sine, cosine, tangent, complements

1) Find $m\angle GHJ$

2) Find $mCD$

3) Find $mC$

4) Find $m\angle 1$ and $m\angle 2$

5) Find 1 & 2

6) Find 1.

7) Find 1 & 2.

8) Find the area of a circle with a diameter of 22 inches.

$$r = \frac{22}{2} = 11$$

$$A = \pi r^2 = \frac{\pi (11)^2}{360^2} = \frac{\pi (121)}{380.1}$$

9) The circumference of a circle is 25.12 ft. What is the radius?

$$\frac{25.12}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 4$$

10) Find the arc length of $AB$

$$AL = \frac{2\pi r\theta}{360} = \frac{2\pi (4)(97)}{360} = \frac{97\pi}{45} \approx 6.77$$

11) Find the area of the shaded region

$$AS = \frac{\pi r^2 \theta}{360} = \frac{\pi (9)^2 (166)}{360} = \frac{477}{20} \pi \approx 74.9$$

12) If the radius of the circle is 6 centimeters, what is the area of the shaded segment?

$$A = \frac{1}{2}bh = \frac{1}{2}(6)(6) = 18$$

$$28.3 - 18 = 10.3$$
1) An insulated foam sleeve is made to fit over water pipe. The distance from the center of the water pipe to the edge of the sleeve is 6 inches. The hole in the center has a radius of 3 inches. **What is the area of the face of the foam sleeve?**

- A. 9.42 in\(^2\)
- B. 18.84 in\(^2\)
- C. 84.78 in\(^2\)
- D. 141.30 in\(^2\)

2) This circle, with center point Q, has a radius of 10 centimeters. The length of the minor arc NP is 20.42 centimeters. To the nearest degree, **what is the value of x?**

- A. 110°
- B. 117°
- C. 204°
- D. 233°

3) Find the area of the shaded sector of circle O.

- A. 5\(\pi\)
- B. 20\(\pi\)
- C. 25\(\pi\)
- D. 50\(\pi\)

4) What is the area of the shaded part of the circle?

- A. \(\frac{57}{4}\ \pi \ cm^2\)
- B. \(\frac{135}{8}\ \pi \ cm^2\)
- C. \(\frac{805}{8}\ \pi \ cm^2\)
- D. \(\frac{513}{8}\ \pi \ cm^2\)
5) What is the measure of $\angle ABC$?

A. $15^\circ$
B. $30^\circ$
C. $60^\circ$
D. $120^\circ$

6) In this circle, $AB$ is tangent to the circle at point $B$, $AC$ is tangent to the circle at point $C$, and point $D$ lies on the circle. What is the $m \angle BAC$?

7) The measure of $\widehat{CD}$ is $80^\circ$. What is the value of $x$?

A. 50
B. 40
C. 35
D. 25
Vocabulary: Chord, tangent, volume, chevalier’s principal, Pythagorean Theorem, cross section.

1) Find the value of x.

\[ x(6) = 3(4) \]
\[ x = \frac{12}{4} \]
\[ x = 3 \]

2) Find the value of x.

\[ 5(5+x) = 6(6+4) \]
\[ 25 + 5x = 60 \]
\[ 5x = 35 \]
\[ x = 7 \]

3) Find the value of x.

\[ x(x) = 9(9+7) \]
\[ x^2 = 144 \]
\[ x = 12 \]

4) Find the value of x.

\[ 3x = x + 12 \]
\[ 2x = 12 \]
\[ x = 6 \]

5) Is \( \overline{AB} \) a tangent? Why or why not?

\[ A^2 + b^2 = c^2 \]
\[ 8^2 + 14^2 = 19^2 \]
\[ 64 + 196 = 361 \]
\[ 260 ≠ 361 \]

6) Find the value of x.

\[ x^2 + 6400 = 6724 \]
\[ x^2 = 324 \]
\[ x = 18 \]

7) Find the volume of the figure with a diameter of 12 in and a height of 20 in.

\[ V = \pi r^2 h \]
\[ V = \pi (6)^2 (20) \]
\[ V = 720 \pi \approx 2262 \text{ in}^3 \]

8) Find the volume of the hemisphere.

\[ V = \frac{2}{3} \pi r^3 \]
\[ V = \frac{2}{3} \pi (15)^3 \]
\[ V = 4500 \pi \approx 14137 \text{ cm}^3 \]

9) If the volume of a cone is 23 \( \text{in}^3 \), what is the volume of a cylinder with the same base area and height? Explain how you got to your answer?

\[ V = \frac{1}{3} \pi r^2 h \]
\[ V = \frac{1}{3} (16)(7) \]
\[ V = 37.3 \text{ in}^3 \]

10) Find the Volume of a square based pyramid.

\[ V = \frac{1}{3} B \cdot h \]
\[ V = \frac{1}{3} (7) \]
\[ V = 23 \text{ cm}^3 \]

11) Name the cross section

Rectangle

12) Name the cross section

Triangle
### GSE Geometry

**Unit 4 – Segment Lengths and Volume**

**EOC Review Answers**

<p>| | | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1) What is the volume of a cylinder with a radius of 3 in. and a height of (9/2) in.?</td>
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</tr>
<tr>
<td>A. (\frac{81}{2}\pi) in(^3)</td>
<td>V = (\pi r^2 h)</td>
<td>B. (\frac{27}{4}\pi) in(^3)</td>
<td>C. (\frac{27}{8}\pi) in(^3)</td>
<td>D. (\frac{9}{4}\pi) in(^3)</td>
</tr>
</tbody>
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<tbody>
<tr>
<td>2) A cereal box is 10.4 inches high, 7.4 inches long, and 2.3 inches wide. What is the volume of the cereal box rounded to the nearest cubic inch?</td>
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<tr>
<td>A. 77</td>
<td>V = B \cdot h</td>
<td>B. 140</td>
<td>C. 177</td>
<td>D. 236</td>
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<tr>
<td>3) Frances bought a new refrigerator to replace her old refrigerator shown below. Her new refrigerator has the same length and width as the old refrigerator but is 8 inches higher. How many more cubic inches of space are in Frances’s new refrigerator compared to her old refrigerator?</td>
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</tr>
<tr>
<td>A. 8,640</td>
<td>Frances‘ Old Refrigerator</td>
<td>B. 14,880</td>
<td>C. 17,856</td>
<td>D. 25,440</td>
</tr>
</tbody>
</table>

---

**Diagram:**

- **Frances’ Old Refrigerator**
  - Height: 62 inches
  - Width: 30 inches
  - Depth: 36 inches
4) The grain bin below is made up of a cylinder with a cone on top. To the nearest cubic foot, how much grain will this bin hold?

A. 5,625 cubic feet  
B. 17,663 cubic feet  
C. 32,987 cubic feet  
D. 70,650 cubic feet

5) A square pyramid is packaged inside a box. The space inside the box around the pyramid is then filled with protective foam. About how many cubic inches of foam is needed to fill the space around the pyramid?

A. 8 cubic inches  
B. 41 cubic inches  
C. 83 cubic inches  
D. 125 cubic inches

6) In circle P below, DG is tangent. \( AF = 8, EF = 6, BF = 4, \) and \( EG = 8. \) Find \( \overline{CF} \) and \( \overline{DG}. \)
<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>1)</strong> Write the equation of the circle in standard form.</td>
<td><strong>2)</strong> Find the midpoint of ((5, 1)) and ((6, 7)).</td>
<td><strong>3)</strong> Find the coordinates of the other endpoint of a segment with an endpoint of ((-2, 2)) and a midpoint ((8, 3)).</td>
</tr>
</tbody>
</table>
| \[
(x-h)^2 + (y-k)^2 = r^2
\]
| \[
\left(\frac{5+6}{2}, \frac{1+7}{2}\right) = \left(\frac{11}{2}, 4\right)
\] | **Answer:** \((6.5, 4)\) |
|  |  |  |
| **4)** Brandy and Mandy are in the pool playing a game of Marco Polo. Brandy swims 10 ft south and 7 ft east of base. Mandy swims 6 ft north and 5 ft west from where they started together in the middle of the pool. How far apart are Brandy and Mandy? | **5)** Determine whether Point A \((-5, 8)\) lies on the circle whose center is Point C \((1, 2)\) and which contains the Point P \((7, -4)\). |
| \[
d = \sqrt{(7-1)^2 + (-4-2)^2} = \sqrt{6^2 + (-6)^2} = \sqrt{72}
\] | \[
d = \sqrt{(1+5)^2 + (-2-8)^2} = \sqrt{(6)^2 + (-10)^2} = \sqrt{116}
\] |
|  |  |  |
| **6)** Find the area and perimeter of the figure. | **7)** Given that a parallelogram’s sides are parallel, prove the following is a parallelogram. |
| \[
A = \frac{1}{2}bh = \frac{1}{2}(6)(8.5) = 21
\] | \[
x_1, y_1, x_2, y_2
\] |
|  |  |  |
| **8)** Write an equation of the line that passes through \((-3, 4)\) and is parallel to \(y = 3x - 1\). | **9)** Write an equation of the line that passes through \((5, -3)\) and is perpendicular to \(y = \frac{5}{2}x + 1\). |
| \[
y - y_1 = m(x - x_1)
\] | \[
y - y_1 = m(x - x_1)
\]
| \[
y - 4 = -3(x + 3)
\] | \[
y - \left(-\frac{5}{3}\right) = \frac{5}{3}(x + \frac{5}{3})
\] |
| \[
y = -3x - 5
\] | \[
y = \frac{5}{3}x - 2
\] |
|   |  |  |
| **10)** Find a point P on the segment with endpoints A \((-1, -3)\) and B \((7, 1)\) that partitions it in a 3:1 ratio. | **11)** Find a point T on the segment with endpoints C \((-4, -6)\) and D \((2, 3)\) that partitions it in a 2:1 ratio. |
| \[
\left(\frac{\frac{3}{4}(-1) + \frac{1}{4}(7)}{\frac{3}{4} + \frac{1}{4}}, \frac{\frac{3}{4}(-3) + \frac{1}{4}(1)}{\frac{3}{4} + \frac{1}{4}}\right) = \left(\frac{5}{2}, \frac{3}{2}\right)
\] | \[
\left(\frac{\frac{2}{3}(-4) + \frac{1}{3}(2)}{\frac{2}{3} + \frac{1}{3}}, \frac{\frac{2}{3}(-6) + \frac{1}{3}(0)}{\frac{2}{3} + \frac{1}{3}}\right) = \left(0, \frac{2}{3}\right)
\] |

**Vocabulary:** Midpoint, distance, partition, endpoint, circle
1) A circular sidewalk is being constructed around the perimeter of a local park. A brick pathway will be added through the diameter of the circle as shown on the coordinate plane below, and a tree will be planted in the sidewalk at the center of the circle. What are the coordinates where the tree will be planted?

1) _____

2) Which is the equation of the circle shown below?

A. \((x - 3)^2 + y^2 = 3\)
B. \((x - 3)^2 + y^2 = 9\)
C. \((x + 3)^2 + y^2 = 3\)
D. \((x + 3)^2 + y^2 = 9\)

2) _____

3) Given the points A(-1,2) and B(5,11), find the coordinates of the point P on directed line segment AB that partitions AB in the ratio 1:2.

A. (1,5)
B. (2,6.5)
C. (6,9)
D. (3,4.5)

3) _____

4) The equation of a circle is \((x + 2)^2 + (y + 3)^2 = 4\). Which represents the equation?

4) _____
5) Darcy used a coordinate grid, shown below, to sketch the location of some important buildings in her town. Each block represents 1 square mile. If Darcy could travel in a straight line from her house to school, how many miles would she travel?

A. 5.1 miles  
B. 6.3 miles  
C. 8.2 miles  
D. 9.1 miles

6) Which point is on a circle with a center of (3,-9) and a radius of 5?

A. (-6,5)  
B. (-1,6)  
C. (1,6)  
D. (6,-5)

7) Triangle ABC has vertices as shown. What is the area of the triangle?

A. $\sqrt{72}$ square units  
B. 12 square units  
C. $\sqrt{288}$ square units  
D. $\sqrt{24}$ square units

8) The line $p$ is represent by the equation $y = 4x + 1$. What is the equation of the line that is perpendicular to the line $p$ and passes through the point (8,5)?
GSE Geometry
Unit 6 – Probability
EOC Review

Name: _________________________
Block: ______

Vocabulary: Independent events, dependent events, conditional probability, Addition Rule, Multiplication Rule for Independent Events, outcome, overlapping events, union, intersection

Employment Survey Results

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>Less than 18</th>
<th>18 or greater</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has Job</td>
<td>20</td>
<td>587</td>
<td>607</td>
</tr>
<tr>
<td>Does Not Have Job</td>
<td>245</td>
<td>92</td>
<td>337</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>265</td>
<td>679</td>
<td>944</td>
</tr>
</tbody>
</table>

1) Find the probability that a randomly selected person will have a job, given they are older than 18. 
\[ P(\text{job} \mid \text{older than 18}) = \frac{587}{679} \]

2) What is the probability that person has a job? 
\[ P(\text{job}) = \frac{607}{944} \]

3) Find the \( P(\text{Does not have a job and is less than 18}) \) 
\[ P(\text{Does not have a job}) = 1 - \frac{607}{944} = \frac{944 - 607}{944} = \frac{337}{944} \]

4) What is the probability of drawing a Queen from a deck of cards, and then drawing a king without replacement? 
\[ \left( \frac{4}{52} \right) \left( \frac{4}{51} \right) = \frac{16}{2652} = \frac{4}{663} \]

5) Drawing one card from a standard deck of cards, what is \( P(\text{drawing a 6 card or drawing a Jack}) \)? 
\[ P(\text{6 card}) + P(\text{Jack}) = \frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \frac{2}{13} \]

6) For a standard deck of cards, what is the probability of drawing a diamond, replacing it, and then drawing a 2? 
\[ \left( \frac{13}{52} \right) \left( \frac{4}{52} \right) = \frac{52}{2704} \]

7) Find \( P(A) = \frac{37}{61} \)
8) Find \( P(B) = \frac{12}{61} \)
9) Find \( P(B') = \frac{49}{61} \)
10) Find \( P(A \cup B) = \frac{44}{61} \)
11) Find \( P(A \cap B) = \frac{5}{61} \)
12) Find \( P(A \cap B') = \frac{56}{61} \)
13) If you draw one card from a standard deck of cards what is \( P(\text{jack card or heart}) \)? 
\[ \frac{4}{52} + \frac{13}{52} = \frac{16}{52} = \frac{4}{13} \]

14) Are the events independent? 
\[ P(A) = 0.08; \ P(B) = 0.4; \ P(A \cap B) = 0.12 \]
\[ P(A \cap B) = P(A) \cdot P(B) = 0.032 \]

15) Are the events independent? 
\[ P(A) = 0.30; \ P(B) = 0.15; \ P(A \cap B) = 0.045 \]
\[ P(A \cap B) = P(A) \cdot P(B) = 0.045 \]
1) For which set of probabilities would event A and B be independent?

A. \( P(A) 0.25, P(B) = 0.25; P(A \text{ and } B) = 0.50 \)
B. \( P(A) 0.08, P(B) = 0.40; P(A \text{ and } B) = 0.12 \)
C. \( P(A) 0.16, P(B) = 0.24; P(A \text{ and } B) = 0.32 \)
D. \( P(A) 0.10, P(B) = 0.30; P(A \text{ and } B) = 0.03 \)

2) What is the probability that a randomly chosen person has blonde hair, given that the person selected is male?

<table>
<thead>
<tr>
<th>Hair Color</th>
<th>Brown</th>
<th>Blonde</th>
<th>Red</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>548</td>
<td>876</td>
<td>82</td>
<td>1,506</td>
</tr>
<tr>
<td>Female</td>
<td>612</td>
<td>716</td>
<td>66</td>
<td>1,394</td>
</tr>
<tr>
<td>Total</td>
<td>1,160</td>
<td>1,592</td>
<td>148</td>
<td>2,900</td>
</tr>
</tbody>
</table>

A. 0.51
B. 0.55
C. 0.58
D. 0.63

3) When rolling a fair, six-sided number cube, what is the probability of rolling an even number or a number less than 3?

A. \( \frac{5}{6} \)
B. \( \frac{2}{3} \)
C. \( \frac{1}{2} \)
D. \( \frac{1}{3} \)

4) Each letter of the alphabet is written on separate cards in red ink. The cards are placed in a container. Each letter of the alphabet is also written on separate cards in black ink. The cards are placed in the same container. What is the probability that a card randomly selected from the container has a letter written in black ink or the letter is A or Z?

A. \( \frac{1}{2} \)
B. \( \frac{7}{13} \)
C. \( \frac{15}{26} \)
D. \( \frac{8}{13} \)
5) Ms. Klein surveyed 240 men and 285 women about their vehicles. Of those surveyed, 155 men and 70 women said they own a red vehicle. If a person is chosen at random from those surveyed, what is the probability of choosing a woman or a person who does NOT own a red vehicle?

<table>
<thead>
<tr>
<th>Option</th>
<th>Probability</th>
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<tbody>
<tr>
<td>A.</td>
<td>(\frac{14}{57})</td>
</tr>
<tr>
<td>B.</td>
<td>(\frac{71}{105})</td>
</tr>
<tr>
<td>C.</td>
<td>(\frac{74}{105})</td>
</tr>
<tr>
<td>D.</td>
<td>(\frac{88}{105})</td>
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</table>

6) Bianca spins two spinners that have four equal sections numbered 1 through 4. If she spins a 4 on at least one spin, what is the probability that the sum of her two spins is an odd number?

<table>
<thead>
<tr>
<th>Option</th>
<th>Probability</th>
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</thead>
<tbody>
<tr>
<td>A.</td>
<td>(\frac{1}{4})</td>
</tr>
<tr>
<td>B.</td>
<td>(\frac{4}{7})</td>
</tr>
<tr>
<td>C.</td>
<td>(\frac{16}{7})</td>
</tr>
<tr>
<td>D.</td>
<td>(\frac{11}{16})</td>
</tr>
</tbody>
</table>

7) Assume that the following events are independent:

- The probability that a high school senior will go to college is 0.72.
- The probability that a high school senior will go to college and live on campus is 0.46

What is the probability that a high school senior will live on campus, given that the person will go to college?

<table>
<thead>
<tr>
<th>Option</th>
<th>Probability</th>
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<tbody>
<tr>
<td>A.</td>
<td>0.26</td>
</tr>
<tr>
<td>B.</td>
<td>0.33</td>
</tr>
<tr>
<td>C.</td>
<td>0.57</td>
</tr>
<tr>
<td>D.</td>
<td>0.64</td>
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</table>

8) A student draws a card from a standard deck and then draws another card without replacing the first card. Explain why the probability of picking an ace on the first draw and the probability of picking a 7 on the second draw are NOT independent events.