Geometry CC Practice #3 Name Key

1) A teenager who is 5 feet 3 inches tall casts a shadow of 7 feet 9 inches. Assuming the teenager is standing perpendicular to the ground, what is the angle of elevation from the end of the shadow to the top of the teenager's head, to the *nearest tenth of a degree*?

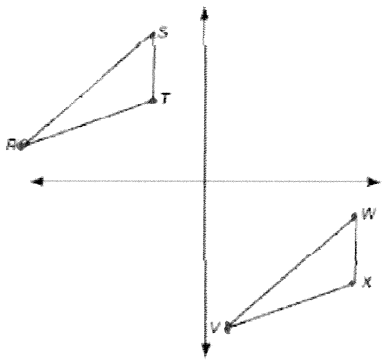
2) Describe the transformation done on ΔRTS to form ΔVXW.

a. rotation around the origin 180°

b. reflection over the x-axis

c. reflection over the y-axis

(d.) translation



3) A triangle has vertices at $A(1, 3)$, $B(4, 2)$, and $C(3, 8)$. Which transformation would produce an image with vertices $A'(3, -1)$, $B'(2, -4)$, $C'(8, -3)$?

a. a reflection over the x-axis $R_{-90°} = R_{270°}(x, y) = (y, -x)$

b. a reflection over the y-axis

(c.) a rotation 90° clockwise

d. a rotation 90° counterclockwise

4) The line y = 2/3 x +9 is dilated by a scale factor of 1/3 and centered at the origin. Write the equation of the image of the line after the dilation. $y = \frac{2}{3}x + 3$

5) A wheel has a radius of 18 inches. Which distance, to the nearest inch, does the wheel travel when it rotates through an angle of $\frac{2\pi}{5}$ radians?

$s = \theta r$

$s = \frac{2\pi}{5}(18) \approx 23$

OR $\left(\frac{\frac{2\pi}{5}}{2\pi}\right)(36\pi) \approx 23$ ($2\pi r$)

1) 45

(2) 23

3) 13

4) 11

6) In circle O, the length of radius $\overline{OB}$ is 5 centimeters and the length of $\overset{\frown}{AB}$ is 5 centimeters.

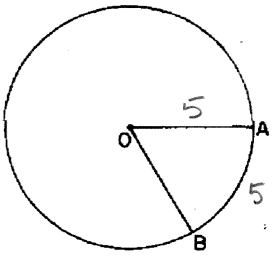
The measure of $\angle AOB$ is

1) 1 radian

2) π radians

3) greater than 60°

4) 60°



7) If, $\cos(2x-1)^\circ = \sin(3x+6)^\circ$ then the value of x is

1) -7

2) 17

3) 35

4) 71

$2x-1+3x+6=90$

$5x+5=90$

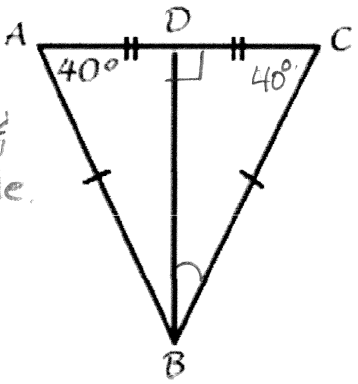
$5x=85$

$x=17$

8) Using the diagram below,

a) Determine if $\overline{BD}$ is an angle bisector of triangle ABC and **justify why or why not.** ***(2pts.)***

$\overline{BD}$ is the $\measuredangle$ bisector because BD is the median, since $\overline{AD} \cong \overline{CD}$. In an isosceles $\triangle$, the median is also the $\measuredangle$ bisector & the altitude.



b) Find the measure of $\angle CBD$. ***(2pts.)***

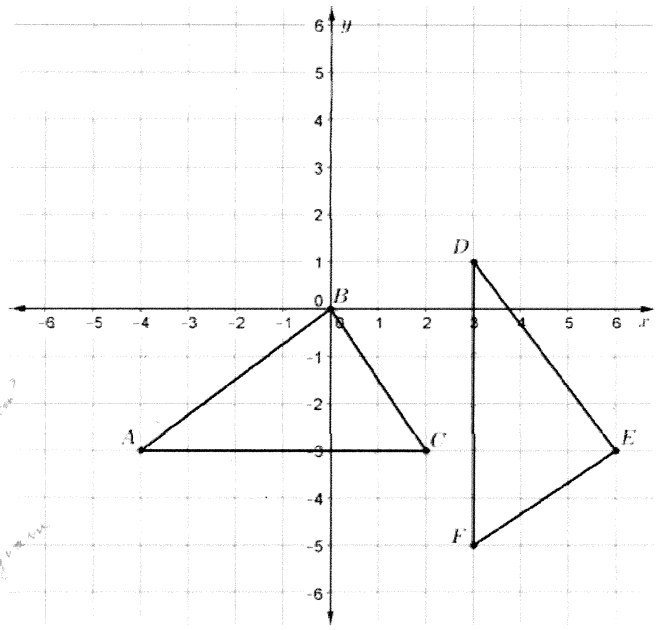
$\measuredangle CBD = 50°$

9) Sophia finds 10 bricks of gold in the "junkyard". Lucky Sophia. The dimensions of each brick are 2.1 cm by 4.7 cm by 4.2 cm, and the density of each brick of gold is 19.32 g/cm^3. Sophia can only carry ~~400~~ 4 kg on her bike. *Can she carry the gold home on her bike?* no

$V = (2.1)(4.7)(4.2) = 41.454\ cm^3 \times 10 = 414.54\ cm^3$

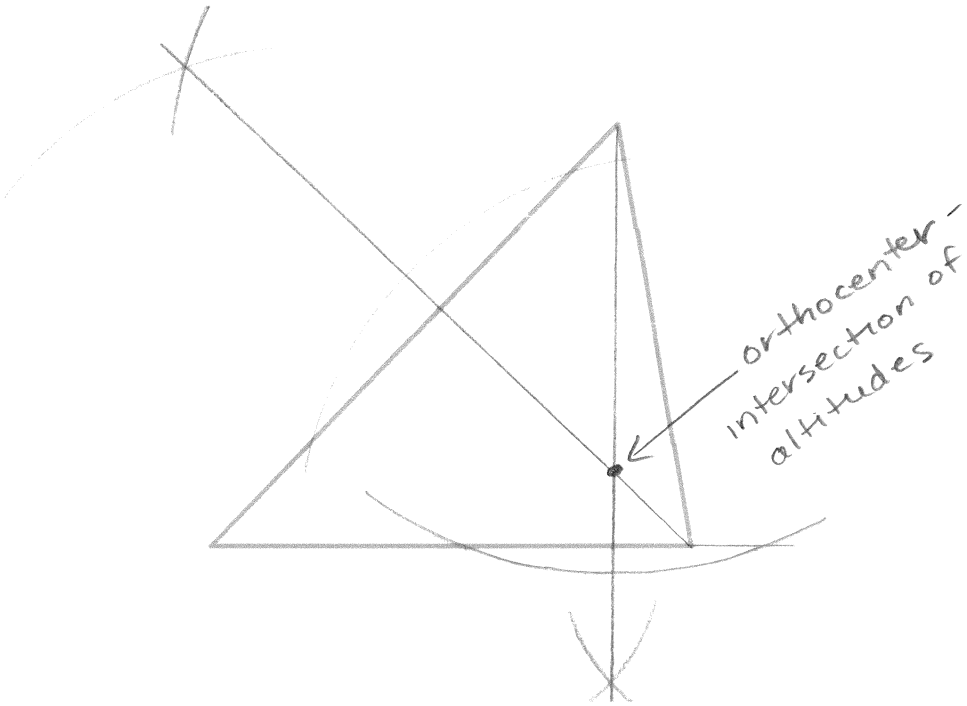
$(414.54\ cm^3)(19.32\ g/cm^3) = 8008.9128\ g\ (.001) \approx 8\ kg$

10) Given ΔABC with vertices A $(-4, -3)$, B $(0, 0)$, C $(2, -3)$ and ΔDEF with vertices D $(3, 1)$, E $(6, -3)$, F $(3, -5)$, use the definition of congruence in terms of rigid motion to show that $\Delta ABC \cong \Delta DEF$. *Describe each rigid motion in terms of coordinates (x, y).*



Rotate ΔABC about origin (Point B) until point A lies on the y-axis. Then translate along vector $\overrightarrow{BE}$ ΔABC will lie on ΔDEF after the sequence of rigid motions. Since rigid motion preserves distance, $\Delta ABC \cong \Delta DEF$

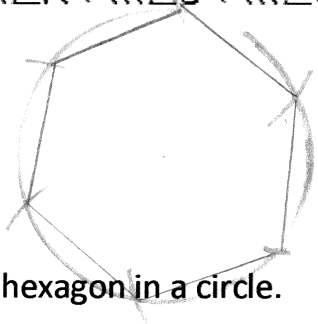
11) Construct the orthocenter of the triangle below.

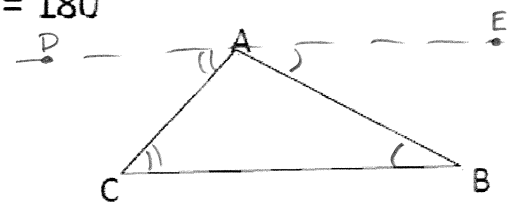


12) Given: Triangle ABC

Prove: $m\angle A + m\angle B + m\angle C = 180°$

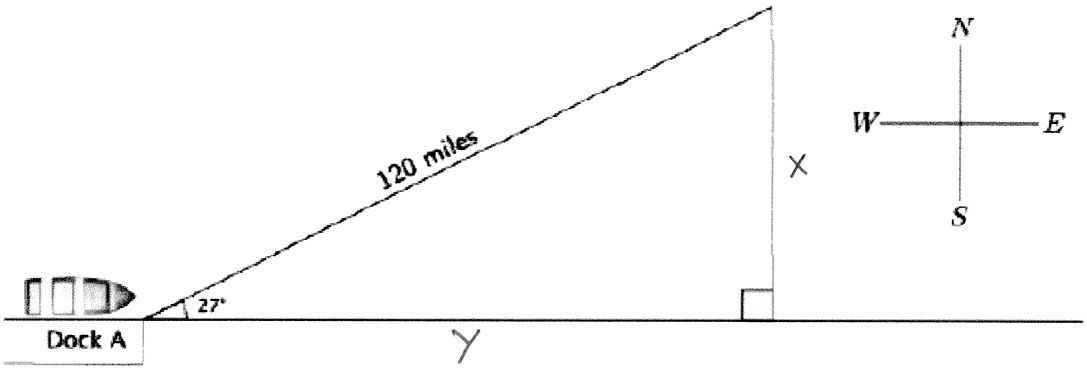
draw auxiliary line $\overleftrightarrow{DE}$ parallel to $\overline{BC}$ going through A.
$\angle EAB \cong \angle B$ since alt int $\angle$s
Also $\angle DAC \cong \angle C$ since alt int $\angle$s
$\cong$. $m\angle DAC + m\angle CAB + m\angle EAB = 180°$, since a straight $\angle = 180°$,
$m\angle A + m\angle B + m\angle C = 180$ by substitution.





13) Inscribe a hexagon in a circle.

14) A shipmate set a boat to sail exactly 27° NE from the dock. After traveling 120 miles, the shipmate realized he had misunderstood the instructions from the captain; he was supposed to set sail going directly east!



a. How many miles will the shipmate have to travel directly south before he is directly east of the dock? Round your answer to the nearest mile.

$\sin 27° = \frac{x}{120}$ $x \approx 54$ mi.

b. How many extra miles does the shipmate travel by going the wrong direction compared to going directly east? Round your answer to the nearest mile.

$\cos 27° = \frac{y}{120}$ $y \approx 107$ mi $107 - 54 = 53$ mi.

15) In the diagram below, right triangle RSU is inscribed in circle O, and $\overline{UT}$ is the altitude drawn to hypotenuse $\overline{RS}$. The length of $\overline{RT}$ is 16 more than the length of $\overline{TS}$ and $TU = 15$.

Find the length of $\overline{TS}$. $\overline{TS} = 9$

Find, in simplest radical form, the length of $\overline{RU}$.

$RT = 25$

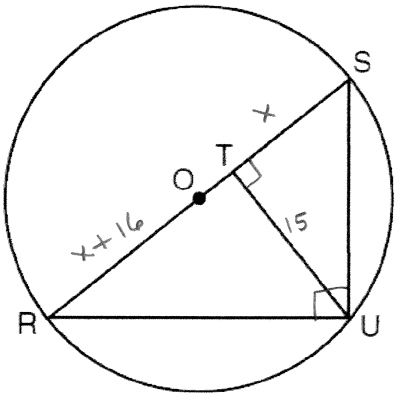
$15^2 + 25^2 = c^2$

$c^2 = 850$

$c = \sqrt{850}$

$\sqrt{25}\sqrt{34}$

$\overline{RU} = 5\sqrt{34}$



$\frac{x}{15} = \frac{15}{x+16}$

$225 = x^2 + 16x$

$x^2 + 16x - 225 = 0$

$(x+25)(x-9) = 0$

$x = -25$ $x = 9$