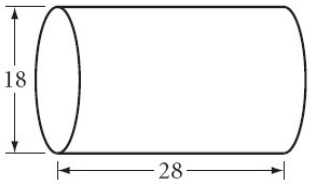
Geometry B – Practice End of Quarter Exam Name: KEY

**(4 points each) Find the volume of each solid. All given measurements are in centimeters. Round your answer to the nearest cubic centimeter.**

1. (G.GMD.3)
Volume = $2268\pi\ cm^3 \approx 7125\ cm^3$



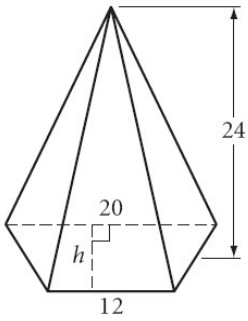

$A = \pi r^2 \quad V = BH$

$A = \pi(9)^2 = 81\pi$

$V = (81\pi)(28)$

$V = 2268\pi$

2. (G.GMD.3)
$h = 8$ cm
Volume = $1024\ cm^3$



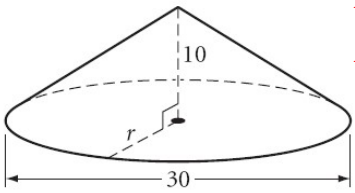

$A = \frac{1}{2}(b_1 + b_2)h \quad V = \frac{1}{3}BH$

$A = \frac{1}{2}(12 + 20)(8) = 128$

$V = \frac{1}{3}(128)(24)$

$V = 1024$

3. (G.GMD.3)
Volume = $750\pi cm^3 \approx 2356\ cm^3$




$A = \pi r^2 \quad V = \frac{1}{3}BH$

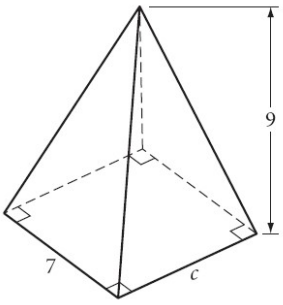
$A = \pi(15)^2 = 225\pi$

$V = \frac{1}{3}(225\pi)(10)$

$V = 750\pi$

**(5 points each) All given measurements are in centimeters.**

4. (G.GMD.3)
Volume = 195.3 cm$^3$
$c =$ $9.3\ cm$




$V = \frac{1}{3}BH$

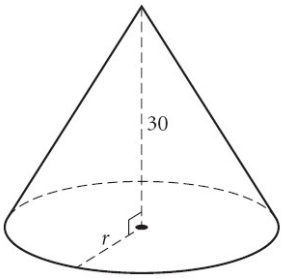
$195.3 = \frac{1}{3}B(9)$

$65.1 = B$

$65.1 = (7)(c)$

$9.3 = c$

5. (G.GMD.3)
Volume = $2560\pi$ cm$^3$
$r =$ $16\ cm$




$V = \frac{1}{3}BH$

$2560\pi = \frac{1}{3}B(30)$

$256\pi = B$

$256\pi = \pi r^2$

$256 = r^2$

$16 = r$

6. Can you pick up a solid aluminum ball of radius 7 inches? Aluminum has a density of 0.098 pound per cubic inch. To the nearest pound, what is the weight of the ball? (G.MG.2)

$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi(7)^3$

$V = 457\frac{1}{3}\pi\ \text{in}^3 \approx 1436.75\ \text{in}^3$

$D = \frac{M}{V}$

$0.098 = \frac{M}{1436.75}$

$M = 141$ lbs

**(5 points each) Rosa Avila is a plumbing contractor. She needs to deliver 300 lengths of steel pipe to a construction site. Each pipe is 160 cm long, has an outer diameter of 6 cm, and has an inner dimeter of 5 cm. Rosa needs to know whether her quarter-tonne truck can handle the weight of the pipes. Steel has a density of about 7.7 g/cm$^3$. One tonne equals 1000 kilograms.**

7. To the nearest kilogram, what is the mass of these 300 pipes? (G.MG.1, G.MG.2)

$A = \pi R^2 - \pi r^2$ $\quad V = BH$ $\quad D = \frac{M}{V}$

$A = \pi(3)^2 - \pi(2.5)^2$ $\quad V = (2.75\pi)(160)$ $\quad 7.7 = \frac{M}{1382.3}$

$A = 9\pi - 6.25\pi = 2.75\pi$ $\quad V = 440\pi \approx 1382.3$ cm$^3$ $\quad 10{,}643.7$ grams each

$10{,}643.7 * 300 = 3{,}193{,}114.77$ grams $\quad \frac{3{,}193{,}114.77}{1000} = 3193$ kilograms

8. How many loads will Rosa have to transport to deliver the 300 lengths of pipe? (G.MG.2)

$\frac{1000}{4} = 250$ kilograms per load $\quad \frac{3193}{250} = 12.77$ loads

She will need to transport 13 loads

**(4 points) Complete.**

9. The density of copper is 8.96 g/cm$^3$. You have a solid copper cylinder with base radius 1 cm and height 3 cm. How much does it weigh? Round your answer to the nearest gram. (G.MG.2)

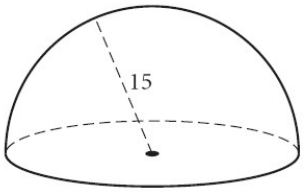
$V = \pi r^2 H \implies V = \pi(1)^2(3) \implies V = 3\pi \implies V \approx 9.42\ cm^3$

$denisty = \frac{mass}{volume}$ $\quad 8.96\frac{g}{cm^3} = \frac{mass}{9.42\ cm^3} \implies 8.96 = \frac{mass}{9.42} \implies 84.40 = mass$

The weight of the cylinder is about 84 grams.

**(4 points) Find the volume of the hemisphere. The radius is in centimeters.**

10. (G.GMD.3)




$V = \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$

$V = \frac{1}{2}\left(\frac{4}{3}\pi(15)^3\right)$

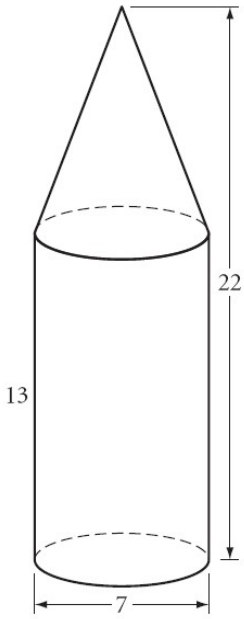
$V = \frac{1}{2}(4500\pi)$

$V = 2250\pi$

Volume $= 2250\pi\ cm^3 \approx 7069\ cm^3$

**(6 points) Find the volume of the solid below. All measurements are in centimeters.**

11. (G.GMD.3)




Cylinder:

$V = \pi r^2 H$

$V = \pi(3.5)^2(13)$

$V = 159.25\pi$

Cone:

$V = \frac{1}{3}\pi r^2 H$

$V = \frac{1}{3}\pi(3.5)^2(9)$

$V = \frac{1}{3}(110.25\pi)$

$V = 36.75\pi$

Total Volume:

$V = 159.25\pi + 36.75\pi$

$V = 196\pi$

$V = 196\pi\ cm^3$

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**(6 points each) Complete.**

12. A scoop of ice cream, shaped like a sphere with diameter 6 cm, is placed in an ice cream cone with diameter 5 cm and height 10 cm. Is the cone big enough to hold all the ice cream if it melts? Explain. (G.GMD.3, G.MG.1)

Sphere:

$V = \frac{4}{3}\pi r^3 \implies V = \frac{4}{3}\pi(3)^3$

$V = 36\pi \implies V \approx 113.09\ cm^3$

Cone:

$V = \frac{1}{3}\pi r^2 H \implies V = \frac{1}{3}\pi(2.5)^2(10)$

$V = \frac{62.5}{3}\pi \implies V \approx 65.45\ cm^3$

The cone is not big enough to hold all of the ice cream if it melts because the volume of the spherical ice cream is larger than the volume of the cone.

13. A prep chef has just made two dozen meatballs. Each meatball has a 1-inch diameter. Right now, before the meatballs are added, the sauce is 2 inches from the top of the 14-inch diameter pot. Will the sauce spill over when the chef adds the meatballs to the pot? (G.GMD.3, G.MG.1)

Volume of Meatballs:

$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi\left(\frac{1}{2}\right)^3$

$V = \frac{1}{6}\pi$ in$^3$ per meatball

$\frac{1}{6}\pi * 24 = 4\pi$ in$^3$ total

Volume of Room in Pot:

$A = \pi r^2$

$A = \pi(7)^2$

$A = 49\pi$

$V = BH$

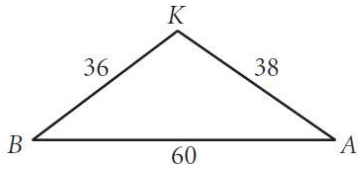
$V = (49\pi)(2)$

$V = 98\pi$ in$^3$

The sauce will not spill over.

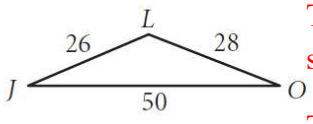
**(4 points each) Determine whether the triangles are similar. Explain why or why not.**

14. Is $\Delta BAK \sim \Delta JOL$? (G.SRT.2)




$\frac{36}{26} \stackrel{?}{=} \frac{38}{28} \stackrel{?}{=} \frac{60}{50}$

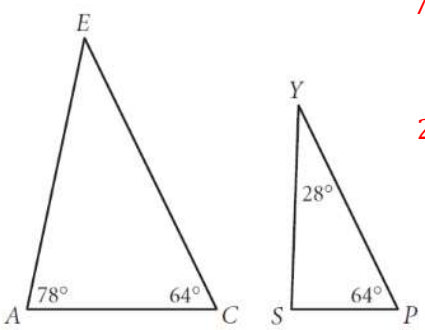
$1.38 \neq 1.36 \neq 1.2$




The triangles are not similar.

The sides are not proportional.

15. Is $\Delta ACE \sim \Delta SPY$? (G.SRT.2)




$\Delta ACE$

$78 + 64 + m\angle E = 180$

$m\angle E = 38°$

$\Delta SPY$

$28 + 64 + m\angle S = 180$

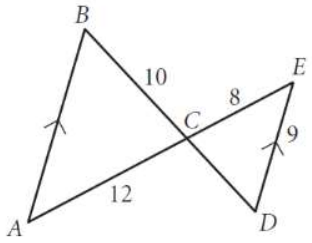
$m\angle S = 88°$

The triangles are not similar.

The corresponding angles are not congruent.

**(6 points) Find and justify any needed information to prove that the triangles are similar, if possible. Write a triangle similarity statement and tell which conjecture shows the similarity. If there is not enough information, write "not enough information." All measures are in centimeters.**

16. (G.SRT.2)

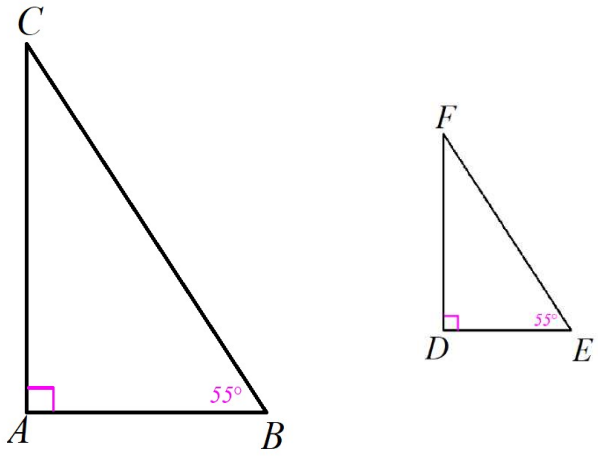



$\angle CED \cong \angle BAC$ AIA

$\angle CDE \cong \angle ABC$ AIA

By AA Similarity, $\Delta ABC \sim \Delta ECD$

**(3 points each) Use the two triangles to complete the following questions.**




17. What will be true about $\angle C$ and $\angle F$? Why? (G.SRT.3)

    $\angle C \cong \angle F$ because both triangles must add to 180° and the other two angles add to 145° in each triangle.

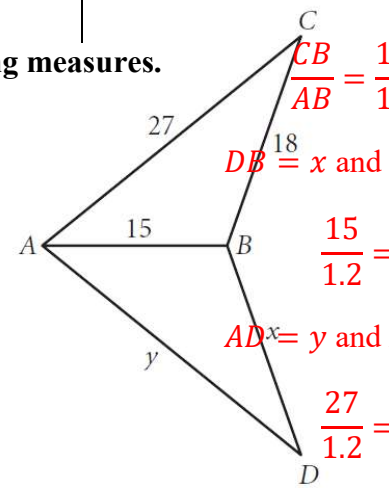
18. Carefully measure the lengths of the sides of both triangles. Compare the ratios of the corresponding sides. What do you notice? (G.SRT.3)

    The sides are proportional.

19. Complete the conjecture: If __two__ angles of one triangle are congruent to __two__ angles of another triangle then __the triangles are similar__. (G.SRT.3)

**(2 points each) Find the values of missing measures.**

$\Delta ABC \sim \Delta DBA$ (G.SRT5)




$\frac{CB}{AB} = \frac{18}{15} = 1.2$

$DB = x$ and $DB \sim AB$

$\frac{15}{1.2} = 12.5$

$AD = y$ and $AD \sim CA$

$\frac{27}{1.2} = 22.5$

20. $x = 12\frac{1}{2}$ (G.SRT5)

21. $y = 22\frac{1}{2}$ (G.SRT5)

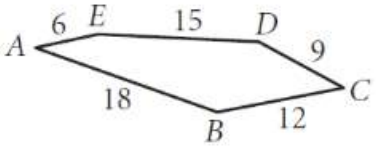
$ABCDE \sim FGHIJ$

22. $w = 36$ (G.SRT5)

$\frac{FG}{AB} = \frac{54}{18} = 3$

$GH = w$ and $GH \sim BC$

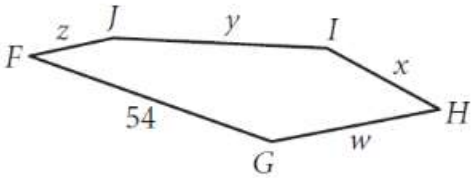
$12 \cdot 3 = 36$




23. $x = 27$ (G.SRT5)

$IH = x$ and $IH \sim DC$

$9 \cdot 3 = 27$




24. $y = 45$ (G.SRT5)

$JI = y$ and $JI \sim ED$

$15 \cdot 3 = 45$

25. $z = 18$ (G.SRT5)

$FJ = z$ and $FJ \sim AE$

$6 \cdot 3 = 18$

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$\frac{120}{90} = \frac{112}{84}$

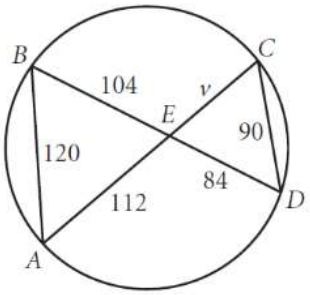
$\frac{120}{90} \neq \frac{104}{84}$

$\frac{120}{90} = \frac{4}{3}$

$EC = v$ and $EC \sim EB$

$\frac{104}{\frac{4}{3}} = 78$

26. $v = 78$ (G.SRT.5)




$k \| \ell \| m \| n$

**w** $\frac{54+36}{54} = \frac{90}{54} = 1\frac{2}{3}$

$72 \cdot 1\frac{2}{3} = 120$ $120 - 72 = 48$

**x** $\frac{54+36+27}{54} = \frac{117}{54} = 2\frac{1}{6}$

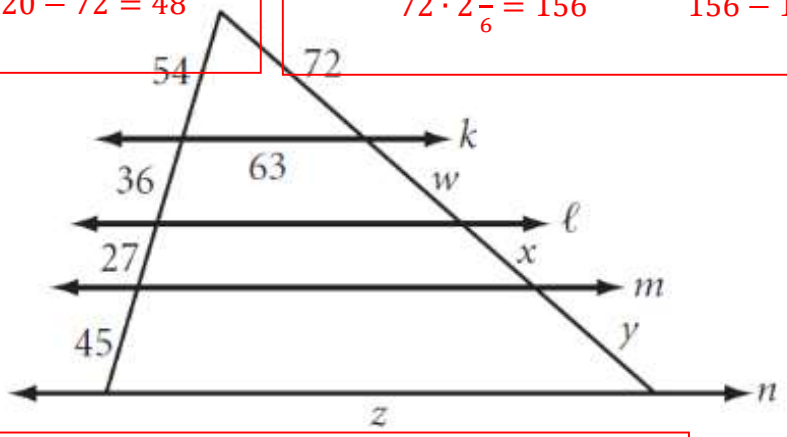
$72 \cdot 2\frac{1}{6} = 156$ $156 - 120 = 36$

27. $w = 48$ (G.SRT5)

28. $x = 36$ (G.SRT5)

29. $y = 60$ (G.SRT5)

30. $z = 189$ (G.SRT5)



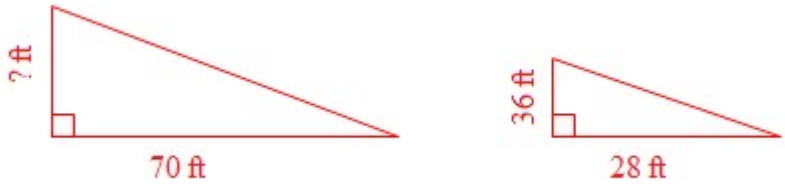

***y* and *z*** $\frac{54+36+27+45}{54} = \frac{162}{54} = 3$

$72 \cdot 3 = 216$ $216 - 156 = 60$

$63 \cdot 3 = 189$

**(5 points each) Complete.**

31. If a 36-foot tree casts a 28-foot shadow at the same time a nearby building casts a 70-foot shadow, how tall is the building? (G.SRT.8)

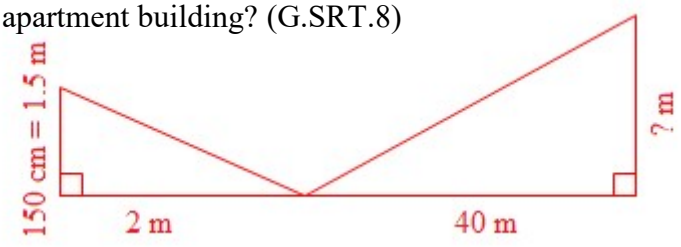



$\frac{70}{28} = 2.5$

$36 \cdot 2.5 = 90$

The building is 90 feet tall.

32. Kendra can see the top of her apartment building reflected in a small fish pond in a park across the street. She is standing two meters from the pond, and the distance from the pond to the apartment building is forty meters. If Kendra's eyes are 150 centimeters above the ground, how tall is the apartment building? (G.SRT.8)

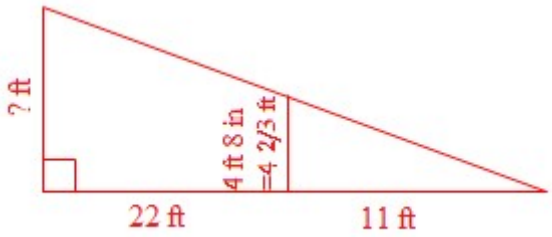



$\frac{40}{2} = 20$

$1.5 \cdot 20 = 30$

The building is 30 meters tall.

33. Igor, who is 4 ft 8 in. tall, wishes to find the height of an oak tree in front of his castle. He walks along the shadow of the tree until the end of his shadow exactly overlaps the end of the treetop's shadow. At that point, he is 22 ft from the foot of the tree and 11 ft from the end of the shadows. How tall is the oak tree? (G.SRT.8)




$$\frac{33}{11} = 3$$

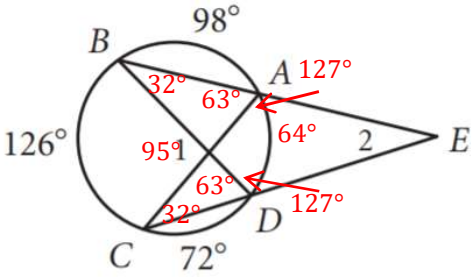
$$4\frac{2}{3} \cdot 3 = 14$$

The oak tree is 14 feet tall.

**(2 points each) Find the missing measure.**

34. $m\angle 1 = 95°$ (G.C.2)

35. $m\angle 2 = 11°$ (G.C.2)




36. $m\overset{\frown}{YE} = 76°$ (G.C.2)

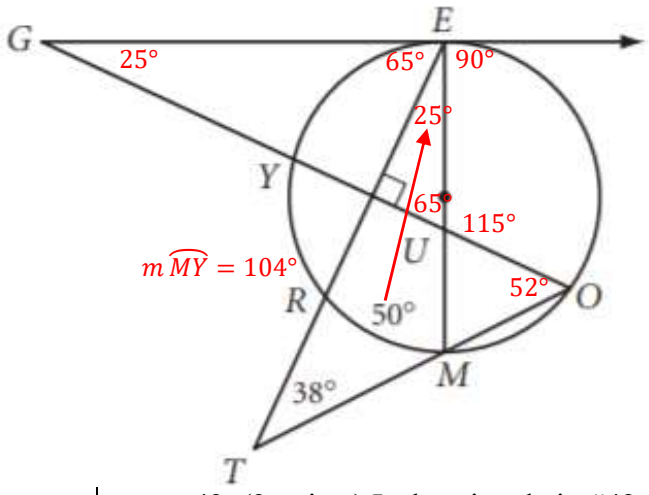
37. $m\angle MOG = 52°$ (G.C.2)

38. $m\angle GUM = 115°$ (G.C.2)

39. $m\angle OGE = 25°$ (G.C.2)

40. $m\angle MER = 25°$ (G.C.2)

41. $m\angle MEG = 90°$ (G.C.2)




42. (5 points) Determine whether $\Delta ABC$ with vertices $A(-2,1)$, $B(-7,4)$, and $C(-1,14)$ is equilateral, isosceles or scalene? (G.GPE.4)

$$AB = \sqrt{5^2 + 3^2} = \sqrt{25 + 9} = \sqrt{34} \approx 5.83$$

$$BC = \sqrt{6^2 + 10^2} = \sqrt{36 + 100} = \sqrt{136} \approx 11.67$$

$$CA = \sqrt{1^2 + 13^2} = \sqrt{1 + 169} = \sqrt{170} \approx 13.04$$

The triangle is scalene.

| $AB$ | | | $BC$ | | | $CA$ | | |
|---|---|---|---|---|---|---|---|---|
| $x$ | $y$ | | $x$ | $y$ | | $x$ | $y$ | |
| $-5$ $-2$ | $1$ | $+3$ | $+6$ $-7$ | $4$ | $+10$ | $-1$ $1$ | $14$ | $-13$ |
| $-7$ | $4$ | | $-1$ | $14$ | | $-2$ | $1$ | |

43. (3 points) Is the triangle in #42 a right triangle? (G.GPE.4)

$$AB = -\frac{3}{5} \qquad BC = \frac{10}{6} = \frac{5}{3} \qquad CA = \frac{-13}{-1} = 13$$

The triangle is a right triangle.

44. (3 points) What is the perimeter of the triangle defined in #42? (G.GPE.7)

$5.83 + 11.66 + 13.04 = 30.53$ units

45. (3 points) What is the area of the triangle defined in #42? (G.GPE.7)

Since $\overline{AB} \perp \overline{BC}$, we can use those as base and height.

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(5.83)(11.67)$$

$$A = 34.02\ units^2$$

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46. (5 points) Determine the type of quadrilateral formed by the vertices $H(5,-5), I(7,-3), J(2,2)$ and $K(0,0)$. (G.PGE.4)

$HI = \sqrt{2^2+2^2} = \sqrt{4+4} = \sqrt{8} \approx 2.83$

$IJ = \sqrt{5^2+5^2} = \sqrt{25+25} = \sqrt{50} \approx 7.07$

$JK = \sqrt{2^2+2^2} = \sqrt{4+4} = \sqrt{8} \approx 2.83$

$IJ = \sqrt{5^2+5^2} = \sqrt{25+25} = \sqrt{50} \approx 7.07$

| $HI$ | |
|---|---|
| $x$ | $y$ |
| 5 | $-5$ |
| 7 | $-3$ |

| $IJ$ | |
|---|---|
| $x$ | $y$ |
| 7 | $-3$ |
| 2 | 2 |

$HI = \frac{2}{2} = 1$ $IJ = \frac{5}{-5} = -1$

The quadrilateral is a rectangle.

47. (3 points) What is the perimeter of the quadrilateral in #46? (G.GPE.7)

$2.83 + 7.07 + 2.83 + 7.07 = 19.8$ units

48. (3 points) What is the area of the quadrilateral in #46? (G.GPE.7)

$A = bh$ $A = 20.01\ units^2$

$A = (2.83)(7.07)$

49. (5 points) Determine the type of quadrilateral formed by the vertices $L(-7,-2), M(-9,-5), N(-2,-5)$ and $P(-4,-2)$. (G.GPE.4)

$LM = \sqrt{2^2+3^2} = \sqrt{4+9} = \sqrt{13} \approx 3.61$

$MN = \sqrt{7^2+0^2} = \sqrt{49+0} = \sqrt{49} = 7$

$NP = \sqrt{2^2+3^2} = \sqrt{4+9} = \sqrt{13} \approx 3.61$

$PL = \sqrt{3^2+0^2} = \sqrt{9+0} = \sqrt{9} = 3$

The quadrilateral is a trapezoid.

50. (1 point) Which point would you use to calculate the height of the quadrilateral in #49? (G.GPE.4)

$(-7,-5)$ or $(-4,-5)$

51. (3 points) What is the perimeter of the quadrilateral in #49? (G.GPE.7)

$3.61 + 7 + 3.61 + 3 = 17.22$ units

52. (3 points) What is the area of the quadrilateral in #49? (G.GPE.7)

$A = \frac{1}{2}(b_1 + b_2)h$

$A = \frac{1}{2}(7+3)3$

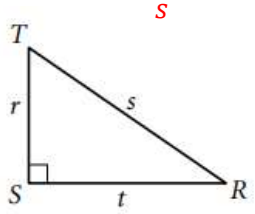
$A = 15\ units^2$

**(4 points each) Use the definitions of the three trigonometric ratios to find each answer. Simplify your answers.**

53. (G.SRT.6)

$\sin R =$ $\frac{r}{s}$

$\cos R =$ $\frac{t}{s}$




54. (G.SRT.6)

$\cos B =$ $\frac{30}{34} = \frac{15}{17}$

$\tan B =$ $\frac{16}{30} = \frac{8}{15}$

$a^2 + b^2 = c^2$

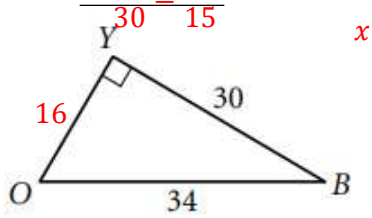
$x^2 + 30^2 = 34^2$

$x^2 + 900 = 1156$

$x^2 = 256$

$x = \sqrt{256}$

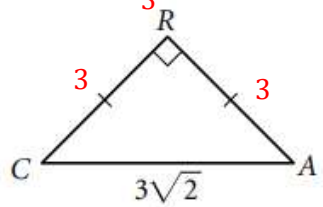
$x = 16$




55. (G.SRT.6)

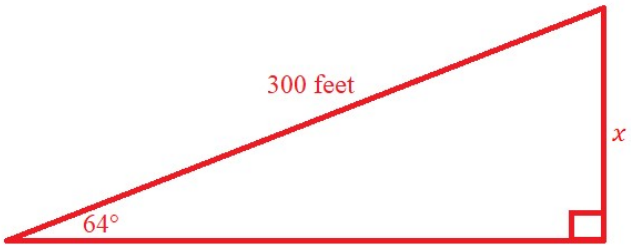
$\sin C =$ $\frac{3}{3\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan C =$ $\frac{3}{3} = 1$



**(5 points each) Complete.**

56. Igor is flying a kite. He has let out 300 ft of kite string. The string makes an angle of 64° with the level ground. To the nearest foot, how high is his kite? (G.SRT.8)




$$\sin 64° = \frac{x}{300}$$

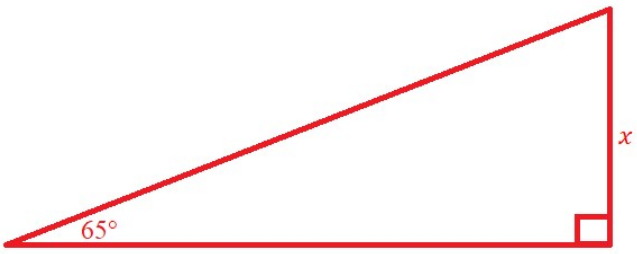
$$300 \cdot \sin 64° = x$$

$$x = 269.64$$

270 feet

57. Julia wants to find the height of a redwood tree. She paces 73 steps from the base of the tree. Each step is 0.6 m. She finds the angle of elevation from the top of the tree to the ground where she is standing to be 65°. How tall is the tree to the nearest meter? (G.SRT.8)

$$73 \cdot 0.6 = 43.8$$




43.8 meters

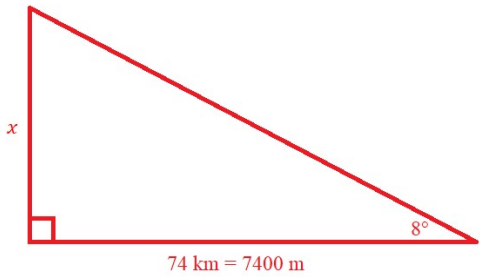
$$\tan 65° = \frac{x}{43.8}$$

$$43.8 \cdot \tan 65° = x$$

$$x = 93.93$$

94 meters

58. Air traffic controller Seymour Plains must quickly calculate the altitude of an incoming jet. He records the jet's angle of elevation as 8°. The jet signals that its land (horizontal) distance from the control tower is 74 km. Calculate the altitude of the jet to the nearest meter. (G.SRT.8)



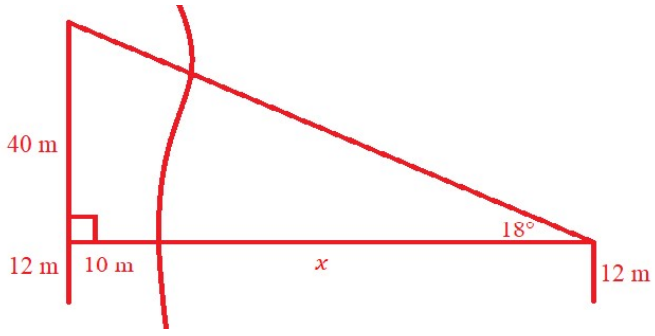

74 km = 7400 m

$$\tan 8° = \frac{x}{7400}$$

$$7400 \cdot \tan 8° = x$$

$x = 1040$ 1040 meters

59. A lighthouse is set 10 meters back from the edge of the shoreline, and its beacon is 52 meters above sea level. Lucy can see the beacon from her ship, and the angle of elevation is 18°. Her eyes are 12 meters above sea level. How far is the ship from the shoreline to the nearest meter? (G.SRT.8)




$$\tan 18° = \frac{40}{y}$$

$$y = \frac{40}{\tan 18°}$$

$$y = 123.11$$

$x = 123 - 10 = 113$ 113 meters

Geometry B – Practice End of Quarter Exam Name:_____KEY_____