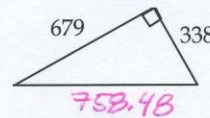
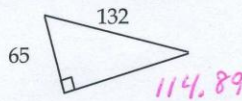


Show your work. It must be neat and organized with answers simplified and boxed in for full credit. For partial credit, show intermediate steps. Answers must include units. Use exact answers or two-decimal accuracy unless otherwise indicated. (5 pts ea, 100 pts total).

- 1) Simplify to a single number. (a) $\frac{1.2}{4.3(-1.3 + 1.8)} = 0.59$ (b) $\frac{1.4 + \frac{4.5}{3.6}}{6.8 - 4.5} = 0.53$
- (c) $10 - 5 | 4^2 - 3^3 | 3 - 8 = -163$ (d) $\frac{\sqrt{17} - 5}{2\pi} = -0.14$ (e) $\sqrt{\sqrt{\pi + 1} + 1} = 1.74$
- 2) Write as a decimal number: (a) $10^4 = 10,000$ (b) $10^{-3} = 0.001$
- (c) $1.64 \times 10^4 = 16,400$ (d) 3.2 Megawatts = 3.2×10^6 watts
- (e) Write using scientific notation: $3,540 = 3.54 \times 10^3$

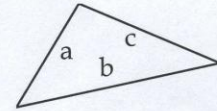
- 3) Find the missing side.



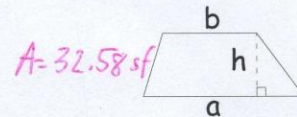
- 4) Find the area of the triangle using Heron's Formula. $a=10'$, $b=12'$, $c=8'$

$$s = \frac{a+b+c}{2}, A = \sqrt{s(s-a)(s-b)(s-c)} \quad A = 39.69 \text{ sf}$$

$\sqrt{1575}$



- 5) Find the area of this trapezoid in sq-ft. $a = 8' 7''$, $b = 6' 9''$, $h = 4' 3''$



- 6) (a) Round 0.4219 to whole 64^{ths}: (b) Round 0.6406 feet to the nearest 16th inch

$$27/64$$

$$7 \frac{11}{16} \text{ ''}$$

- (c) Simplify to the nearest 16th inch: $\frac{19' 10 \frac{7}{8} \text{ ''}}{4}$ 4 ft 11 $\frac{12}{16}$ in

- 7) Apply the rounding rules we discussed in class.

(a) Heather must mark out a 75' × 35' rectangle with the enclosed **area accurate to the nearest sq-ft**.

How accurately must she measure out the length and width? Fill-in zeros to show the accuracy.

$$A = 2625$$

$$75. \underline{00} \text{ ft} \times 35. \underline{00} \text{ ft}$$

(b) $52,368 + 10,611 + 10,000 \approx$

A) 72,979

B) 72980

C) 73,000

D) 73,000

E) 70,000

(c) $224.5 \times 1002 / 1500 \approx$

A) 149,966

B) 149.97

C) 150.0

D) 150

E) 150

8) Compute the area of this rectangle in sq-ft.

width = $9' 5 \frac{3}{4}"$, length = $7' 4 \frac{7}{8}"$

$$9.4792 \times 7.40625$$

$$A = 70.21 \text{ sf}$$

Direct Proportions

9) Using her new paint sprayer, Judy paints a 36' × 18' wall in 27 min. How long should it take her to spray a 75' × 14' rectangle?

$$1050$$

$$\frac{27}{648} = \frac{x}{1050}$$

$$A = 648$$

$$43.75 \text{ min}$$

Measurement Conversions- Convert to equivalent measurements. Show your work and **round accordingly**.

Use 5,280 ft = 1 mi 7.48 gal = 1 ft³ 2.54 cm = 1 in 1.61 km = 1 mi

10) 250 mph = ? ft/sec

$$\frac{250 \text{ mi}}{\text{hr}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}} \approx \underline{366.67 \text{ fps}}$$

11) $7' 4 \frac{3}{4}" = ? \text{ cm}$

$$88.75 \text{ in} \cdot \frac{2.54 \text{ cm}}{1 \text{ in}} \approx \underline{225.43 \text{ cm}}$$

12) 1.4 million cu-in = ? cu-yd

$$1.4 \times 10^6 \text{ in}^3 \cdot \frac{1 \text{ yd}^3}{36^3 \text{ in}^3} \approx \underline{30.01 \text{ yd}^3}$$

13) $75,000 \frac{\text{gal}}{\text{min}} = ? \frac{\text{cu-ft}}{\text{sec}}$ (Answer to nearest gal)

$$75000 \frac{\text{gal}}{\text{min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{1 \text{ cu-ft}}{7.48 \text{ gal}} = \underline{167.11 \text{ cfs}}$$

Applying Percents

- 14) An assembly line has a 12.7% defective rate.
(a) If 5000 are produced, how many will be usable?

$$[100\% - (12.7\%)] 5000 = \underline{4365}$$

- (b) If 5000 are required, how many must be produced?

$$\frac{5000}{1 - 12.7\%} \approx \underline{5728}$$

- 15) A 5 Hp rated pump specs out at 5.2 Hp at time of manufacture. A pump that is 3 yrs old is tested and found to produce 4.8 Hp.

- a) What is the absolute error in the Hp? -0.4 Hp

- b) What is the relative error in the Hp? -7.699%

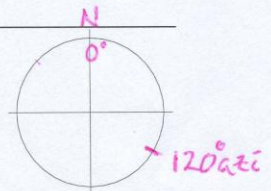
16) Standard Angle, Bearing and Azimuth

- (a) Mark 120° azi on the compass shown here.

Convert 120° azi to its (b) negative θ -angle -30° , (c) to its bearing $S60^\circ E$

Convert the bearing $N45^\circ W$ to its equivalent

- (d) positive θ -angle 135° (e) back bearing $S45^\circ E$



Solving Equations

- 17) Solve for H: $3(2H - 7) = 2H + 11$

$$6H - 21 = 2H + 11$$

$$4H = 32$$

$$\underline{H = 8} \checkmark$$

- 18) Solve for x: $\frac{1.7 + 2.4x}{2.5} = (3.6x + 1.8) 2.5$

$$1.7 + 2.4x = 9x + 4.5$$

$$-2.8 = 6.6x$$

$$\underline{x \approx -0.42} \checkmark$$

- 19) (a) Use the indicated points to find the slope of this line.

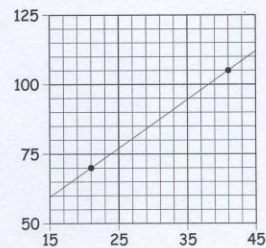
$(21, 70)$ $(41, 105)$ $m = 7/4$

- (b) Convert a slope of $5/13$ to its %grade.

38.469%

- (c) Convert a grade of 28% to its pitch.

$3,36/12$

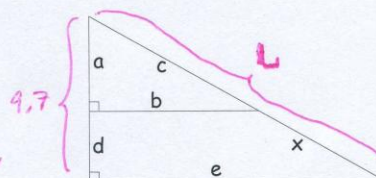


- 20) Find x .

$a = 5.7, b = 8.9, d = 4'$

$c = \sqrt{111.7} \approx 10.57$

$5.7/9.7 = c/(c+x)$ $L \approx 17.99$ $x = L - c = \underline{\underline{7.42'}}$



BONUS

Find the shaded area of this figure in sq-in.

$$\begin{aligned}
 A &= A_{\square} - A_{\triangle} - A_{\square} - A_{\odot} \\
 &= (12)(8) - \frac{1}{2}(4)(2) - (4)(2) - \frac{1}{2}\pi(4)^2 \\
 &= 58.87 \text{ in}^2
 \end{aligned}$$

