

Exam 1 – Part II: Chapters 1, 2, and 3

Math 97, Geometry, Section 3385

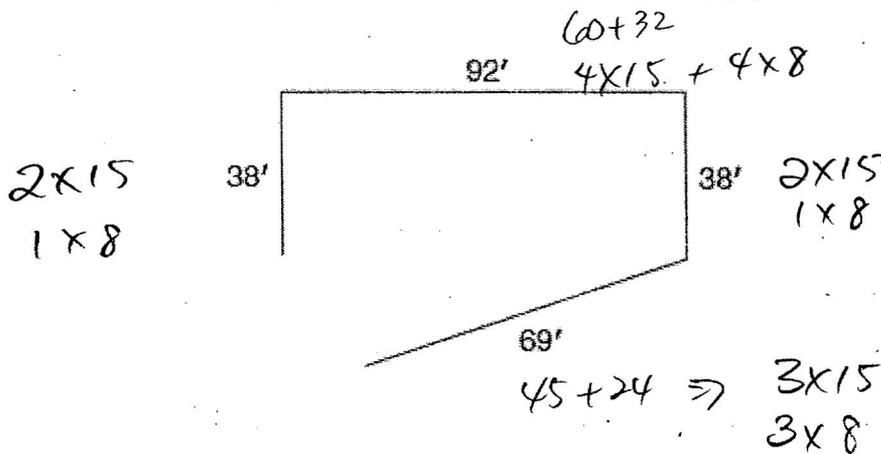
Fall 2009: Michael Orr

100 points total (30 pts Part I, 70 pts Part II)

Show all work to receive full credit. You may use a calculator. CHECK YOUR WORK!!!!

NAME ANSWER KEY

1. (10 pts) A water system must be installed in a field as shown below. If the pipe comes in both 8-foot and 15-foot lengths, and cannot be cut, how many pipes of each length will be required?



11 15-FOOT LENGTHS
9 8-FOOT LENGTHS

2. (3 pts) Use inductive reasoning to 6th, 7th, and 12th terms of the following sequence:

4, 7, 11, 16, 22, ...

$\begin{matrix} 8 & 9 & 10 & 11 & 12 \\ 46, & 56, & 67, & 79, & 92 \end{matrix}$

6th = 29

7th = 37

12th = 92

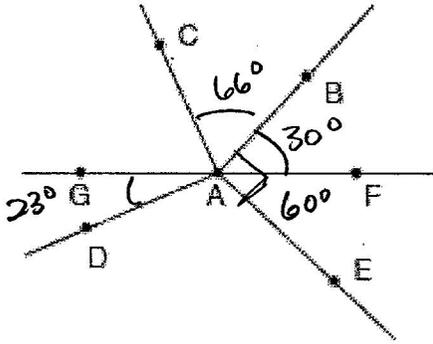
3. (3 pts each) Determine the missing numbers in each of the following Fibonacci-type sequences:

A. 1, 4, 5, 9, 14, 23, 37

B. 2, 4, 6, 10, 16, 26

C. 3, 7, 10, 17, 27

4. (8 pts) In the figure, $m\angle FAB = 30^\circ$, $m\angle CAB = 66^\circ$, $m\angle GAD = 23^\circ$, $\overline{BA} \perp \overline{EA}$, and G and F are collinear.



- (2) A. What type of angle is $\angle AFB$? *Acute*
- (2) B. Are $\angle FAC$ and $\angle BAG$ supplementary? *NO*
- (4) C. What is $m\angle DAE$? $180 - (60 + 23) = \boxed{97^\circ}$

5. (6 pts) Convert 29.11° to degrees and minutes.

$$0.11^\circ \times \frac{60 \text{ min}}{1^\circ} = 6.6'$$

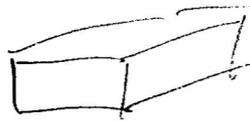
$$\boxed{29^\circ 6.6'}$$

6. (10 pts) Water is flowing along a stream at the rate of 1200 gallons per minute. What is the rate in liters per second? Round to the nearest hundredth. (Remember there are 4 quarts in a gallon and 1.057 quarts in a liter).

$$1200 \frac{\text{gal}}{\text{min}} \times \frac{4 \text{ QTS}}{\text{gal}} \times \frac{1.057 \text{ L}}{1.057 \text{ QTS}} \times \frac{1 \text{ min}}{60 \text{ sec}} = 75,685.9$$

$$= \boxed{75.69 \text{ L/sec}}$$

7. (8 pts) A large rectangular flower planter is 4 ft by 1.5 ft by 9 ft. Potting soil comes in $\frac{1}{2}$ cubic yard bags. How many bags of potting soil are needed to completely fill the planter? (3 ft = 1 yard)



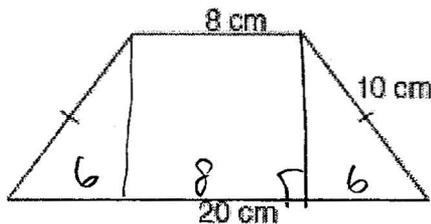
$$V = lwh = 4(1.5)(9) = 54 \text{ ft}^3$$

$$54 \text{ ft}^3 \times \left(\frac{1 \text{ YD}}{3 \text{ FT}}\right)^3 = \frac{54}{27} = 2 \text{ YD}^3$$

$$\# \text{ BAGS} = \frac{2 \text{ YD}^3}{\frac{1}{2} \text{ YD}^3} \times \frac{1 \text{ BAG}}{\frac{1}{2} \text{ YD}^3}$$

$$= \boxed{4 \text{ BAGS}}$$

8. (8 pts) Determine the area of the figure shown:



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

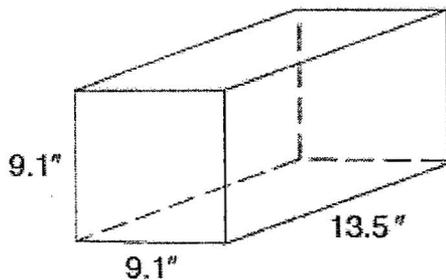
$$h^2 = 10^2 - 6^2 = 64$$

$$h = 8$$

$$A = \frac{1}{2} (8)(8 + 20) = 4(28)$$

$$= \boxed{112 \text{ cm}^2}$$

9. (8 pts) What is the surface area of the rectangular prism shown below?



$$2(9.1)(9.1) + 2(9.1)(13.5)$$

$$+ 2(9.1)(13.5)$$

$$= 2(9.1)^2 + 4(9.1)(13.5)$$

$$= 165.62 + 491.4$$

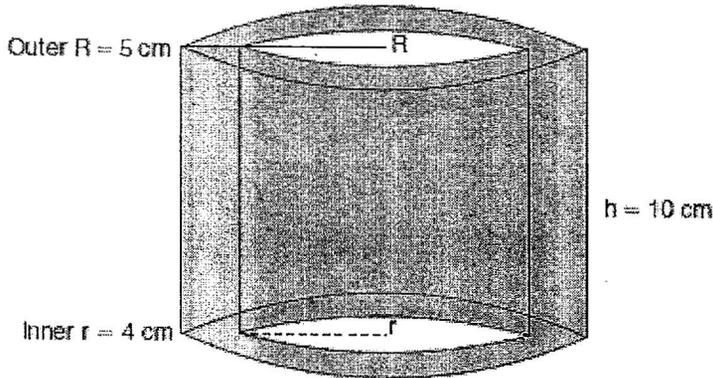
$$= \boxed{657.02 \text{ in}^2}$$



BONUS (total of 10 extra points each)



A cylindrical cooling sleeve for a beverage is filled with liquid for freezing. The sleeve is 1 cm thick; the inner radius of the sleeve is 4 cm, the outer radius of the sleeve is 5 cm, and the height of the sleeve is 10 cm. How much liquid is needed? Round to the nearest hundredth.



$$V_{\text{outer}} - V_{\text{inner}}$$

$$V = \pi r^2 h$$

$$V_{\text{outer}} = \pi (5)^2 (10) = 250\pi \text{ cm}^3$$

$$V_{\text{inner}} = \pi (4)^2 (10) = 160\pi \text{ cm}^3$$

$$V_{\text{sleeve}} = 250\pi - 160\pi \text{ cm}^3$$

$$= 90\pi \text{ cm}^3$$

$$= 282.60 \text{ cm}^3 \quad (\pi = 3.14)$$

$$= 282.74 \text{ cm}^3 \quad (\uparrow)$$