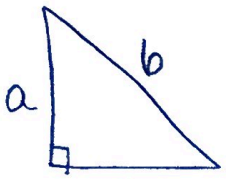
Math 206 - Test 4 Name Key

Chapter 13

Show all work to receive full credit. Partial credit may be given. This test is due in its D2L assignment folder on or before 11:59pm on Wednesday.

1. (6pts) Find the area of a right isosceles triangle whose hypotenuse measures 6 cm.



(+1)

$a^2 + a^2 = 6^2$ (+1)

$2a^2 = 36$ (+1)

$a^2 = 18$

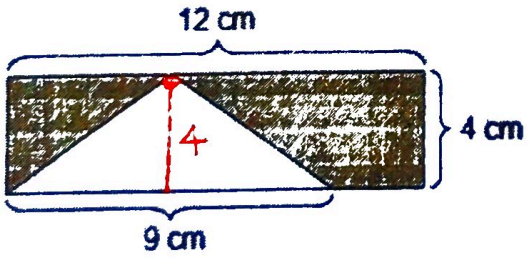
$a = \sqrt{18}$ (+1)

$A = \frac{1}{2} \cdot \sqrt{18} \cdot \sqrt{18}$ (+1)

$= \frac{1}{2}(18)$

$= \boxed{9\ cm^2}$ (+1)

2. (3pts) Find the area of the shaded region.



(+1)

Area entire rectangle: $(12)(4) = 48\ cm^2$

Area white (unshaded) triangle: $\frac{1}{2}(9)(4) = 18\ cm^2$ (+1)

Area shaded region: $48 - 18 = \boxed{30\ cm^2}$ (+1)

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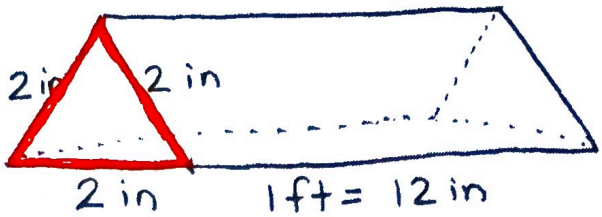
3. (8pts) A Toblerone candy bar has the shape of a triangular prism. The base of the prism is an equilateral triangle with side length 2 in and the candy bar is 1 ft long.

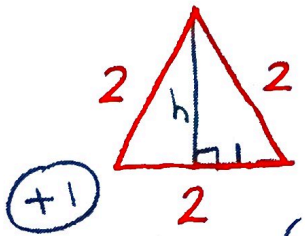
(a) Find the surface area in square inches.



$SA = 2A + Ph$

(+2) $= 2\left(\frac{1}{2}(2)\sqrt{3}\right) + 6(12)$

(+1) $= \boxed{75.5\ in^2}$



(+1) $h^2 + 1^2 = 2^2$ (+1)

$h^2 = 3$

$h = \sqrt{3}$ (+1)

(height of the triangular base)

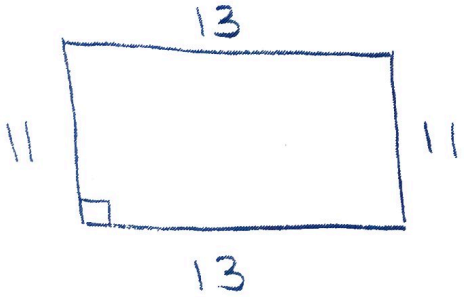
(b) Find the volume in cubic inches.

$V = Ah$

$V = \left(\frac{1}{2} \cdot 2 \cdot \sqrt{3}\right)(12) = \boxed{20.8\ in^3}$

(+1) (+1)

4. (3pts) A room is 11 ft by 13 ft. You want to hang a border around the top of the walls. If a roll of border comes in a 5 yd length, how many rolls do you need? (Note: You can't buy a fraction of a roll.)



$P = 11 + 13 + 11 + 13 = 48\ ft$ (+1)

$48\ \cancel{ft}\left(\frac{1\ yd}{3\ \cancel{ft}}\right) = 16\ yd$ (+1)

$16\ yd \div 5\ yd = 3.2$ rolls

So, 4 rolls are needed. (+1)

5. (4pts) If the volume of a liquid in a sphere with radius 5 cm is transferred to a cylinder with the same radius in its base, to what height would the cylinder be filled?

Volume Sphere: $\frac{4}{3}\pi r^3$ where $r = 5$

$\frac{4}{3}\pi(5)^3 = 523.6\ cm^3$ (+1)

Volume Cylinder: $\pi r^2 h$ where $r = 5$

$\pi(5)^2 h = 523.6$ ← solve for h (+2)

$25\pi h = 523.6$

$h = \frac{523.6}{25\pi} \approx \boxed{6.7\ cm}$ (+1)

6. (9pts) Circle the most realistic measure for each item:

(a) The volume of a medium sized mouthwash bottle: (33 oz,) 33 mL, 33 g

(b) The length of a living room rug: 8 yd, (8 ft,) 8 dm

(c) The surface area of a coffee table: (8 ft^2,) 8 m^2, 8 in^2

(d) The mass of a tube of toothpaste: 180 oz, 180 mg, (180 g)

(e) The diameter of a nickel: 1 dm, 0.5 cm, (0.02 m)

(f) The volume of a gallon of milk: (3.78 L,) 1 L, 9.73 L

(g) The height of a chair back (from the floor): 30 cm, 2 yd, (1000 mm)

(h) The mass of a baseball: 5 lb, (5.25 oz,) 5 kg

(i) The area of the grassy part of Soldier Field: 4 km^2, (1.3 acres,) 100 yd^2

1pt each

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7. (10pts) Convert.

(a) $18.73\,\text{mm}^2 =$ _____ dm^2

$18.73 \div 10^4 = \boxed{0.001873\,\text{dm}^2}$

dm
÷10 ↗ cm
÷10 ↗ mm

double the # of ÷10s bc area

2pts each

(b) $100\,\text{yd} =$ _____ mi

$100\,\text{yd}\left(\frac{1\,\text{mi}}{1760\,\text{yd}}\right) = \boxed{0.0568\,\text{mi}}$

(c) $0.02\,\text{mi}^2 =$ _____ ft^2

$0.02\,\text{mi}^2\left(\frac{5280^2\,\text{ft}^2}{1^2\,\text{mi}^2}\right) = \boxed{557,568\,\text{ft}^2}$

(d) $718\,\text{in}^3 =$ _____ yd^3

$718\,\text{in}^3\left(\frac{1^3\,\text{yd}^3}{36^3\,\text{in}^3}\right) = \boxed{0.0154\,\text{yd}^3}$

(e) $0.62\,\text{hm} =$ _____ cm

$0.62 \times 10^4 = \boxed{6,200\,\text{cm}}$

hm ×10→ dam ×10→ m ×10→ dm ×10→ cm

8. (1pt) Which formula would be the best to find the area of a rhombus? (Choose only one.)

(a) The formula for the area of a square.

(b) The formula for the area of a rectangle.

(c) The formula for the area of a parallelogram. ← bc every rhombus is a parallelogram

(d) The formula for the area of a trapezoid. ← This would also work, but the parallelogram formula is better.

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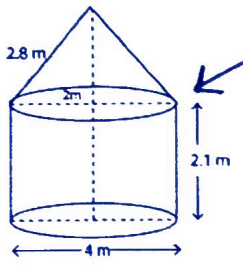
9. (6pts) Find the surface area of the following figure.



Since the bottom of the cone and the top of the cylinder are covered, they are NOT part of the surface area of this figure. (They are crossed off here.) (+1)

S.A. cone = ~~πr^2~~ + $\pi r l$

S.A. cylinder = ~~2~~ $\pi r^2 + 2\pi r h$

S.A. Cone (+2)

$\pi r l$

$= \pi (2)(2.8)$

$= 5.6\pi$

$\approx 17.59 m^2$

S.A. Cylinder (+2)

$\pi r^2 + 2\pi r h$

$= \pi (2)^2 + 2\pi (2)(2.1)$

$= 12.4\pi$

$\approx 38.96 m^2$

Total surface area

$17.59 + 38.96 = \boxed{56.55 m^2}$ (+1)

or

$5.6\pi + 12.4\pi = \boxed{18\pi m^2}$

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