WEEK 6:

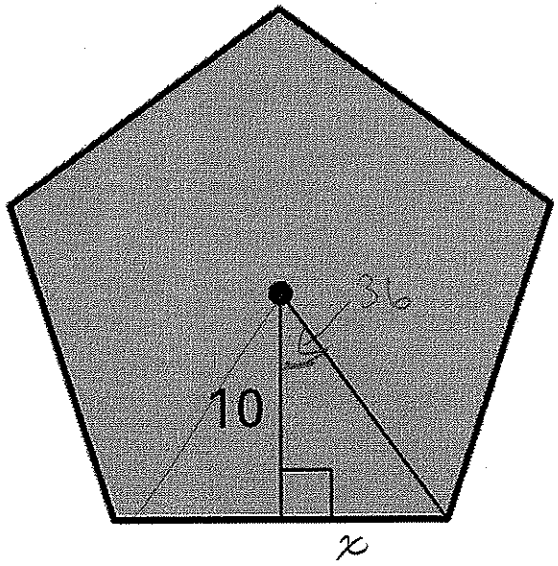
AREA OF POLYGONS
SURFACE AREA
VOLUME

Light and Easy 11

9	1	7	8	2	3	5	4	6
8	5	2	6	1	4	7	9	3
4	3	6	7	5	9	8	1	2
6	8	5	2	4	1	9	3	7
2	4	9	3	7	8	6	5	1
1	7	3	5	9	6	2	8	4
5	9	4	1	6	7	3	2	8
7	2	8	4	3	5	1	6	9
3	6	1	9	8	2	4	7	5

1 2 3
4 5 6
7 8 9

Find the perimeter and area of the regular polygon.



① $\frac{360}{n}$ $\frac{360}{5} = 72$

② $\tan 36 = \frac{x}{10}$

$x = 10 \tan 36$

$= 7.265$

Side $= 2x$

14.53

③ $P = 5(14.53) = 72.65$

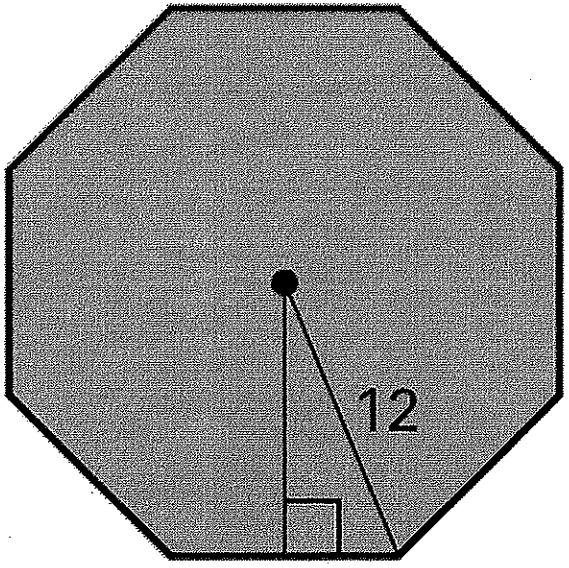
④ $A = \frac{1}{2}aP$ or $= \frac{1}{2}a(ns)$

$= \frac{1}{2}(10)(72.65)$

$= 363.25$

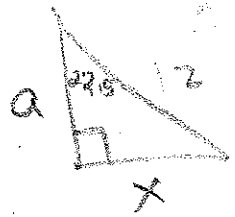
Find the perimeter and area of the regular polygon.

Note: This is the one I wanted as a hexagon accidently



① central $\measuredangle$

$\frac{360}{8} = 45$



② apothem

$\cos 22.5 = \frac{a}{12}$

$a = 12\cos 22.5$

$a = 11.086 \approx 11.1$

③ Find side length ($2x$)

$\sin 22.5 = \frac{x}{12}$

$x = 12\sin 22.5$

$x \approx 4.59$

side length ($2x$)

$2(4.59) = 9.18$

④ Perimeter = (# sides)(side length)

$P = n(s)$

$= 8(9.18)$

$= 73.44$

⑤ Area

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

$= \frac{1}{2}(11.1)(73.44) \approx 407.592\ u^2$

Geometric Probability

Probability: a number between 0 and 1 that represents a chance that an event will occur.

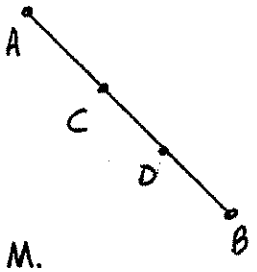
Ex. 1 die: Find the probability of rolling a 5. => 1/6 ≈ 17%

Geometric Probability: same idea, deals with length or area

Probability and Length:

- Find the probability that a point K lies on $\overline{CD}$.

$$\frac{\text{Length of } \overline{CD}}{\text{Length of } \overline{AB}}$$



Probability and Area:

- Find the probability that point K lies in region M.

$$\frac{\text{Area of M}}{\text{Area of J}}$$

Examples:

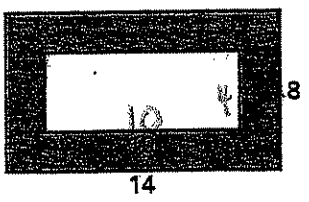
1. Find the probability that point K is on $\overline{CF}$.

$\frac{CF}{AF}$

$\frac{10}{15} = \frac{2}{3} \approx 66.7\%$

2. Find the probability that point K lies in the shaded region.

W = whole
US = unshaded
S = shaded



$A_W = 14(8) = 112$

$A_{US} = 10(4) = 40$

$A_S = A_W - A_{US} = 72$

$P = \frac{72}{112} = \frac{9}{14} \approx 64.3\%$

LESSON 11.6

NAME _____ DATE _____

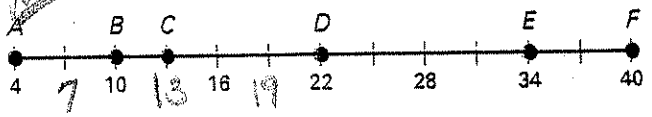
Practice B

For use with pages 699–705

careful starts at 4 not 0

Find the probability that a point K, selected randomly on $\overline{AF}$, is on the given segment.

1. $\overline{AB}$
2. $\overline{CD}$
3. $\overline{BD}$
4. $\overline{CF}$



(1) $\frac{6}{36} = \frac{1}{6} \approx 16.7\%$

(2) $\frac{9}{36} = \frac{1}{4} = 25\%$

(3) $\frac{12}{36} = \frac{1}{3} \approx 33.3\%$

(4) $\frac{27}{36} = \frac{3}{4} = 75\%$

Find the probability that a point X, selected randomly on $\overline{LQ}$, is on the given segment.

5. $\overline{LM}$
6. $\overline{NP}$
7. $\overline{OQ}$
8. $\overline{MQ}$

(5) $\frac{2}{24} = \frac{1}{12} \approx 8.3\%$

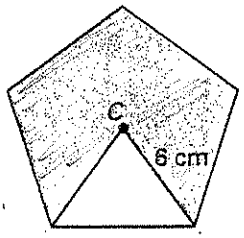
(6) $\frac{12}{24} = \frac{1}{2} = 50\%$

(7) $\frac{12}{24} = \frac{1}{2} = 50\%$

(8) $\frac{22}{24} = \frac{11}{12} \approx 91.7\%$

Find the probability that a randomly chosen point in the figure lies in the shaded region.

9.

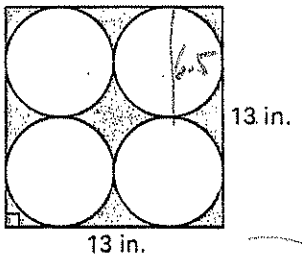


careful!!

$4/5 = 80\%$

no work needed

10.



$A_{SQ} = 13^2 = 169$

$A_{IC} = \pi r^2$

$= \pi(3.25)^2$

$= 10.5625\pi$

$A_{US} = 4$ circles

$4(10.5625\pi)$

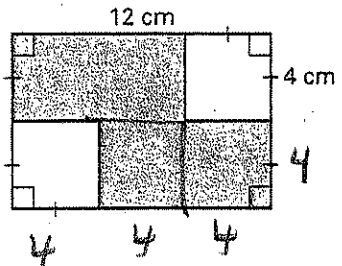
42.25π

$A_S = A_{SQ} - A_{US}$

$169 - 42.25\pi$

$P(E) = \frac{169 - 42.25\pi}{169} \approx 21.46\%$

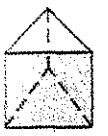
11.



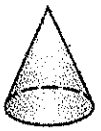
4/6 shaded

$2/3 \approx 66.7\%$

Geometry: Surface area and Volume Formulas


Prism


Pyramid


Cone


Cylinder


Sphere

use the π key on calc.

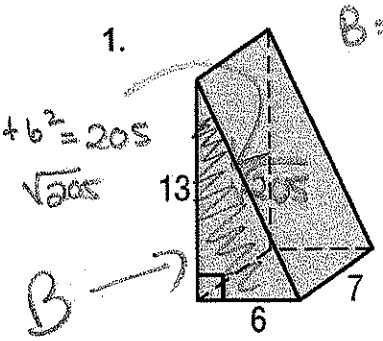
Surface Area and Volume of Geometric Solids

Geometric Solid	Surface Area	Volume
Prism	$S = 2B + Ph$	$V = Bh$
Cylinder	$S=2\pi r^2 + 2\pi rh$	$V=\pi r^2 h$
Sphere	$S = 4\pi r^2$	$V=\frac{4}{3}\pi r^3$
Pyramid	$S = B + \frac{1}{2}Pl$	$V=\frac{1}{3}Bh$
Cone	$S = \pi r^2 + \pi rl$	$V=\frac{1}{3}\pi r^2 h$

P-perimeter of the base B-area of the base
l-slant height

Find the surface area and volume of each of the following figures. Round your answer to the nearest tenth, if necessary.

1.



$13^2+6^2=205$

$\sqrt{205}$

B →

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

$=\frac{1}{2}(13)(6)$

$=39u$

$P=19+\sqrt{205}$

$S=2B+Ph$

$=2(39)+(19+\sqrt{205})(7)$

$=78+133+7\sqrt{205}$

$=211+7\sqrt{205}$

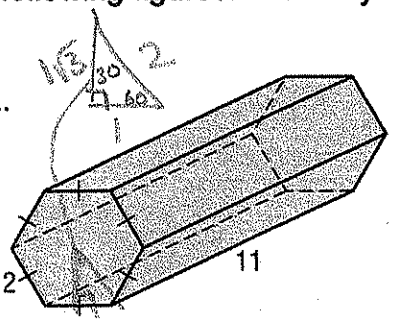
$\approx 311.2u^2$

$V=Bh$

$=39(7)$

$=273u^3$

2.



$P=2(6)=12$

$B=\frac{1}{2}aP$

$=\frac{1}{2}(\sqrt{3})(12)$

$=6\sqrt{3}$

$S=2B+Ph$

$=2(6\sqrt{3})+12(11)$

$=12\sqrt{3}+132$

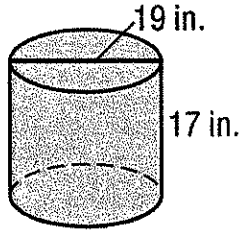
$\approx 152.8u^2$

$V=Bh$

$=(6\sqrt{3})(11)$

$=66\sqrt{3}$

$=114.3u^3$

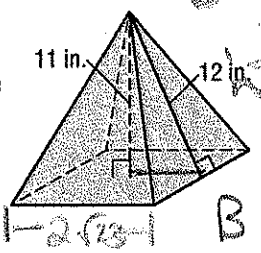
3. 

$r = 9.5$

$S = 2\pi r^2 + 2\pi rh$
$= 2\pi(9.5)^2 + 2\pi(9.5)(17)$
$= 180.5\pi + 323\pi$
$= 503.5\pi$
$\approx 1581.8 \text{ in}^2$

$V = \pi r^2 h$
$= \pi(9.5)^2(17)$
$= 1534.25\pi$
$\approx 4820.0 \text{ in}^3$

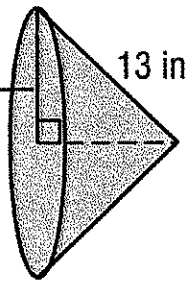
4. Assume Base is regular



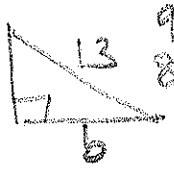
$B = (2\sqrt{23})^2 = 4(23) = 92 \text{ in}^2$

$S = B + \frac{1}{2}Pl$
$= 92 + \frac{1}{2}(8\sqrt{23})(12)$
$= 92 + 48\sqrt{23}$
$\approx 322.2 \text{ in}^2$

$V = \frac{1}{3}Bh$
$= \frac{1}{3}(92)(11)$
$= \frac{1012}{3}$
$\approx 337.3 \text{ in}^3$

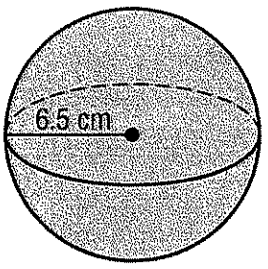
5. 

$S = \pi r^2 + \pi rl$
$= \pi(9)^2 + \pi(9)(13)$
$= 81\pi + 117\pi$
$= 198\pi$
$\approx 622.0 \text{ in}^2$



$9^2 + b^2 = 13^2$
$81 + b^2 = 169$
$b^2 = 88$
$b = \sqrt{88} = 2\sqrt{11}$

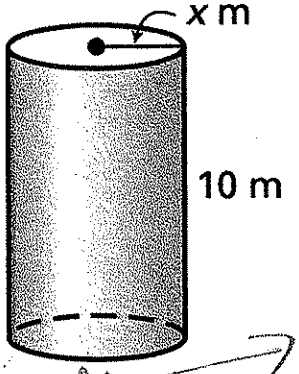
$V = \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}\pi(9)^2(2\sqrt{11})$
$= 54\sqrt{11}\pi$
$\approx 562.7 \text{ in}^3$

6. 

$S = 4\pi r^2$
$= 4\pi(6.5)^2$
$= 169\pi$
$\approx 530.9 \text{ cm}^2$

$V = \frac{4}{3}\pi r^3$
$= \frac{4}{3}\pi(6.5)^3$
$= 366\frac{1}{6}\pi$
$\approx 1150.3 \text{ cm}^3$

Use the measurement given to find the value of x.

7. 

$V = 283 \text{ m}^3$

$V = \pi r^2 h$
$283 = \pi(x)^2(10)$
$283 = 10\pi x^2$
$\frac{283}{10\pi} = x^2$
$\sqrt{\frac{283}{10\pi}} = x$

Use Power Calc

$x \approx 3.001$
$x \approx 3$