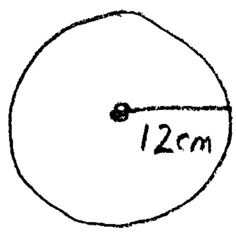
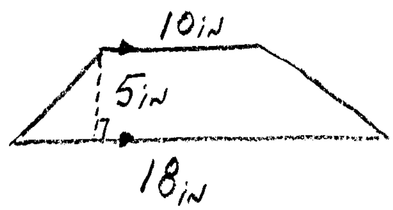
BE - Precalc | Tuesday 2-9-10

(1.) Find the area (exact):

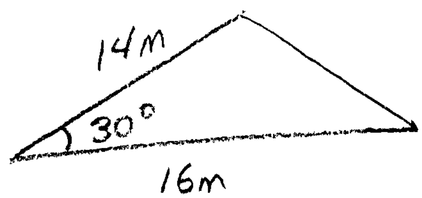
(A)



(B)



(C)



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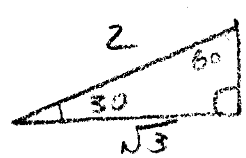
(1) $A_{\odot} = \pi r^2 = \pi 12^2 = \boxed{144\pi \text{ cm}^2}$

(2) $A = \frac{1}{2}(10+18)(5) = \boxed{70 \text{ in}^2}$

(3) $A_{\Delta} = \frac{1}{2}(14)(16)\sin 30^\circ$

$= \frac{1}{2}(14)(16)\frac{1}{2} = \boxed{56 \text{ m}^2}$



$\sin 30^\circ = \frac{1}{2}$

Homework Review Pg. 804 # 7, 8

(7) $(5-y)^3$ $\qquad N=3$

$$(X+Y^N) = X^N + NX^{N-1}Y + \frac{N(N-1)}{2\cdot 1}X^{N-2}Y^2 + Y^N$$

$$= 5^3 + 3\cdot 5^2(-Y)^1 + \frac{3(2)}{2}\cdot 5^1 Y^2 + (-Y)^3$$

$$\boxed{125 - 75Y + 15Y^2 - Y^3}$$

8. $(3p-2q)^4$

$$\underset{X}{3p} \quad \underset{Y}{2q} = X^N + NX^{N-1}Y + \frac{N(N-1)}{2\cdot 1}\cdot X^{N-2}Y^2 \dots Y^N$$

$$\therefore (3p)^4 + 4\cdot(3p)^3(-2q)^1 + \frac{4(3)}{2}\cdot(3p)^2(-2q)^2$$

$$+ \frac{4(3)(2)}{3\cdot 2}\cdot(3p)^1(-2q)^3$$

$$+ \frac{4\cdot3\cdot2\cdot1}{4\cdot3\cdot2\cdot1}\cdot(3p)^0(-2q)^4$$

$$81p^4 - 108p^3\cdot 2q + 54p^2\cdot 4q^2 - 12p\cdot 8q^3 + 1\cdot 16q^4$$

$$81p^4 - 216p^3q + 216p^2q^2 - 96pq^3 + 16q^4$$

Sigma Notation (see Ch. 12-5 for more ex.)

$$\sum_{N=1}^{4} (N^2-3)$$

$$= \left[(1)^2-3\right] + \left[(2)^2-3\right] + \left[(3)^2-3\right] + \left[(4)^2-3\right]$$

$$= -2 + 1 + 6 + 13$$

$$= \boxed{18}$$

Read: the sum of N^2-3 as N goes from 1 to 4

$$\sum_{\text{STARTING INDEX}}^{\text{ENDING INDEX}}$$

If you only want one particular term, say the 4th term of $(2x-y)^6$,

use: $\boxed{(x+y)^N = \sum_{r=0}^{N} \frac{N!}{r!(N-r)!} x^{N-r} y^r}$

Pg 803

Another Form of the Binomial Theorem

Sigma or "Sum" notation

(Ex) $\sum_{N=3}^{5} N = 3+4+5 = 12$

Starting "index"

Ex) 4th term of $(2x-y)^6$ Let $r=3$

$N=6$, $r=\underline{\underline{3}}$ since terms $\Rightarrow$ 0, 1, 2, 3...

$$(x+y)^6 = \sum_{r=0}^{6} \frac{6!}{3!(6-r)} (2x)^{6-r}(-y)^r$$

$$\therefore r=3 \Rightarrow \frac{6!}{3!(3!)} (2x)^3(-y)^3$$

$$= \frac{\cancel{6}\cdot 5\cdot 4}{\cancel{3}\cdot\cancel{2}\cdot 1} \cdot 2^3x^3 \cdot -1y^3$$

$$= -20 \cdot 8x^3y^3$$

$$= \boxed{-160x^3y^3} \checkmark$$

8x4 Pg 803 Find the fifth term of $(4a+3b)^7$

$N=7 \quad r=4$

$$(4a+3b)^7 \Longrightarrow \frac{7!}{4!(3)!}(4a)^{7-4}(3b)^4$$

FIFTH TERM

$$\frac{7\cdot\cancel{6}\cdot5}{\cancel{3\cdot2\cdot1}}\cdot 4^3a^3\cdot 3^4b^4$$

$$35\cdot 64a^3\cdot 81b^4$$

$$(35\cdot64\cdot81)a^3b^4$$

$$\boxed{181,440a^3b^4} = 5^{th} \text{ term of } (4a+3b)^7$$

Homework: Pg 804 # 9, 10, 22.