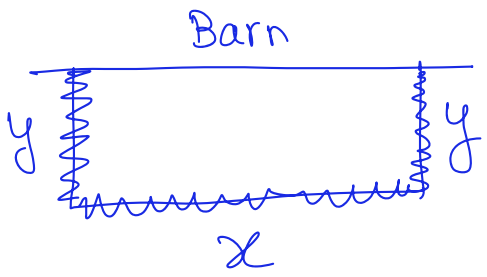
MLM HW 8.8



$86 = y + x + y = x + 2y$

$\Rightarrow x + 2y = 86$

Maximize the area.

$x + 2y = 86$

$x = 86 - 2y$

$A = xy \Rightarrow A = (86 - 2y)y$

$\Rightarrow A(y) = -2y^2 + 86y$

$a = -2,\ b = 86$

$y = \frac{-b}{2a} = \frac{-86}{2(-2)} = \frac{-86}{-4} = \frac{43}{2}$

$y = \frac{43}{2} \Rightarrow x + 2\left(\frac{43}{2}\right) = 86 \Rightarrow x + 43 = 86 \Rightarrow x = 86 - 43 = 43$

Dimensions that maximize the area are :-

$x = 43$ ft and $y = \frac{43}{2} = 21.5$ ft.

Composite Functions

$f(x) = 3x$, $g(x) = x^3$

$(f \circ g)(a) = f(g(a)) = f(a^3)$

$= 3a^3$

$\boxed{(f \circ g)(x) = 3x^3}$

$g(2) = 2^3$

$f(1) = 3 \times 1 = 3$

$f(2) = 3 \times 2 = 6$

$f(a) = 3a$

$f(a^3) = 3a^3$

Logic

① Check if the argument is valid or not?

$p \vee q$
$p \wedge q$

$p \to q$

Premises / Conclusion

$((p \vee q) \wedge (p \wedge q)) \to (p \to q)$

p	q	$p \vee q$	$p \wedge q$	$(p \vee q) \wedge (p \wedge q)$	$p \to q$	$((p \vee q) \wedge (p \wedge q)) \to (p \to q)$
T	T	T	T	T	T	T
T	F	T	F	F	F	T
F	T	T	F	F	T	T
F	F	F	F	F	T	T

Valid

② If he drives fast, he will crash.
He drive fast.

He will crash.

p: He drives fast q: He will crash.

$p \to q$
p
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q

$((p \to q) \wedge p) \to q$

P	q	$P \to q$	$(P \to q) \wedge P$	$((P \to q) \wedge P) \to q$
T	T	T	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	T

VALID

(3) State the contrapositive, converse and inverse of the following statement:

I will help you (q) if you will help me. (P)

Given $P \to q$, its

Contrapositive is $\neg q \to \neg P$

Converse is $q \to P$

inverse is $\neg P \to \neg q$.

Contrapositive: You will not help me if I will not help you.

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If I will not help you then you will not help me

Converse: You will help me if I will help you

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If I will help you then you will help me.

Inverse: I will not help you if you will not help me.

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If you will not help me, then I will not help you.