$$\frac{27x+2}{(2-x)(1+3x)} \equiv \frac{P}{2-x} + \frac{Q}{1+3x}.$$

(1)

a) Find the value of each of the constants P and Q.

b) Hence show that if x is sufficiently small

$$\frac{27x+2}{(2-x)(1+3x)} \approx a + bx + cx^2 + dx^3$$

$$f(x) = \frac{8x}{\sqrt{4-x}}.$$

(2)

Show that if x is small, then

$$f(x) \approx p + qx + rx^2 + sx^3$$

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(3)

When θ is small, find the approximate value of $\cos^4\theta - \sin^4\theta$.

write in the form $j + k\theta + l\theta^2$

$$\tan\theta(1+\sec 2\theta) \equiv m\tan 2\theta$$

(4)

a) Prove the validity of the above trigonometric identity. state m

b) Hence, or otherwise, solve for $0 \le \theta < 180°$

$$\tan\theta(1+\sec 2\theta) = 4\tan\theta.$$

Prove

(5)

$$\frac{1}{\sec x - \tan x} - \frac{1}{\sec x + \tan x} \equiv n\tan x$$

state n

M = 11
E = 0
A = 54.7
E = 6
R = −26
F = 3/32
S = 1
B = 0
Y = 144.7
C = −1
S = 3
A = 8
N = −2
G = 35.3
O = −35.3
H = −3
C = 0
U = 1
O = 2
W = 1
I = 4
N = −11
C = 4
D = 163/2
N = 235.3
T = 163

P = 1/2