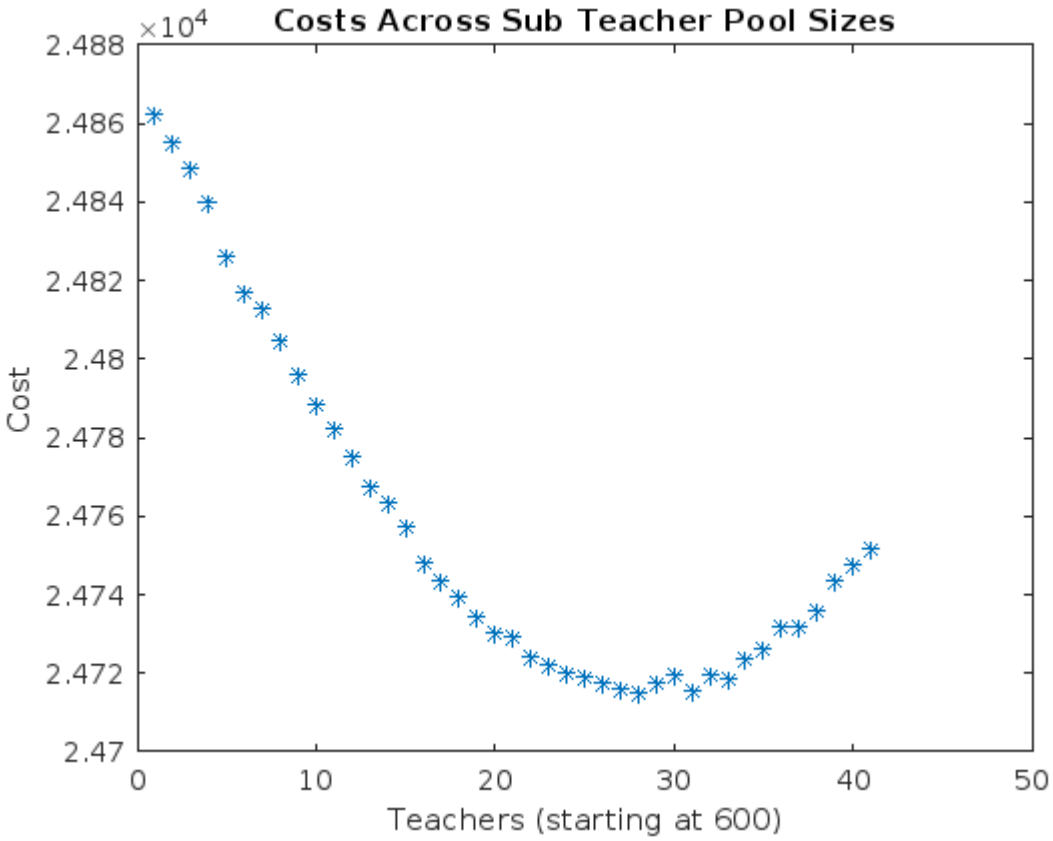
```
rng(0)

h = 75; %interval width
a = 201:h:876; %left and right endpoints
b = 275:h:950;

%relative and cumulative pts. for Tuesday data
rp = [2.5 2.5 5.0 7.5 12.5 17.5 42.5 5.0 2.5 2.5]/100;
cp = [2.5 5.0 10.0 17.5 30.0 47.5 90.0 95.0 97.5 100.0]/100;
n = length(cp); %number of intervals

%determining linear spline and inverse

%slopes
m(1) = cp(1)/(h/2); %first and last intervals w/ irregular length
m(n) = (cp(n)-cp(n-1))/(1.5*h);
for k = 2:n-1
    m(k) = (cp(k)-cp(k-1))/h;
end

N = 10000000; %number of simulations

cost = [];
p = 36;
r = 81; %rates for subs and regular teachers

Sk = 1; %index for cost array
for S = 600:1:640
    C = 0; %cost at each S
    for k = 1:N %simulating demand
        rd = rand; %value plugged into inverse splice

        if rd < cp(1)
            x0 = (a(1)+b(1))/2;
            y0 = cp(1);
            x = x0 + (rd-y0)/m(1);
        elseif rd < cp(2)
            x0 = (a(2)+b(2))/2;
            y0 = cp(2);
            x = x0 + (rd-y0)/m(2);
        elseif rd < cp(3)
            x0 = (a(3)+b(3))/2;
            y0 = cp(3);
            x = x0 + (rd-y0)/m(3);
        elseif rd < cp(4)
            x0 = (a(4)+b(4))/2;
            y0 = cp(4);
            x = x0 + (rd-y0)/m(4);
        elseif rd < cp(5)
            x0 = (a(5)+b(5))/2;
            y0 = cp(5);
            x = x0 + (rd-y0)/m(5);
```

```
        elseif rd < cp(6)
            x0 = (a(6)+b(6))/2;
            y0 = cp(6);
            x = x0 + (rd-y0)/m(6);
        elseif rd < cp(7)
            x0 = (a(7)+b(7))/2;
            y0 = cp(7);
            x = x0 + (rd-y0)/m(7);
        elseif rd < cp(8)
            x0 = (a(8)+b(8))/2;
            y0 = cp(8);
            x = x0 + (rd-y0)/m(8);
        elseif rd < cp(9)
            x0 = (a(9)+b(9))/2;
            y0 = cp(9);
            x = x0 + (rd-y0)/m(9);
        else
            x0 = b(10);
            y0 = cp(10);
            x = x0 + (rd-y0)/m(10);
        end

        if x < S %finding the cost given sub pool and demand
            Cxs = p * S;
        else
            Cxs = p * S + r * (x-S);
        end

        C = C + Cxs; %cumulative cost for pool size
    end %for k, trials at a certain pool size

    cost(Sk) = C/N; %average cost
    Sk = Sk + 1;
end

plot(cost, '*')
title('Costs Across Sub Teacher Pool Sizes')
xlabel('Teachers (starting at 600)')
ylabel('Cost')

%{
In the end, x = 27, 28, 29 (627, 628, 629) teachers had
the lowest expected cost at $24,716.7,
but the difference between
these values and their immediate surroundings was negligible.
%}
```



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