

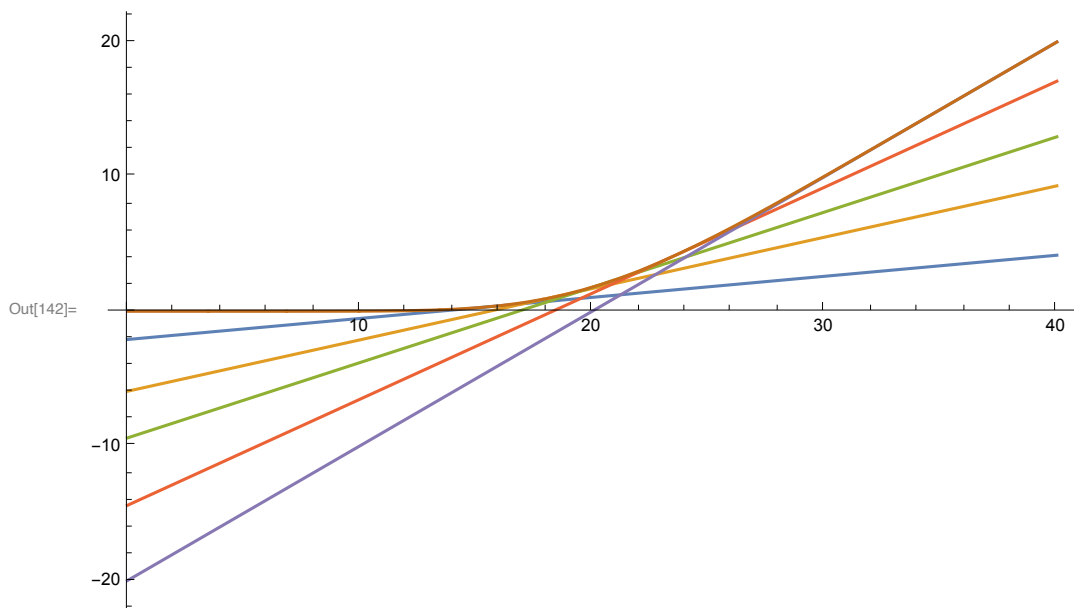
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In[139]:= λ = 20;
demand = PoissonDistribution[λ];

L[x_, d_] := Sum[Max[x - k, 0] PDF[d, k], {k, 0, x}]

Plot[{
  pAcc[[1]] x - Sum[(p[[i]] × exp[[i]]), {i, 1, 1}],
  pAcc[[2]] x - Sum[(p[[i]] × exp[[i]]), {i, 1, 2}],
  pAcc[[3]] x - Sum[(p[[i]] × exp[[i]]), {i, 1, 3}],
  pAcc[[4]] x - Sum[(p[[i]] × exp[[i]]), {i, 1, 4}],
  pAcc[[5]] x - Sum[(p[[i]] × exp[[i]]), {i, 1, 5}],
  L[x, demand]}, {x, 0, 40}]

```



```

In[132]:= P = 5;
p = Array[1 / P &, P]
pAcc = Accumulate[p]
b = {0,
  InverseCDF[demand, pAcc[[1]]],
  InverseCDF[demand, pAcc[[2]]],
  InverseCDF[demand, pAcc[[3]]],
  InverseCDF[demand, pAcc[[4]]],
  InverseCDF[demand, pAcc[[5]]]
}

p = Array[N[ $\sum_{k=b[[\#]]}^{b[[\#+1]]-1} \text{PDF}[\text{demand}, k]$ ] &, P]

pAcc = Accumulate[p]

exp = Array[N[ $\sum_{k=b[[\#]]}^{b[[\#+1]]-1} k \text{PDF}[\text{demand}, k]$ ] / p[[\#]] &, P]

Out[133]=  $\left\{\frac{1}{5}, \frac{1}{5}, \frac{1}{5}, \frac{1}{5}, \frac{1}{5}\right\}$ 

Out[134]=  $\left\{\frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}, 1\right\}$ 

Out[135]= {0, 16, 19, 21, 24,  $\infty$ }

Out[136]= {0.156513, 0.224909, 0.177671, 0.2284, 0.212507}

Out[137]= {0.156513, 0.381422, 0.559093, 0.787493, 1.}

Out[138]= {13.4001, 17.0882, 19.5, 21.9224, 26.2945}

```

```

In[634]:= P = 5;
p = Array[1 / P &, P]
pAcc = Accumulate[p]

λ = 20;
demand = PoissonDistribution[λ];

samples = RandomInteger[demand, 100 000];
sortedSamples = Sort[samples];
exp = Array[0 &, P];
conditionalExpectationIndex = 1;
probabilityMass = 0;
For[i = 1, i ≤ Length[sortedSamples], i++,
  If[probabilityMass < 1 && probabilityMass < p[[conditionalExpectationIndex]],
    exp[[conditionalExpectationIndex]] +=
      sortedSamples[[i]] / Length[sortedSamples];
    probabilityMass += 1 / Length[sortedSamples];
  ,
    exp[[conditionalExpectationIndex]] /= p[[conditionalExpectationIndex]];
    probabilityMass = 0;
    conditionalExpectationIndex++;
  ]
]
exp[[conditionalExpectationIndex]] /= p[[conditionalExpectationIndex]];
N[exp]

```

```

Plot[{
  pAcc[[1]] x -  $\sum_{i=1}^1 (p[[i]] \times \text{exp}[[i]]),$ 
  pAcc[[2]] x -  $\sum_{i=1}^2 (p[[i]] \times \text{exp}[[i]]),$ 
  pAcc[[3]] x -  $\sum_{i=1}^3 (p[[i]] \times \text{exp}[[i]]),$ 
  pAcc[[4]] x -  $\sum_{i=1}^4 (p[[i]] \times \text{exp}[[i]]),$ 
  pAcc[[5]] x -  $\sum_{i=1}^5 (p[[i]] \times \text{exp}[[i]]),$ 
  L[x, demand] }, {x, 0, 40}]

```

Out[635]= $\left\{ \frac{1}{5}, \frac{1}{5}, \frac{1}{5}, \frac{1}{5}, \frac{1}{5} \right\}$

Out[636]= $\left\{ \frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}, 1 \right\}$

Out[646]= {13.9732, 17.504, 19.8417, 22.2357, 26.4548}

