Selected Solutions:

1. 
   Bucket fill factor *(Table Average)* = 0.95
   Bucket load = \((0.9 \times 0.95)\) = 0.855 LCY
   Production = \(\frac{(0.855 \times 50 \times 60)}{35}\) = 73.3 LCY/hr
   Time required = \(\frac{400}{73.3}\) = 5.5 hr

3. 
   Standard cycles/hr *(Table)* = 170
   Swing factor *(Table)* = 0.94
   Bucket capacity = 3.0 BCY
   Bucket fill factor *(Table Average)* = 0.80
   Job efficiency *(Table)* = 0.78
   Production = \(170 \times 0.94 \times 3.0 \times 0.80 \times 0.78\) = 299 BCY/hr

4. 
   Bucket fill factor *(Table Average)* = 0.95
   Assume soil swell equals heaping.
   Bucket load = \((3.0 \times 0.95)\) = 2.85 BCY

7. 
   Actual trench width *(Bucket Width)* = 2 ft
   Volume = \(((32 \times 40 \times 5) + (5 \times 2 \times 60))/27\) = 259 BCY
   Bucket fill factor *(Table) – 0.95
   Standard cycles/hr – 200
   Swing angle = 75°
   Average / maximum depth = \(5/14.7\) = 34%
   Swing-depth factor *(Table)* = 1.20
   Estimated production = \((200 \times 1.20 \times 0.50 \times 0.95 \times (50/60))\) = 95.0 BCY/hr
   
   a. Time Required = \(259/95.0\) = 2.7 hr
   b. Unit Cost = \((180 + (50 \times 2.7))/259\) = \$1.22 BCY

8. 
   Trench width *(Bucket Width)* = 30 in
   Soil swell *(Table)* = 23%
   Volume of excavation per unit length of trench = \(((30/12) \times (4.5/27)) \times 1.23\) = 0.513 LCY/ft
   Standard cycles/hr *(Table)* = 160
   Depth / maximum depth = \(4.5/15\) = 30%
   Swing angle = 80°
Swing-depth factor *(Table)* = 1.19
Job efficiency = 0.75
Bucket fill factor *(Table Average)* = 0.80
Trench adjustment factor *(Table)* = 1.0

\[ P = (160 \times 1.19 \times 0.75 \times 0.80 \times 0.75) = 85.7 \text{ LCY/hr} \]

Linear production/hr = \(\frac{85.7}{0.513}\) = 167 ft/hr