Machining Speed & Feed — Answer Key

1) What is SFM and why does it matter?
Answer: SFM (Surface Feet per Minute) is the cutting speed at the tool's edge. It controls heat generation and, therefore, tool life and finish; choosing an appropriate SFM for the material helps avoid premature wear while maintaining productivity. (Inch_Speed_Feed)

2) Formula for RPM given diameter and SFM
Answer: RPM = (SFM × 3.82) ÷ Diameter. (Inch_Speed_Feed)

3) Difference between fZ and fn
Answer: fZ (feed per tooth) is the linear advance per cutting edge per revolution; fn (feed per revolution) is the total linear advance per full spindle revolution (all teeth combined). (Inch_Speed_Feed)

4) Why flute count (Z) matters for end mills
Answer: More flutes mean more cutting edges engaging each revolution; at the same fZ and RPM, increasing Z increases IPM (feed rate), impacting chip load distribution and finish. (IPM = fZ × Z × RPM). (Inch_Speed_Feed)

5) Facemill finish—what most influences it?
Answer: For a multi-insert facemill, feed per tooth (fZ) has a strong effect on finish (lower fZ → finer scallops). Insert count and cutter geometry matter too; SFM influences heat/edge behavior, but the visible scallop height is most directly tied to chip load per tooth. (Inch_Speed_Feed)

6) ½″ endmill, Aluminum @ 400 SFM → RPM
Given: D = 0.500″, SFM = 400. Calc: RPM = (400 × 3.82) ÷ 0.500 = 3,056 RPM (≈3056). (Inch_Speed_Feed)

7) From #6, 4 flutes, fZ = 0.002″ → IPM
Given: RPM = 3056, Z = 4, fZ = 0.002″. Calc: IPM = 0.002 × 4 × 3056 = 24.45 IPM (≈24.45). (Inch_Speed_Feed)

8) 1.5″ facemill, 6 inserts, 600 SFM, fZ = 0.006″ → RPM & IPM
RPM: (600 × 3.82) ÷ 1.5 = 1,528 RPM. IPM: 0.006 × 6 × 1528 = 55.01 IPM (≈55.0). (Inch_Speed_Feed)

9) ■″ drill (0.375″) in steel, 90 SFM, fn = 0.005″ → RPM & IPM
RPM: (90 × 3.82) ÷ 0.375 = 917 RPM. IPM: fn × RPM = 0.005 × 917 = 4.58 IPM (≈4.58). (Inch_Speed_Feed)

10) Increase SFM by 25%; fZ unchanged — what changes?
Answer: Since RPM ∝ SFM, RPM increases 25%. With IPM = fZ × Z × RPM, IPM also increases 25%. Expect higher heat and faster tool wear, though finish may improve if the tool/material can handle it. (Inch_Speed_Feed)