Applied Math for Manufacturing Assessment - Worked Solutions

Part 1: Fractions, Decimals, Percentages
1) 7/16 ÷ 16 = 0.4375
2) 0.875 = 875/1000 = 35/40 = 7/8
3) 5.25 - 3.875 = 1.375
4) 1/4 + 3/8 = 2/8 + 3/8 = 5/8 (0.625)
5) 5.25 - 4.75 = 0.50 inches
6) 80 × (1 - 0.15) = 80 × 0.85 = 68 Ra
7) Spec = 1.495–1.505, measured = 1.493, so it is below tolerance → Not in spec
8) 8/400 = 0.02 = 2% defective

Part 2: Measurement & Conversion
9) 152.4 ÷ 25.4 = 6.000 inches
10) 3.75 × 25.4 = 95.25 mm
11) 2 1/8 = 2.125 inches
12) 105 ÷ 25.4 = 4.134 inches
13) 5 ÷ 8 = 0.625 inches
14) 0.3125 = 5/16
15) Range = 4.000 ± 0.003 = 3.997" to 4.003"
16) V = 6.5 × 3.75 × 2 = 48.75 in³

Part 3: Geometry & Trigonometry
17) A = 8.5 × 2.5 = 21.25 in²
18) A = 1/2 × 4 × 6 = 12 in²
19) C = πd = 3.14 × 6 = 18.84"
20) Hyp = √(5² + 12²) = √169 = 13"
21) r = C / (2π) = 31.4 / (6.28) = 5"
22) A = πr² = 3.14 × 1.5² = 7.065 in²
23) Hyp = √(6² + 10²) = √136 = 11.662"
24) Hyp = 10 / cos20° = 10 / 0.94 = 10.64 ft

Part 4: Algebra & Formulas
25) 5x - 10 = 20 → 5x = 30 → x = 6
26) 3(x + 4) = 27 → x + 4 = 9 → x = 5
27) RPM = (12 × 400) / (π × 1.5) = 4800 / 4.71 = 1019 RPM
28) T = F × D = 150 × 2 = 300 lb·ft
29) Feed = 1200 × 0.005 × 4 = 24 in/min
30) 3x - 5 = 25 → 3x = 30 → x = 10
31) Time = 800 ÷ 2400 = 0.333 min = 20 sec
32) SA = 2πr² + 2πrh = 14.13 + 37.68 = 51.81 in²

Part 5: Word Problems
33) 3 hrs = 10800 sec; 10800 ÷ 36 = 300 parts
34) 300 × 0.42 = 126 lb
35) 1200 ÷ 18 = 66 full products
36) 90 + 60 + 150 = 300 sec = 5 min

Final Page

37) 80 ft = 960 in; 960 - 624 = 336 in excess

38) 40 hr = 5 shifts; 1.5 × 5 = 7.5 gal

39) 1000 ÷ 10 hr = 100 parts/hr

40) 3750 ÷ 500 = 7.5 → 8 taps required