

Answers Test 1A CST8233 F17

1. a 2. e 3. a 4. d 5. b 6. c 7. c 8. d 9. b 10. e

11. e 12. a 13. c 14. b 15. c 16. a 17. c 18. a 19. b 20. a 21. e 22. d 23. d

24.

$-0.5_{10} = -0.1_2 = -1.0_2$ in normalized form

The 32-bit float form of the number is:

Sign bit = 1

Exponent = $127 - 1 = 126 = 01111110_2$

Mantissa = [1].0

So the total bit field for a float is

1011 1111 0000 0000 0000 0000 0000 0000
= BF000000₁₆

25a.

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots \quad \text{for all } x$$

So $\frac{1}{2}e^{\frac{x}{2}} = \frac{1}{2}(1 + x/2 + x^2/8 + \dots) = \frac{1}{2} + x/4 + x^2/16 + \dots$

25b.

At $x = 1$,

$$f(x) = 0.5 + 0.25 = 0.75$$

The error is approximated as the first truncated term = $x^2/16 = 1/16$

$$\text{so the \% fractional error} = (1/16)/(3/4) * 100 = (1/12) * 100 = 8.3\%$$