American Computer Science League

2020-2021 ● Contest 2: Shorts Solutions ● Intermediate Division

1. Prefix-Infix-Postfix

− / * 4 + 2 3 * 2 5 / + ^ 6 2 4 8
= − / * 4 (+ 2 3) (* 2 5) / + (^ 6 2) 4 8
= − / (* 4 5) 10 / (+ 36 4) 8
= − (/ 20 10) (/ 40 8)
= − 2 5 = -3

1. -3 (D)

2. Prefix-Infix-Postfix

$A = 2\pi rh + 2\pi r^2$:
A = 2 * P * r * h + 2 * P * r^2
A = (2 P *) * r * h + (2 P *) * (r 2 ^)
A = ((2 P *) r *) * h + ((2 P *) (r 2 ^) *)
A = (((2 P *) r *) h *) + ((2 P *) (r 2 ^) *)
A = (2 P * r * h * 2 P * r 2 ^ * +)
The complete formula is: A 2 P * r * h * 2 P * r 2 ^ * + =

2. A2P*r*h*2P*r2^*+= (C)

3. Bit-String Flicking

((LSHIFT-1 11011) OR (RCIRC-2 01101) AND 01111)
= (10110 OR (01011 AND 01111))
= (10110 OR 01011) = 11111

3. 11111 (A)

4. Bit-String Flicking

Let X = abcde
LHS = ((LCIRC-3 X) AND 10110)
= ((LCIRC-3 abcde) AND 10110)
= (deabc AND 10110) = d0ab0
LHS = RHS
⇒ d0ab0 = 10100
⇒ d = 1, a = 1, b = 0, c = *, e = *
⇒ 10*1*

4. 4 (C)

5. LISP (CDR (CAR '((b c d) (e f) g))) = (CDR '(b c d)) = (c d)	**5.** (c d) (D)