



Задание	1	2	3	4	5	6	7	8	Всего
Баллы	X	12	1	12	0	0	15	X	50

WS

1) $x \in \mathbb{R} \setminus \mathbb{Q}$ 2) $x \in \mathbb{Q}$

$$v_0 = \sqrt{v_{0x}^2 + v_{0y}^2} = 1.03 \text{ m/s}$$

$$v_x^2 = v_0^2 \cos^2 \theta + (v_0 \sin \theta - g t)^2$$

$$30^2 = 10^2 \frac{1}{4} + 160 \cdot \frac{\sqrt{3}}{2} = 100 \frac{1}{4} + 80\sqrt{3}$$

$$900 = 400 + (20\sqrt{3} - 10t)$$

$$20\sqrt{3} - 10 + x = 16\sqrt{5}$$

$$10 + 4 = 20\sqrt{3} - 10\sqrt{5}$$

$$+1 = 2\sqrt{3} - \sqrt{3} \approx 3,46 - 2,24 = 1,22$$

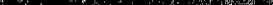
$$10 + 15 = 25 \sqrt{32} \approx 10 \text{ s}$$

$$1 = -2\sqrt{3} \neq \sqrt{3} = 5.260$$

Incumbent and challenger

CHRYSLER CREDIT CORP.





1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

the 1990s, the number of people in the world who are under 15 years of age is expected to increase from 1.1 billion to 1.5 billion. The number of people aged 65 and over is expected to increase from 200 million to 400 million. The number of people aged 15 and over is expected to increase from 3.5 billion to 4.5 billion. The number of people aged 15 and over is expected to increase from 3.5 billion to 4.5 billion. The number of people aged 15 and over is expected to increase from 3.5 billion to 4.5 billion.

the 1990s, the number of people in the world who are undernourished has declined from 1.1 billion to 800 million. The number of people who are malnourished has declined from 1.5 billion to 1 billion. The number of people who are obese has increased from 100 million to 300 million. The number of people who are overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million.

17-00000-05241

$$1.22 \pm 24, 4 (\mu)$$

$$s_1 = x - 1.1 \quad \text{vgl. } x = \varnothing_0 \cosh t$$

$$S(1,1) = 40, \quad \frac{1}{2} \cdot 16 - x_1 = 160 - 24,4$$

$$= 135,6$$

$$S_1 + S_2 = 160 \text{ m} - 40 \cdot \frac{1}{2} \cdot S_1 = 160 \text{ m} - 14 \text{ m} = 48 \text{ m}$$

$$12 = 40 \cdot \frac{1}{5} \cdot 7 = 194 \text{ m}$$



$$\lambda = \frac{v}{f} = \frac{340}{5} = 68 \text{ m}$$



Задание	1	2	3	4	5	6	7	8	Всего
Баллы									

Вариант

N2 12

Do Seda, Jane

Done

F 9768 17 1.28

$$\frac{0.45 \times 1.84}{1.84} = 1.01$$

IX 8

$$\int \frac{0,75x + 1,2y}{x + y} = 1,1$$

$$0 \leq x \leq 1, 0 \leq y \leq 1, x + y \leq 250$$

$0.14 = 0.85x$

6-5-9



146

the 1990s, the number of people in the world who are illiterate has increased from 1.2 billion to 1.5 billion. The number of illiterate people in the world is projected to reach 1.7 billion by the year 2015. The number of illiterate people in the world is projected to reach 1.7 billion by the year 2015.

194



[illegible]

the β phase of the polymer. The β phase is the most important phase in the polymer, as it is the phase that is most responsible for the mechanical properties of the polymer. The β phase is the phase that is most responsible for the mechanical properties of the polymer. The β phase is the phase that is most responsible for the mechanical properties of the polymer.

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Figure 1

1000

$x = 20 \Rightarrow \frac{100}{20} = 5$ $\Rightarrow$ 5 $\times$ 5 = 25 $\Rightarrow$ 25 $\times$ 2 = 50 $\Rightarrow$ 50 $\times$ 2 = 100

[illegible][illegible]

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

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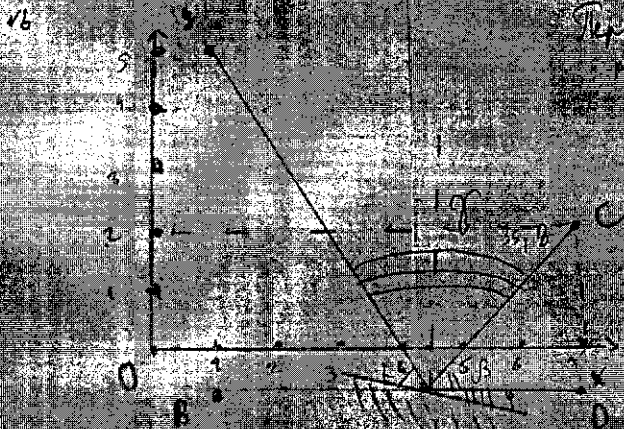


Многопрофильная
инженерная олимпиада
«Звезда»

шифр 29-09-02

Задача	1	2	3	4	5	6	7	8	Всего
Баллы									

Вариант 1



Перпендикуляр
к прямой

Координаты
точки пересечения
14.10.11

Решение

1) Определим угол α

ΔAOB

$\angle AOB = 90^\circ$

2) Углы при вершине O

$\angle AOB = 90^\circ$

$\angle BOC = 90^\circ$

$\angle COD = 90^\circ$

3) Угол $\gamma = 180^\circ - (63,4^\circ + 45^\circ) = 71,6^\circ$

4) Если провести отрезок AC , то

получим равнобедренный треугольник

$\angle AOC = 135^\circ$

5) $\angle AOC = 135^\circ$

4) $\angle AOC = 135^\circ$



Многопрофильная
инженерная олимпиада
«Звезда»

шифр 21-09-02

Задание	1	2	3	4	5	6	7	8	Всего
Баллы									

Вариант 1

14

$$f(x) = x^3 + ax^2 + bx + c = (x - x_1)(x - x_2)(x - x_3)$$

$$f(x^2 + 6x + 2024) = (x^2 + 6x + 2024 - x_1)(x^2 + 6x + 2024 - x_2)(x^2 + 6x + 2024 - x_3)$$

$$x^2 + 6x + 2024 - x_i = 0 \quad i = 1, 2, 3$$

$$D = 36 - 4(2024 - x_i) \geq 0$$

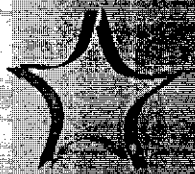
$$x_i \leq 36 + 4(2024 - x_i)$$

$$x_i \leq 2024/5$$

$$f(2024/5) = (2024 - x_1)(2024 - x_2)(2024 - x_3)$$

$$f(2024/5) = 2024/5 \cdot 2024/5 \cdot 2024/5$$

$$f(2024/5) = 2024^3/125$$



Многопрофильная
инженерная академия
«Звезда»

шифр 22-09-02

Задача	1	2	3	4	5	6	7	8	Всего
Баллы									

Вариант 1

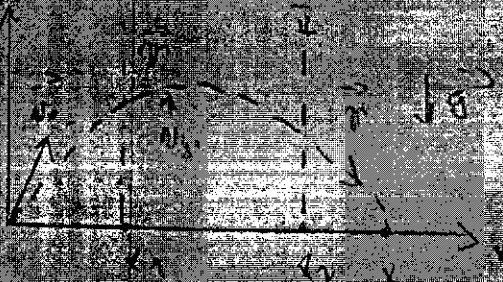
Дано

$$V_0 = 40 \text{ м/с}$$

$$\alpha = 60^\circ$$

$$V_x = 30 \text{ м/с}$$

$$g = 10 \text{ м/с}^2$$



1) $A \rightarrow B \rightarrow C \Rightarrow$ изменить только направление скорости в б. х. шарика не будет изменен $\Rightarrow$ использовать формулы S_{bx} и S_{by}

$$x = V_0 \cos \alpha t$$

$$y = V_0 \sin \alpha t - \frac{g t^2}{2}$$

2) $V_x = V_0 \cos \alpha$ — скорость в б. х. шарика

по условию $V_x = 30 \text{ м/с}$ и $V_0 = 40 \text{ м/с}$

$$V_0 = 40 \text{ м/с}$$

$$t = 2.4 \text{ с}$$



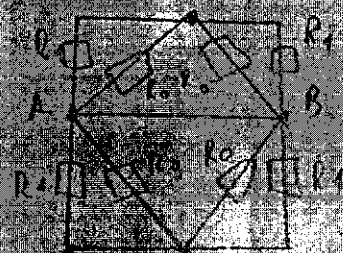
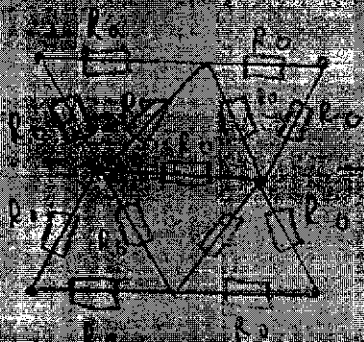
Многопрофильная
инженерная школа
«Звезда»

шифр 29-19-02

Задача	1	2	3	4	5	6	7	8	Всего
Баллы									

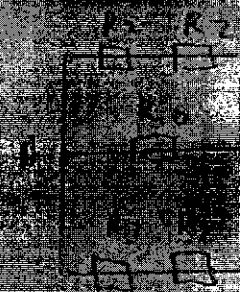
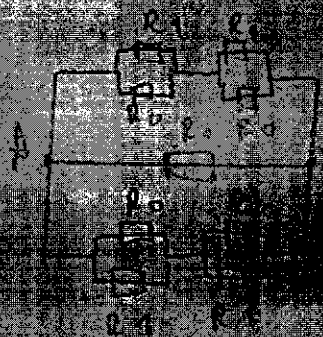
Вариант 1

№7
Дано
 $R_0 = 10 \text{ Ом}$
 $R_{05} = ?$



$$R_{05} = R_0 + R_0 = 2R_0$$

$$R_{05} = 20 \text{ Ом}$$



$$R_{05} = R_0 + R_0 = 2R_0$$

$$R_{05} = 20 \text{ Ом}$$

$$R_{05} = 20 \text{ Ом}$$



шифр

209-09-02

Задание	1	2	3	4	5	6	7	8	Всего
Баллы									

Вариант 1

с окружностью Γ точкой A . Вспомогательная одна точка в окружности не будет взаимодействовать. Значит если потребовать сделать многогранник без точки точки A может для его построения, но многогранник второй многогранник то есть предмет грани точки A многогранник. Новей многогранник. Значит, наше соотношение будет 1×2022 где 1 - это точка A , а 2022 - точка A . Ответ: 1 точка A будет больше или без точки.



Многопрофильная
инженерная олимпиада
«Звезда»

Шифр 09-09-02

Задание	1	2	3	4	5	6	7	8	Всего
Баллы									

Вариант 1

№6

Дано

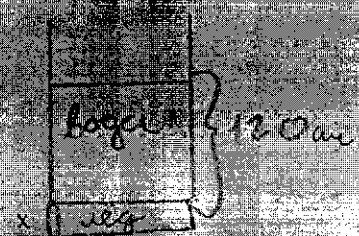
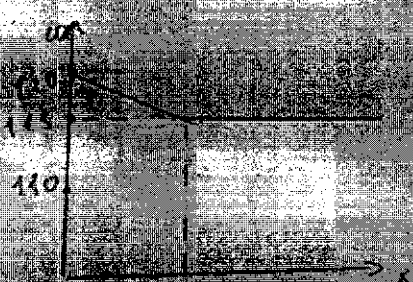
$$S = 15 \text{ м}^2$$

$$\rho_A = 0,9 \text{ г/см}^3$$

$$\rho_B = 1 \text{ г/см}^3$$

$m_A = ?$
 $m_B = ?$

Решение



Когда весь лёд растаял (испарился) то
всего воды стало по уровню 115 см, т.е. прибавилось воды
5 см. Она образовалась из льда.

Масса льда = масса воды, вытекшей 5 см

$$(5 \text{ см} \cdot S \cdot \rho_A) = \text{масса воды}$$

$$\text{масса воды } m_B = 5 \text{ см} \cdot \rho_B \cdot S \text{ см}$$

$$m_{\text{вода}} = \rho_B \cdot S \cdot x$$

$$m_B = \rho_B \cdot S \cdot x = 5 \text{ см} \cdot \rho_B \cdot S$$

$$x = \frac{S \cdot \rho_B}{\rho_A} = \frac{5 \cdot 1000}{900} = 5,55 \text{ см} \quad \text{высота льда уменьшилась}$$

Масса льда уменьшилась

$$m_A = S \cdot \rho_A = 5,55 \cdot 0,9 \cdot S$$

110 см - высота вытекшей воды уменьшилась

$$110 \text{ см} = 115 \text{ см} - 5 \text{ см} = 110 \text{ см}$$

$$0,9 \cdot S \cdot x = 5 \text{ см} \cdot S$$

$$m_A = 4,995 \text{ кг} \quad \text{или} \quad 4,995 \text{ кг} \cdot 1,66 \approx 8,29 \text{ кг}$$



Многопрофильная
инженерная олимпиада
«Звезда»

шифр 22-09-02

Задание	1	2	3	4	5	6	7	8	Всего
Баллы									

Вариант 1

12

Do Segra Tare

I $0,75 \times 1,1 = 1,25$

II $x = 8$

$0,75 \times 1,1 = 1,25$

$0,75 \times 1,1 = 1,25$

$0,75 \times 1,1 = 1,25$

$0,75 \times 1,1 = 1,25$

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$0,75 \times 1,1 = 1,25$

$0,75 \times 1,1 = 1,25$

Всего

$0,75 \times 1,1 = 1,25$

Всего баллов 1,1

Всего баллов 1,1

Всего баллов 1,1

Всего баллов 1,1

Всего баллов 1,1

Всего баллов 1,1