

### 3.5: Selected Answers

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<sup>1</sup>  $t_2 = 1.86 \text{ s}$

<sup>2</sup>  $v_1 = 11.2 \text{ m/s}$

<sup>3</sup>  $\delta r_x = 8.3 \text{ m}$

<sup>4</sup>  $v_1 = 3.28 \text{ m/s}$

<sup>5</sup>  $v_1 = 31.4 \text{ m/s}$

<sup>6</sup> The ball hits people in the stands behind home plate. (It sails 10.7 m above home plate.)

<sup>7</sup>  $\theta = 44^\circ$

<sup>8</sup>  $\theta = 20.1^\circ, 68.8^\circ$

<sup>9</sup>  $\theta = 18.6^\circ, 77.2^\circ$

<sup>10</sup> No.

<sup>11</sup> Yes, as long as the cannon is set to  $16.4^\circ$ .

<sup>12</sup>  $t_2 = 0.56 \text{ s}$

<sup>13</sup>  $t_2 = 3.22 \text{ s}$

<sup>14</sup>  $t_2 = 3.22 \text{ s}$

<sup>15</sup> 335 m from home

<sup>16</sup>  $t_2 = 40 \text{ s}$   $a = 0.15 \text{ m/s}^2$

<sup>17</sup> 52.6 m from ship

<sup>18</sup> 25.7 m from ship

<sup>19</sup>  $t_2 = 33.5 \text{ s}$   $\theta = 188^\circ$  from line initially between ship and man

<sup>20</sup>  $\mu_s \geq 0.256$

<sup>21</sup>  $a = 0 \text{ m/s}^2$

<sup>22</sup>  $a = 0.94 \text{ m/s}^2$

<sup>23</sup>  $m = 65.2 \text{ kg}$

<sup>24</sup>  $F_{sf} = 56 \text{ N}$

<sup>25</sup>  $F_{sf} = 186 \text{ N}$  up

<sup>26</sup>  $a = 1.39 \text{ m/s}^2$  down

<sup>27</sup>  $a = 0.84 \text{ m/s}^2$

<sup>28</sup>  $m = 51.4 \text{ kg}$

<sup>29</sup>  $t_2 = 7.4 \text{ s}$

<sup>30</sup>  $r_2 x = 14 \text{ m}$

<sup>31</sup>  $\mu_k = 0.085$

<sup>32</sup>  $F = 270 \text{ N}$

<sup>33</sup>  $F = 55.9 \text{ N}$

<sup>34</sup>  $a = 0.73 \text{ m/s}^2$

<sup>35</sup>  $a = 0.66 \text{ m/s}^2$

<sup>36</sup>  $a = 0 \text{ m/s}^2$

<sup>37</sup>  $F_{\max} = 980 \text{ N}$

$$^{38} F_{\max} = 359 \text{ N}$$

$$^{39} F_{\max} = 947 \text{ N}$$

$$^{40} F_{\min} = 210 \text{ N}$$

$$^{41} \text{ a. } r_2 = 2.23 \text{ m b. } t_2 = 1.49 \text{ s}$$

$$^{42} \text{ a. } v_2 = 2.52 \text{ m/s b. } r_2 = 3.78 \text{ m}$$

$$^{43} m = 51.4 \text{ kg}$$

$$^{44} \text{ a. } r_2 = 14 \text{ m b. } t_2 = 1.75 \text{ s}$$

$$^{45} v_2 = 27 \text{ m/s}$$

$$^{46} \mu = 0.14$$

$$^{47} v_2 = 14.9 \text{ m/s}$$

$$^{48} v_2 = 8.89 \text{ m/s}$$

$$^{49} v_2 = 14.3 \text{ m/s}$$

$$^{50} \theta = 56^\circ$$

$$^{51} v_2 = 5.8 \text{ m/s}$$

$$^{52} v_{2\text{audi}} = 12.8 \text{ m/s}$$

$$^{53} v_{2\text{audi}} = 4.86 \text{ m/s}$$

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