

Rationales for Multiple Choice Questions:

Q1

A	<i>The student found $a'(3)$</i>
B	<i>This answer is correct</i>
C	<i>The student found $x(3)$</i>
D	<i>The student found $v(3)$</i>

Q2

A	<i>The student found time when $a(t)=0$</i>
B	<i>The student found the time when $v(t)=0$</i>
C	<i>The student found $a(t)$ when $v(t)=0$</i>
D	<i>This answer is correct</i>

Q3

A	<i>The student averaged the avg. velocity of each subinterval</i>
B	<i>The student added up the given $v(t)$ values and divided by 10</i>
C	<i>This answer is correct</i>
D	<i>The student chose the middle velocity value in the table</i>

Q4

A	<i>The student averaged the $v(1)$ and $v(4)$</i>
B	<i>The student found the approx. $a(t)$ on $[0,4]$</i>
C	<i>The student found the approx. $a(t)$ on $[0,10]$</i>
D	<i>This answer is correct</i>

Q5

A	<i>This answer is correct</i>
B	<i>The student found a Left Riemann sum</i>
C	<i>The student found a trapezoidal sum</i>
D	<i>The student shows a misunderstanding of a Riemann sum</i>

Q6

A	<i>The student included a negative when differentiating $\sin(t)$</i>
B	<i>The student failed to use the chain rule</i>
C	<i>This answer is correct</i>
D	<i>The student incorrectly evaluated the trig function</i>

Q7

A	<i>The student found the final position with a RRS</i>
B	<i>This answer is correct</i>
C	<i>The student used a Left Riemann Sum</i>
D	<i>The student multiplied each t value with the corresponding $v(t)$ and added</i>

Q8

A	<i>The student only found the decrease in velocity from 1 to 3 sec</i>
B	<i>This answer is correct</i>
C	<i>The student found the average acceleration over the entire interval</i>
D	<i>The student approximated $v(2)$</i>

Q9

A	<i>The student found the displacement of the bug after 8 seconds</i>
B	<i>This answer is correct</i>
C	<i>The student found the total distance the bug traveled over the 8 seconds</i>
D	<i>The student added the initial condition to the total distance</i>

Q10

A	<i>The student found the displacement of the bug after 8 seconds</i>
B	<i>The student found the position of the bug after 8 seconds</i>
C	<i>This answer is correct</i>
D	<i>The student added the initial condition to the total distance</i>

Q11

A	<i>This answer is correct</i>
B	<i>The student found when the bug's position is negative</i>
C	<i>The student found when the bug was moving to the right</i>
D	<i>The student found when $a(t) > 0$</i>

Q12

A	<i>The student found $v(10)$ and divided by 10</i>
B	<i>The student found the average acceleration over the interval</i>
C	<i>This answer is correct</i>
D	<i>The student found the average position of the bug</i>

Q13

A	<i>The student found $v(7)$</i>
B	<i>The student assigned a negative value to $a(7)$</i>
C	<i>This answer is correct</i>
D	<i>The student found the speed of the toy at $t = 7$</i>

Q14

A	<i>The student found when $v'(t)=0$</i>
B	<i>This answer is correct</i>
C	<i>The student found when $v'(t)$ is undefined</i>
D	<i>The student found the critical values for $v(t)$</i>

Q15

A	<i>The student only found when $v(t) > 0$ and $v'(t) > 0$</i>
B	<i>This answer is correct</i>
C	<i>The student found when the car has a positive acceleration</i>
D	<i>The student found when the car is speeding up</i>

Q16

A	The student chose the initial time instead of finding $v(t) = 0$
B	<i>This answer is correct</i>
C	The student incorrectly factored $y(t)$ and solved for t
D	The student found when $y(t) = 0$

Q17

A	The student found when the ball was slowing down
B	The student found when $v(t) < 0$
C	The student incorrectly handled the coefficient 5 in the problem
D	<i>This answer is correct</i>

Q18

A	The student used $t=0$ as a critical value when solving $e^t = 0$
B	The student $a(t)$ incorrectly
C	The student did not use product rule when finding $a(t)$
D	<i>This answer is correct</i>

Q19

A	<i>This answer is correct</i>
B	The student did not include a negative when differentiating $\cos(t)$
C	The student did not use the chain rule when differentiating
D	The student did not use the chain rule when differentiating

Q20

A	<i>This answer is correct</i>
B	The student incorrectly differentiated $\cos(t)$ and did not include a negative
C	The student incorrectly found the critical values after differentiating
D	The student found when the ball is moving left

Q21

A	<i>The student incorrectly integrated $\sin(t)$ as $\cos(t)$ instead of $-\cos(t)$</i>
B	<i>This answer is correct</i>
C	<i>The student failed to integrate velocity</i>
D	<i>The student did not divide by π to find the average velocity</i>

Q22

A	<i>The student found only one of the correct intervals</i>
B	<i>The student found only when $v(t) < 0$</i>
C	<i>This answer is correct</i>
D	<i>The student misinterpreted the sign charts for $v(t)$ and $a(t)$</i>

Q23

A	<i>The student averaged $v(0)$ and $v(2)$</i>
B	<i>This answer is correct</i>
C	<i>The student found $v(4)$</i>
D	<i>The student found the average acceleration of the bug</i>

Q24

A	<i>The student did not include the initial position</i>
B	<i>This answer is correct</i>
C	<i>The student found the total distance traveled</i>
D	<i>The student used the total distance traveled with the initial condition</i>

Q25

A	<i>The student did not consider when $v'(t)$ is undefined when checking intervals</i>
B	<i>The student did not consider when $v'(t)$ is undefined when checking intervals</i>
C	<i>The student incorrectly checked values in the interval</i>
D	<i>This answer is correct</i>

Q26

A	<i>The student did not include the initial position</i>
B	<i>This answer is correct</i>
C	<i>The student did not include the initial position and found total distance</i>
D	<i>The student found total distance plus initial position</i>

Q27

A	<i>The student found the net displacement</i>
B	<i>The student found the final position</i>
C	<i>This answer is correct</i>
D	<i>The student incorrectly used the initial position</i>

Q28

A	<i>The student found the time when $a(t) = 5$</i>
B	<i>This answer is correct</i>
C	<i>The student found $a(5)$</i>
D	<i>The student found $v(5)$</i>

Q29

A	<i>The student found displacement</i>
B	<i>The student found the final position</i>
C	<i>This answer is correct</i>
D	<i>The student added 5 to the total distance</i>

Q30

A	<i>The student did not know how to apply the IVT</i>
B	<i>The student did not know how to correctly apply IVT multiple times</i>
C	<i>The student only identified two of the three times guaranteed by IVT</i>
D	<i>This answer is correct</i>

Q31

A	The student found $v(6)-v(0)$
B	The student found $v(6)$
C	The student found the net displacement of the particle
D	This answer is correct

Q32

A	The student found when $v(t) > 0$
B	This answer is correct
C	The student found when $v(t) < 0$ and $a(t) = 0$
D	The student found when $a(t) > 0$ but $v(t) < 0$

Q33

A	The student only checked the endpoints
B	This answer is correct
C	The student found when $a(t) = 0$
D	The student found when $a(t)$ is a maximum

Q34

A	The student found the net displacement
B	This answer is correct
C	The student added the initial position to the distance
D	The student found the final position

Q35

A	The student found the net displacement of the particle over the interval
B	The student found net displacement and did not use u-sub properly when integrating
C	This answer is correct
D	The student did not use u-sub properly when integrating

Q36

A	<i>The student did not divide by 5 to find the average value</i>
B	<i>This answer is correct</i>
C	<i>The student added up each $v(t)$ in the table and divided by 5</i>
D	<i>The student found the average acceleration</i>

Q37

A	<i>This answer is correct</i>
B	<i>The student added the position at 5 instead of subtracting</i>
C	<i>The student found a Right Riemann sum but did not use the initial position value</i>
D	<i>The student found total distance traveled with the initial condition</i>

Q38

A	<i>The student found when $v(t) > 0$</i>
B	<i>This answer is correct</i>
C	<i>The student found when $a(t) > 0$</i>
D	<i>The student found when the bug is slowing down</i>

Q39

A	<i>This answer is correct</i>
B	<i>The student found $v(1)$</i>
C	<i>The student found the displacement</i>
D	<i>The student found the total distance traveled</i>

Q40

A	<i>The student found the displacement</i>
B	<i>The student found the position at $t=4$</i>
C	<i>The student found the displacement and took the absolute value</i>
D	<i>This answer is correct</i>

Q41

A	The student found when $t = 0$
B	The student found the $a(t)$ was a minimum
C	The student found when $a(t) = 0$
D	This answer is correct

Q42

A	The student took the absolute value of displacement
B	This answer is correct
C	The student found $v(1) - v(0)$
D	The student found $v'(1)$

Q43

A	The student found $a(0)$
B	This answer is correct
C	The student found $v(0)$
D	The student only found the time when $v(t)=0$

Q44

A	The student found the absolute value of $v(0)$
B	The student found $a(t)$ when the bug is at rest
C	This answer is correct
D	The student found when $a(t) = 0$

Q45

A	The student assumed $a(t) = 0$ when $v(t) = 0$
B	The student found $a(0)$
C	This answer is correct
D	The student found the time when the particle is at rest

Q46

A	<i>This answer is correct</i>
B	<i>The student did not consider $v(3)$</i>
C	<i>The student confused $v(t)$ and $a(3)$</i>
D	<i>The student confused $a(t)$ and $v(t)$</i>

Q47

A	<i>The student found the particles are both moving toward the right</i>
B	<i>The student found when one particle was moving right but the second was at rest</i>
C	<i>This answer is correct</i>
D	<i>The student found when the particles were moving in opposite directions</i>

Q48

A	<i>The student found when the particles must move toward each other</i>
B	<i>This answer is correct</i>
C	<i>The student incorrectly included the first interval</i>
D	<i>The student found two intervals that would not be guaranteed to cross paths</i>

Q49

A	<i>The student found the average velocity of each interval and averaged the answers</i>
B	<i>The student found the average value of just the endpoints</i>
C	<i>This answer is correct</i>
D	<i>The student found the average values of the intervals separately and added</i>

Q50

A	<i>The student found when both particles had positive acceleration</i>
B	<i>The student found when particle B had great velocity than particle A</i>
C	<i>This answer is correct</i>
D	<i>The student found when the velocities have opposite signs</i>

Q51

A	<i>This answer is correct</i>
B	<i>The student found the difference in total distance traveled</i>
C	<i>The student did not include the initial position</i>
D	<i>The student included initial position but used total distance</i>

Q52

A	<i>The student found when the particles' position had opposite signs</i>
B	<i>The student found when the particles' velocity had opposite signs</i>
C	<i>The student did not include the full interval</i>
D	<i>This answer is correct</i>

Q53

A	<i>The student the position of particle A when Particle B started to move left</i>
B	<i>This answer is correct</i>
C	<i>The student found the time when the particles crossed paths</i>
D	<i>The student found the total distance traveled by particle B</i>

Q54

A	<i>The student found when $v(t) > 0$</i>
B	<i>This answer is correct</i>
C	<i>The student found when $a(t)$ is increasing</i>
D	<i>The student found when $a(t) > 0$</i>