Ad. Math –Homework Packet
Chapter 15B – Integrals

**NAME** _____

## 15.9: Distance and Riemann Sums

1. What is the total distance traveled by a car, which travels at a rate of 65mph for 1.5 hours, 15mph for 30 minutes, and 40mph for 45 minutes?

2. You hear a commercial claiming a car can go from "0 to 60" in 5 seconds.

    a. How fast is 60 miles per hour in terms of feet per second? (It's in your notes!!)

    b. Graph the situation above. Let the measurement of each "block" be .5 seconds by 10 ft/s.

    c. Assuming acceleration was constant, write a formula for the velocity of the car (in f/s). (It's a LINE, people)

    d. How far did the car go in the first **5 seconds**? How far did it go in the first **8 seconds**?

3. Suppose a space probe travels on a straight line with an initial speed of 100m/sec and a constant acceleration of 9.8 $m/sec^2$. Then its velocity at time *t* is given by $100 + 9.8t$. Find the distance it will have traveled in 10 seconds.

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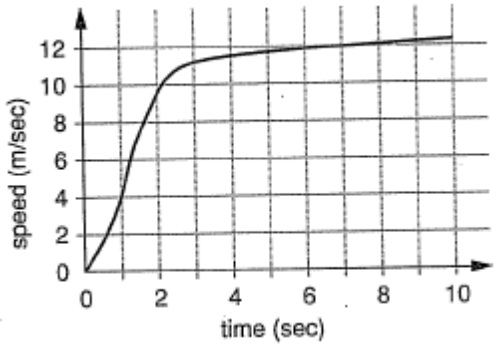
*For 4 and 5, each rate-time graph depicts a runner competing in a track event., From the graph, estimate the distance of the race.*

4.

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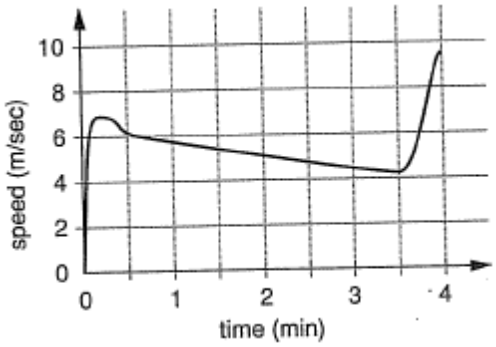
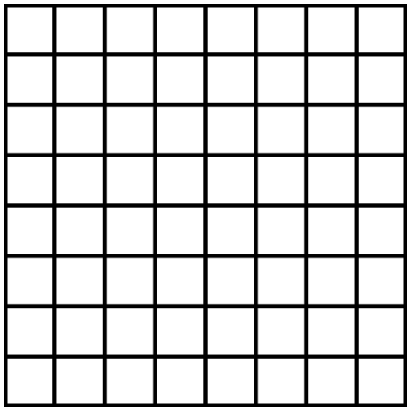
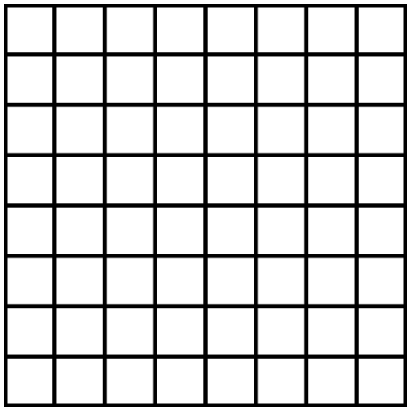



6. For the function $f(x) = 3x^2 - 1$, calculate the Riemann sum over the given interval. (Hint: Draw a picture.)

a. Over $0 \le x \le 2$ for $\Delta x = .25$, when $z_i$ = the left endpoint of the $i^{th}$ interval.



b. Over $0 \le x \le 8$ with 4 subintervals, when $z_i$ = the right endpoint of the $i^{th}$ interval



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## 15.10: Area Under the Curve

*Find each anti-derivative*

1. $\int 4dx$

2. $\int xdx$

3. $\int (2x+2)dx$

4. $\int (3x-6)dx$

5. $\int (3x^3 - x^2 + 2)dx$

6. $\int (x^{\frac{5}{4}} - x^{\frac{3}{4}} + 4x^{\frac{1}{2}})dx$

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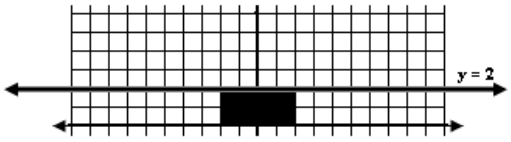
*Evaluate the area under each curve by* ***examining the graph of the function*** *.(DRAW A PICTURE!!)*

7. $\int_{-1}^{3}(-|x|+2)dx$

8. $\int_{-7}^{7}(2-x)dx$

9.

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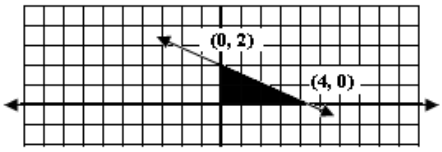


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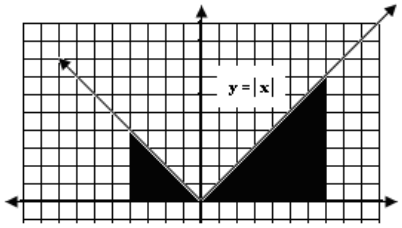


12. Graph the velocity function $V = t^2 + 4$ where $0 \le t \le 5$.

a. Use your calculator to graph the function between t = 0 and t = 5.

b. Determine the area under the curve between t = 0 and t = 5.

c. How do we express this area with mathematical symbols?

## 15.11: Basic Integration

*Use the properties of integrals to write the expression as a single integral (if it is not already). Then, find the exact value of the integral.*

1. $\int_{2}^{5} 4dx$

2. $\int_{-1}^{3} xdx$

3. $\int_{-2}^{2} (2x+2)dx$

4. $\int_{3}^{7} 3(x-2)dx$

5. $\int_{2}^{5} (2x+2)dx + 2\int_{5}^{10} (x+1)dx$

6. $\int_{-1}^{4} 4dx + \int_{4}^{5} 4dx$

7. $\int_{0}^{5} (x^2+2)dx + 3\int_{0}^{5} xdx$

8. $\int_{0}^{15} x^2dx - \int_{10}^{15} x^2dx$

9. $\int_{-3}^{5} (x^2+4)dx$

10. $\int_{2}^{10} (x^2+5x+2)dx$

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**15.12: Bounded Curves and Other Basic Integration**

*Write the definite integral represented in each. Then evaluate the integral.*

1. $f(x) = -.1x^2 + 7$ from x = 0 to x = 5.

2. $f(x) = 3x^3 + 2x - 4$ from x = 3 to x = 11.

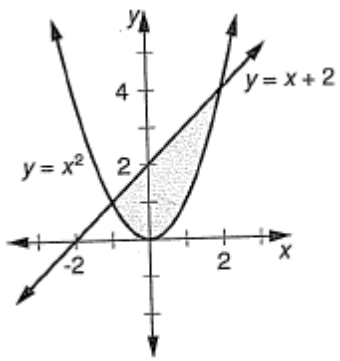
3. $f(x) = 4$ from x = -3 to x = 3.

4. $f(x) = -\cos x$ from x = 0 to x = 1. (HINT: Think back to Chapter 13A…)

5. Suppose a car accelerates from 0 to 100 ft/sec in 5 seconds so that its velocity in ft/sec after t seconds is given $v(t) = .25(t - 5)^2 + 100$. What is the total distance traveled in the 5 second interval?

*For 5 and 6, express the area of the shaded region using integral notation and find its value.*

6.




7.