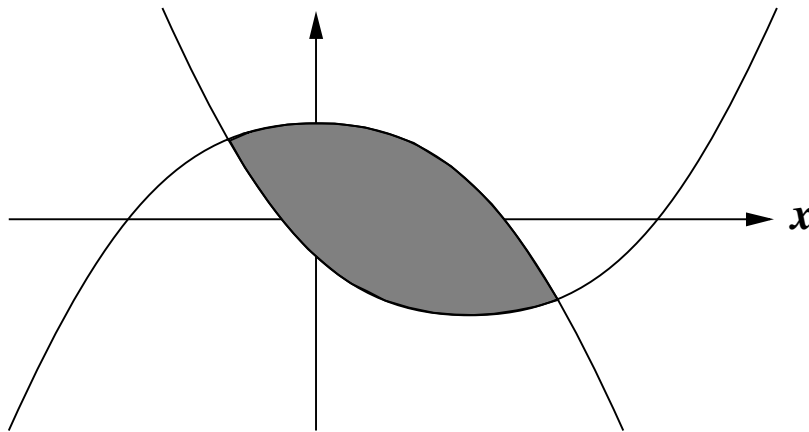


Name \_\_\_\_\_

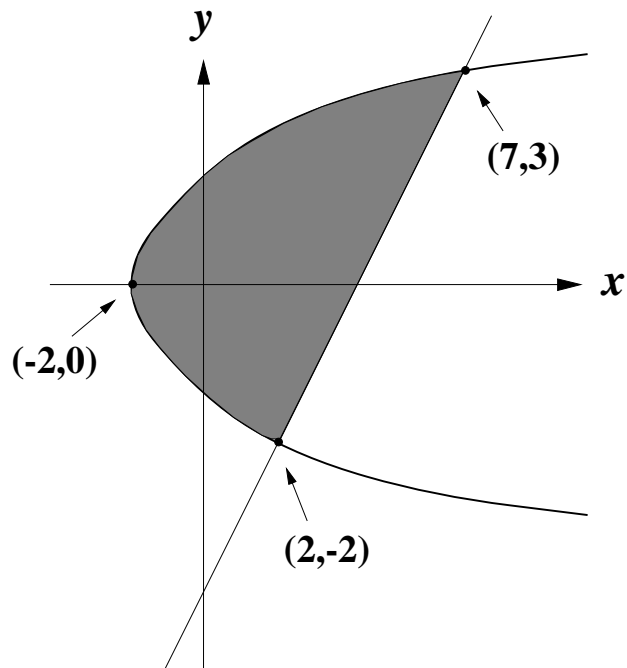
**RULES FOR PART 2 OF THIS TEST:**

- You may use a calculator.
- For full credit, you should:
  - show enough work to justify each answer.
  - simplify each answer.
  - use correct notation.

1. (10 points) The graphs of  $f(x) = x^2 - 8x - 4$  and  $g(x) = 20 - x^2$  are sketched below and the area between the two curves is shaded in. Find the exact area of this shaded region.

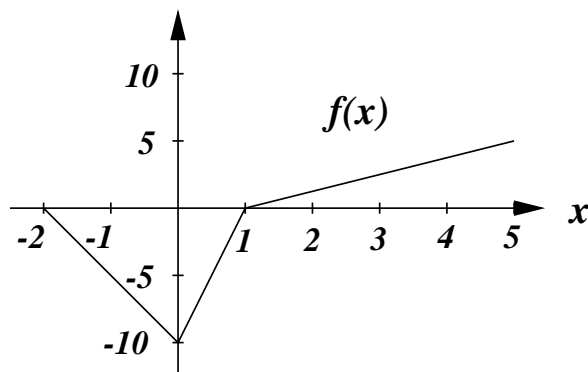


2. (8 points) The graphs of  $x = y + 4$  and  $x = y^2 - 2$  are sketched below and the area between the two curves is shaded in. The coordinates of some of the key points on these graphs are labeled as shown.



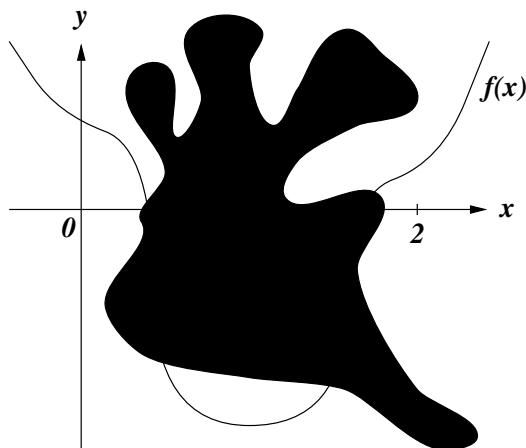
- (a) Write down one definite integral with respect to  $y$  which represents the area of this shaded region. You do not need to evaluate this integral.
- (b) Write down two definite integrals with respect to  $x$  whose sum represents the area of this shaded region. You do not need to evaluate these integrals.

3. (7 points) One of the ten choices below gives the exact value of the definite integral  $\int_{-2}^5 f(x) dx$ . Circle the correct choice.



- (a) -10                      (b) -5                      (c) 0                      (d) 5                      (e) 10
- (f) 15                      (g) 20                      (h) 25                      (i) 30                      (j) 35
4. (10 points) With Thanksgiving quickly approaching, George the turkey has wisely decided to escape from the turkey farm. Starting from a resting position, George runs with constant acceleration until 10 seconds later his velocity is 30 feet per second. How far did George run?

5. (6 bonus points) Suppose that  $f(x)$  is a polynomial whose graph is sketched below. Unfortunately, due to a terrible ink spill, only a portion of the graph can now be seen. Answer the following questions — you will only get credit if you correctly justify your answers.



- (a) The value of  $\int_0^2 f(x) dx$  is:  
 (a) negative                      (b) zero                      (c) positive                      (d) impossible to determine

- (b) The value of  $\int_0^2 f'(x) dx$  is:  
 (a) negative                      (b) zero                      (c) positive                      (d) impossible to determine

- (c) The value of  $\int_0^2 f''(x) dx$  is:  
 (a) negative                      (b) zero                      (c) positive                      (d) impossible to determine