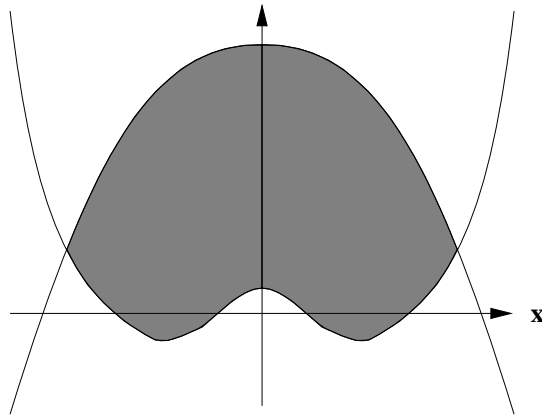
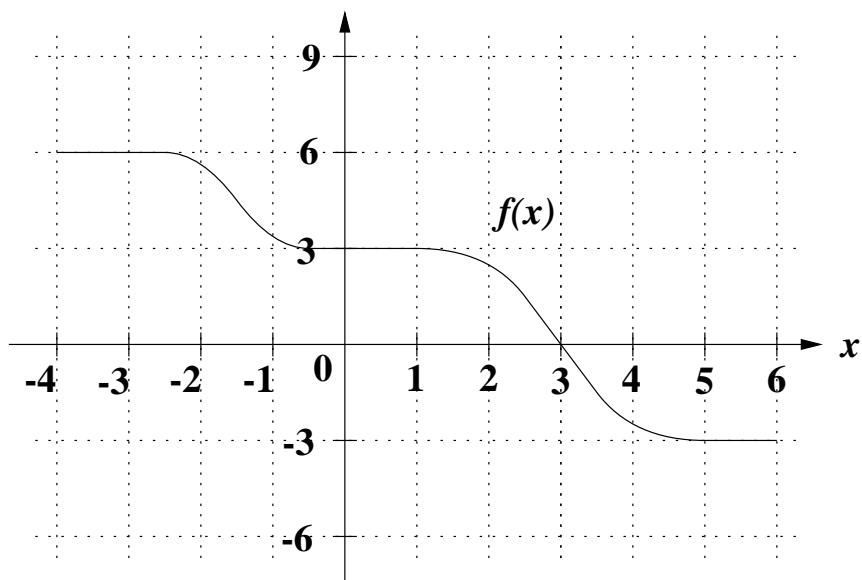


Name _____

1. (2 points) The graphs of $f(x) = x^4 - 7x^2 + 5$ and $g(x) = 86 - 7x^2$ are sketched below and the area between the two curves is shaded in. Find the **exact area** of this shaded region. Your final answer should be correct to one place after the decimal point and you must show sufficient work to justify your answer.





2. (2 points) The graph of $f(x)$ is shown above. The definite integral, $\int_{-4}^6 f(x) dx$, is equal in value to one of the choices below. Which one? Circle your answer.

- (a) -34.5
- (b) -27.5
- (c) -19.5
- (d) -11.5
- (e) -4.5
- (f) 0
- (g) 4.5
- (h) 11.5
- (i) 19.5
- (j) 27.5
- (k) 34.5

3. (2 points) Suppose that a town had a population of 5000 people in 1970. If the population was growing at a rate of $r(t) = 16t$ people per year, where t represents the number of years since 1970, then what was the population of the town in 1980? You must show sufficient work to justify your answer.

4. (2 points) The marginal cost of a product, in dollars per item, is $C'(q) = q^2 - 50q + 700$. If fixed costs are \$500, find the total cost to produce 50 items. You must show sufficient work to justify your answer.

5. (1 point) Which one of the following most clearly states the Fundamental Theorem of Calculus?

(a) Rate of change of a quantity from $t = a$ to $t = b$ equals \int_a^b (total change in that quantity) dt

(b) Rate of change of a quantity from $t = a$ to $t = b$ equals \int_b^a (total change in that quantity) dt

(c) Total change in a quantity from $t = a$ to $t = b$ equals \int_a^b (rate of change of that quantity) dt

(d) Total change in a quantity from $t = a$ to $t = b$ equals \int_b^a (rate of change of that quantity) dt

(e) Rate of change of a quantity from $t = a$ to $t = b$ equals \int_a^b (rate of change of that quantity) dt

(f) Rate of change of a quantity from $t = a$ to $t = b$ equals \int_b^a (rate of change of that quantity) dt

(g) Total change in a quantity from $t = a$ to $t = b$ equals \int_a^b (total change in that quantity) dt

(h) Total change in a quantity from $t = a$ to $t = b$ equals \int_b^a (total change in that quantity) dt

6. (1 point) Which one of the following most clearly states the Fundamental Theorem of Calculus?

(a) $\int_a^b F'(t) dt = F'(b) - F'(a)$

(b) $\int_a^b F'(t) dt = F'(a) - F'(b)$

(c) $\int_a^b F'(t) dt = F(b) - F(a)$

(d) $\int_a^b F'(t) dt = F(a) - F(b)$

(e) $\int_a^b F(t) dt = F'(b) - F'(a)$

(f) $\int_a^b F(t) dt = F'(a) - F'(b)$

(g) $\int_a^b F(t) dt = F(b) - F(a)$

(h) $\int_a^b F(t) dt = F(a) - F(b)$