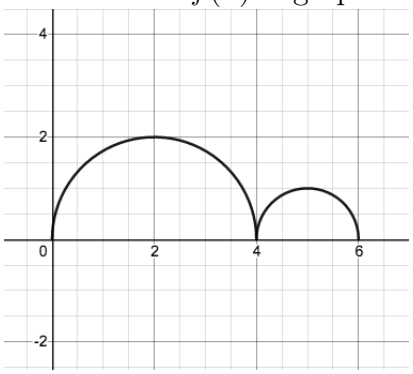
Name: _____

5.4 Theorems about Definite Integrals

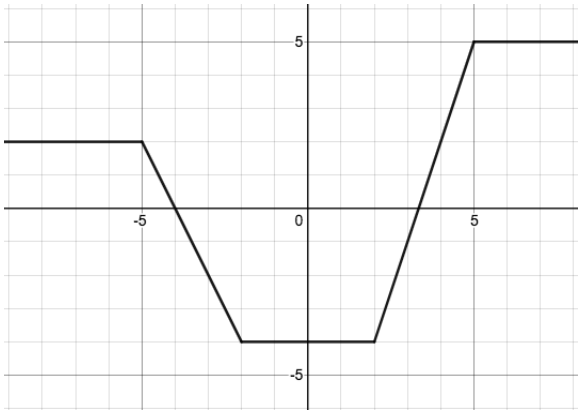
1. The function $f(x)$ is graphed below. Note that it is made of two half circles.



   (a) Find $\int_0^6 f(x)\,dx$.

   (b) How does this illustrate the property $\int_a^b f(x)\,dx + \int_b^c f(x)\,dx = \int_a^c f(x)\,dx$?

2. Which of the following integrals are positive? Why?



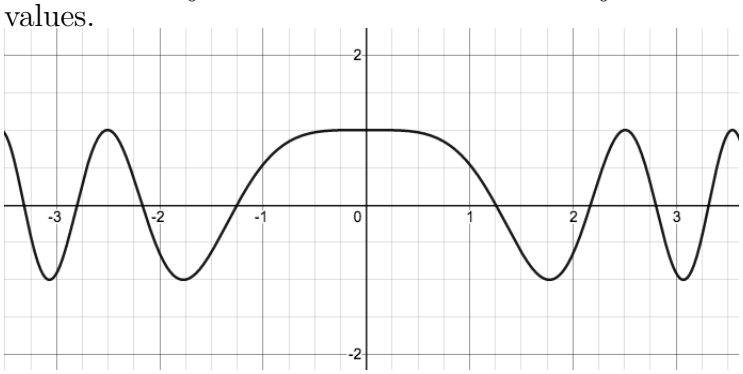
   (a) $\int_2^0 f(x)\,dx$

   (b) $\int_5^{10} f(x)\,dx$

   (c) $\int_{-10}^{-5} f(x)\,dx$

   (d) $\int_{-5}^{-10} f(x)\,dx$

3. Given that $\int_0^{1.25} \cos\left(x^2\right) dx = 0.98$ and $\int_0^1 \cos\left(x^2\right) dx = 0.90$. Find the following values.

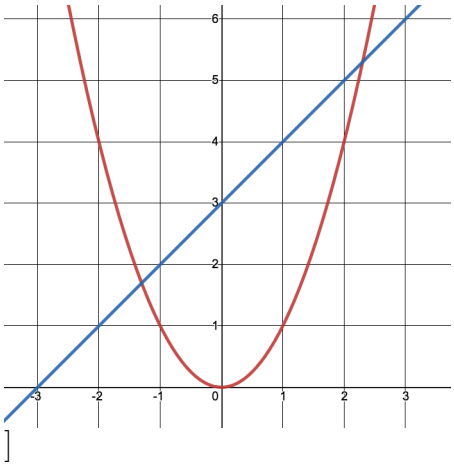


(a) $\int_1^{1.25} \cos\left(x^2\right) dx$

(b) $\int_{-1}^{1} \cos\left(x^2\right) dx$

(c) $\int_{1.25}^{-1} \cos\left(x^2\right) dx$

4. The functions $f(x) = x^2$ and $g(x) = x + 3$ are graphed below.



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(a) Write and integral that represents the area between $f(x) = x^2$ and $g(x) = x + 3$.

(b) Use FTC to compute the integral.

5. Find the average value of $f(x)$ on the interval $0 \leq x \leq 4$ when you know that $\int_0^4 f(x)\, dx = 9.22667$.