Calculus Review

Find each antiderivative.

[1] $\int (3x-4)dx$

[2] $\int \left(3x^4 - \frac{1}{x}\right)dx$

[3] $\int \frac{dx}{x^2}$

[4] $\int \cos x \ dx$

[5] $\int e^{2x-3}dx$

[6] $\int \left[ x^3 \left(x^4 - 1\right)^5 \right] \ dx$

[7] $\int \frac{dx}{4x+1}$

[8] $\int \frac{dx}{\left(4x+1\right)^2}$

[9] $\int x \cdot \sin\left(x^2\right) \ dx$

[10] $\int \left[ x^3 \left(x^4 - 1\right)^5 \right] \ dx$

Evaluate each definite integral.

[11] $\int_0^4 (|x-2|-1)\,dx$

[12] $\int_0^4 \sqrt{16-x^2}\ dx$

[13] $\int_0^{\frac{\pi}{2}} \cos x\,dx$

[14] $\int_{\ln 2}^{\ln 3} e^x\,dx$

[15] $\int_1^{e^3} \frac{1}{x}dx$

[16] $\int_0^4 x \cdot \sqrt{16-x^2}\ dx$

[17] $\int_0^1 \frac{x}{x^2+4}dx$

[18] $\int_0^{\frac{\pi}{6}} \cos\left(2x\right)dx$

[19] A particle is moving along the *x*-axis so that its acceleration is given by $a(t) = 2t - 7$, $t \geq 0$, measured in m/s$^2$.

At time $t = 0$, the velocity is 10m/s and the particle is at $x = -3$.

[a] Which way is the particle moving when $t = 3$?

[b] Where is the particle when $t = 3$?

[c] Is the particle's speed increasing or decreasing when $t = 3$?

[d] When is the particle at rest?

[e] Find the distance travelled by the particle during the first 10 seconds.

[f] Find the displacement the particle after the first 10 seconds.

[20] A particle is moving along the *x*-axis so that its velocity is given by $v(t) = \cos\frac{t}{2}$, $0 \leq t \leq 2\pi$, measured in m/s.

At time $t = 0$, the particle is at $x = 4$.

[a] Where is the particle when $t = \frac{2\pi}{3}$?

[b] When is the particle at rest?

[c] Is the particle's speed increasing or decreasing when $t = \frac{2\pi}{3}$