Calculus 12
6-1 Questions

1. State the derivative of each function.

a) $f(x) = 32$

b) $f(x) = x^4$

c) $y = x^{12}$

d) $y = -3.724$

e) $f(x) = x$

f) $f(x) = x^\pi$

g) $f(x) = x^{43}$

h) $f(x) = 2^5$

i) $g(x) = x^{-2}$

j) $g(x) = x^{\frac{3}{2}}$

2. Differentiate.

a) $f(x) = 8x^{12}$

b) $f(x) = -3x^9$

c) $f(t) = 3t^{\frac{4}{3}}$

d) $g(t) = 8t^{-\frac{3}{4}}$

e) $y = \dfrac{1}{x^4}$

f) $y = \dfrac{2}{x^2}$

g) $g(t) = (2t)^3$

h) $h(y) = \left(\dfrac{y}{3}\right)^5$

i) $f(x) = \sqrt[3]{x}$

j) $f(x) = \sqrt[3]{x^2}$

k) $y = \dfrac{1}{\sqrt{x}}$

l) $y = \dfrac{3}{\sqrt[4]{x}}$

m) $y = \sqrt{3}x^{\sqrt{2}}$

n) $y = \left(x^3\right)^4$

3. Find the slope of the tangent line to the graph of the given function at the point whose x-coordinate is given.

a) $f(x) = 2x^3$, $x = \dfrac{1}{3}$

b) $f(x) = x^{1.4}$, $x = 1$

c) $g(x) = x^{-3}$, $x = -1$

d) $g(x) = \sqrt[5]{x}$, $x = 32$

e) $y = \sqrt{x^3}$, $x = 8$

f) $y = \dfrac{6}{x}$, $x = -3$

4. Find the equation of the tangent line to the curve at the given point.

a) $y = x^5$, $(2, 32)$

b) $y = 2\sqrt{x}$, $(9, 6)$

c) $xy = 1$, $\left(5, \dfrac{1}{5}\right)$

d) $y = \sqrt[3]{x}$, $(-8, -2)$

5. At what point on the parabola $y = 3x^2$ is the slope of the tangent line equal to 24?

6. Find the point on the curve $y = x\sqrt{x}$ where the tangent line is parallel to the line $6x - y = 4$.

7. At what point on the curve $y = -2x^4$ is the tangent line perpendicular to the line $x - y + 1 = 0$.