

Homework 1

section 0.1

14) If $f(x) = x^3 + x^2 - x - 1$, find $f(1)$, $f(-1)$, $f(1/2)$, and $f(a)$

$$f(1) = (1)^3 + (1)^2 - (1) - 1 = 1 + 1 - 1 - 1 = \boxed{0}$$

$$f(-1) = (-1)^3 + (-1)^2 - (-1) - 1 = -1 + 1 + 1 - 1 = \boxed{0}$$

$$f\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^2 - \left(\frac{1}{2}\right) - 1 = \frac{1}{8} + \frac{1}{4} - \frac{1}{2} - 1 = \frac{1}{8} + \frac{2}{8} - \frac{4}{8} - \frac{8}{8} = \frac{1+2-4-8}{8} = \boxed{\frac{-9}{8}}$$

$$f(a) = \boxed{a^3 + a^2 - a - 1}$$

17) If $f(x) = 3x + 2$ and $h \neq 0$, find $\frac{f(3+h) - f(3)}{h}$. Simplify your answer as much as possible.

$$\frac{f(3+h) - f(3)}{h} = \frac{[3(3+h) + 2] - [3(3) + 2]}{h} = \frac{\cancel{9} + 3h + \cancel{2} - \cancel{9} - \cancel{2}}{h} = \frac{3h}{h} = \boxed{3} \quad *$$

section 0.3

26) Let $f(x) = x^6$, $g(x) = \frac{x}{1-x}$, and $h(x) = x^3 - 5x^2 + 1$. Calculate the following functions: $h(f(t))$

$$h(f(t)) = h(t^6) = (t^6)^3 - 5(t^6)^2 + 1 = \boxed{t^{18} - 5t^{12} + 1}$$

28) Let $f(x) = x^6$, $g(x) = \frac{x}{1-x}$, and $h(x) = x^3 - 5x^2 + 1$. Calculate the following functions: $g(f(x))$

$$g(f(x)) = g(x^6) = \frac{x^6}{1 - x^6}$$

section 0.4

2) Use the quadratic formula to find the zeros of the function: $f(x) = 3x^2 + 2x - 1$

$$3x^2 + 2x - 1 = 0 \Rightarrow x = \frac{-2 \pm \sqrt{(2)^2 - 4(3)(-1)}}{2(3)} = \frac{-2 \pm \sqrt{4+12}}{6} = \frac{-2 \pm \sqrt{16}}{6} = \frac{-2 \pm 4}{6} = \frac{-6}{6}, \frac{2}{6} = \boxed{-1, \frac{1}{3}} \quad *$$

14) Factor the polynomial: $x^2 - 10x + 16$

$$x^2 - 10x + 16 = \boxed{(x-8)(x-2)}$$

section 0.5

20) Compute the number: $(27)^{2/3}$

$$(27)^{2/3} = (27^{1/3})^2 = (\sqrt[3]{27})^2 = (3)^2 = \boxed{9} \quad *$$

32) Use the laws of exponents to compute the number: $(9^{4/5})^{5/8}$

$$(9^{4/5})^{5/8} = 9^{4/8} = 9^{1/2} = \sqrt{9} = \boxed{3}$$

Section 1.1

8) Find an equation of the given line: Slope is 2; (1,-2) on line

point-slope form: $y - (-2) = 2(x - 1) \Rightarrow \boxed{y + 2 = 2(x - 1)} \text{ OR } \boxed{y = 2x - 4}$

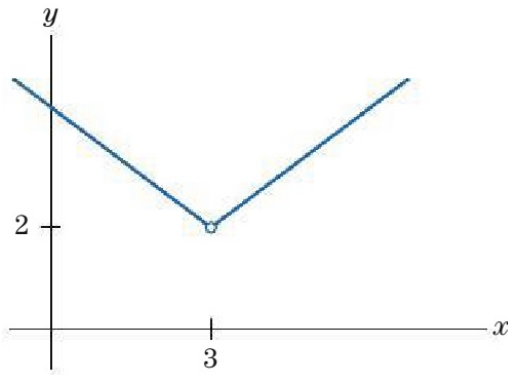
56) A salesperson's weekly pay depends on the volume of sales. If she sells x units of goods, her pay is $y = 5x + 60$ dollars. Give an interpretation of the slope and the y-intercept of this straight line.

She makes \$5 per unit sold (slope) *

\$60 is her base pay

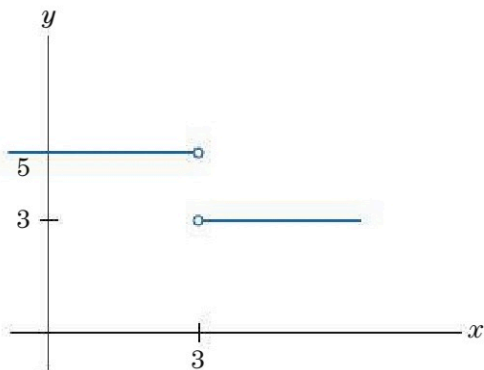
Section 1.4

2) For the following function $g(x)$, determine whether $\lim_{x \rightarrow 3} g(x)$ exists. If so, give the limit:



$\lim_{x \rightarrow 3} g(x) = \boxed{2}$ *

4) For the following function $g(x)$, determine whether $\lim_{x \rightarrow 3} g(x)$ exists. If so, give the limit:



$\lim_{x \rightarrow 3} g(x)$ DNE

(classwork problems graded: 1, 3, 4, 8, 11)