# Key for 2nd Review

1) a) $1^3 - 5 = -4$

b) $1^2 - 3 = -2$

c) does not exist

2) $\dfrac{s(6)-s(1)}{6-1} = \dfrac{(2(6)^2-6+4)-(2\cdot 1^2-1+4)}{5}$

$= \dfrac{72-6+4-2+1-4}{5}$

$= \dfrac{65}{5} = \boxed{13 \text{ cm/sec}}$

3) $f'(4) = \lim\limits_{h\to 0} \dfrac{\frac{2}{(4+h)^2} - \frac{2}{4^2}}{h}$

$= \lim\limits_{h\to 0} \dfrac{32 - 2(4+h)^2}{h(4+h)^2\cdot 4^2}$

$= \lim\limits_{h\to 0} \dfrac{\cancel{32}-\cancel{32}-16h-2h^2}{h(4+h)^2\cdot 16}$

$= \lim\limits_{h\to 0} \dfrac{-16-2h}{(4+h)^2\cdot 16} = \dfrac{\cancel{-16}^{\,-1}}{4^2\cdot \cancel{16}} = \boxed{\dfrac{-1}{16}}$

4) $f'(x) = \lim\limits_{h\to 0} \dfrac{(5(x+h)^2-4(x+h)+3)-(5x^2-4x+3)}{h}$

$= \lim\limits_{h\to 0} \dfrac{5(x^2+2xh+h^2)-4x-4h+3-5x^2+4x-3}{h}$

$= \lim\limits_{h\to 0} \dfrac{\cancel{5x^2}+10xh+5h^2-\cancel{4x}-4h+\cancel{3}-\cancel{5x^2}+\cancel{4x}-\cancel{3}}{h}$

$= \lim\limits_{h\to 0} \dfrac{\cancel{h}(10x+5h-4)}{\cancel{h}}$

$\boxed{= 10x - 4}$

5) $f(x) = 2x^5 - 8x^3 + 5x$

$f'(x) = 10x^4 - 24x^2 + 5$

$m = f'(-1) = 10 - 24 + 5$

$m = -9$

Point $(-1, f(-1))$

$f(-1) = 2(-1)^5 - 8(-1)^3 + 5(-1)$

$= -2 + 8 - 5$

$= 1$

$(-1, 1)$

$1 = -9(-1) + b$

$-8 = b$

$\boxed{y = -9x - 8}$

6) $\lim\limits_{h\to 0} \dfrac{(5\sqrt{3+h} - 5\sqrt{3})}{h} \cdot \dfrac{(5\sqrt{3+h}+5\sqrt{3})}{(5\sqrt{3+h}+5\sqrt{3})}$

$\lim\limits_{h\to 0} \dfrac{25(3+h) - 25\cdot 3}{h(5\sqrt{3+h}+5\sqrt{3})}$

$\lim\limits_{h\to 0} \dfrac{\cancel{75}+25\cancel{h}-\cancel{75}}{\cancel{h}(5\sqrt{3+h}+5\sqrt{3})}$

$= \dfrac{25}{5\sqrt{3}+5\sqrt{3}} = \dfrac{25}{10\sqrt{3}}$

$\boxed{= \dfrac{5}{2\sqrt{3}}}$

7) $\lim\limits_{h\to 0} \dfrac{(6h-11)^2 - 121}{h}$

$\lim\limits_{h\to 0} \dfrac{36h^2 - 132h + \cancel{121} - \cancel{121}}{h}$

$\lim\limits_{h\to 0} \dfrac{\cancel{h}(36h-132)}{\cancel{h}}$

$\boxed{= -132}$

8) $\lim\limits_{x\to 11} \dfrac{x^2-7x-44}{x^2-121}$

$\lim\limits_{x\to 11} \dfrac{\cancel{(x-11)}(x+4)}{\cancel{(x-11)}(x+11)}$

$\boxed{= \dfrac{15}{22}}$

9) a) $C = 75 + 0.6m$

b) $C = 75 + 0.6\cdot 750 = \$525$

c) $1095 = 75 + 0.6m$

1700 miles

10)

| | $f$ | $f'$ | $f''$ |
|---|---|---|---|
| A | − | + | − |
| B | + | + | − |
| C | − | − | + |
| D | − | 0 | + |
| E | − | + | + |