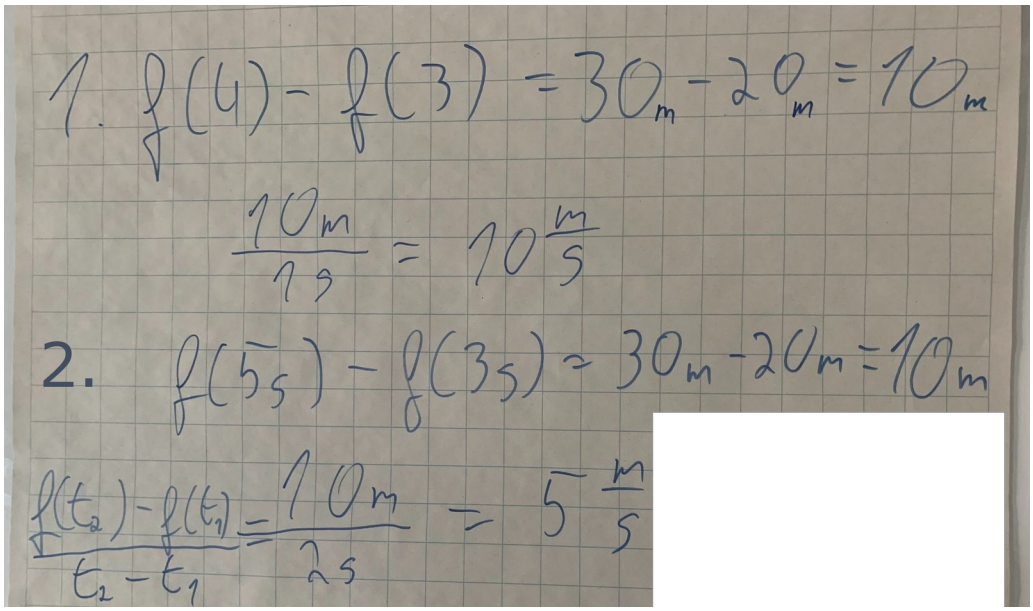
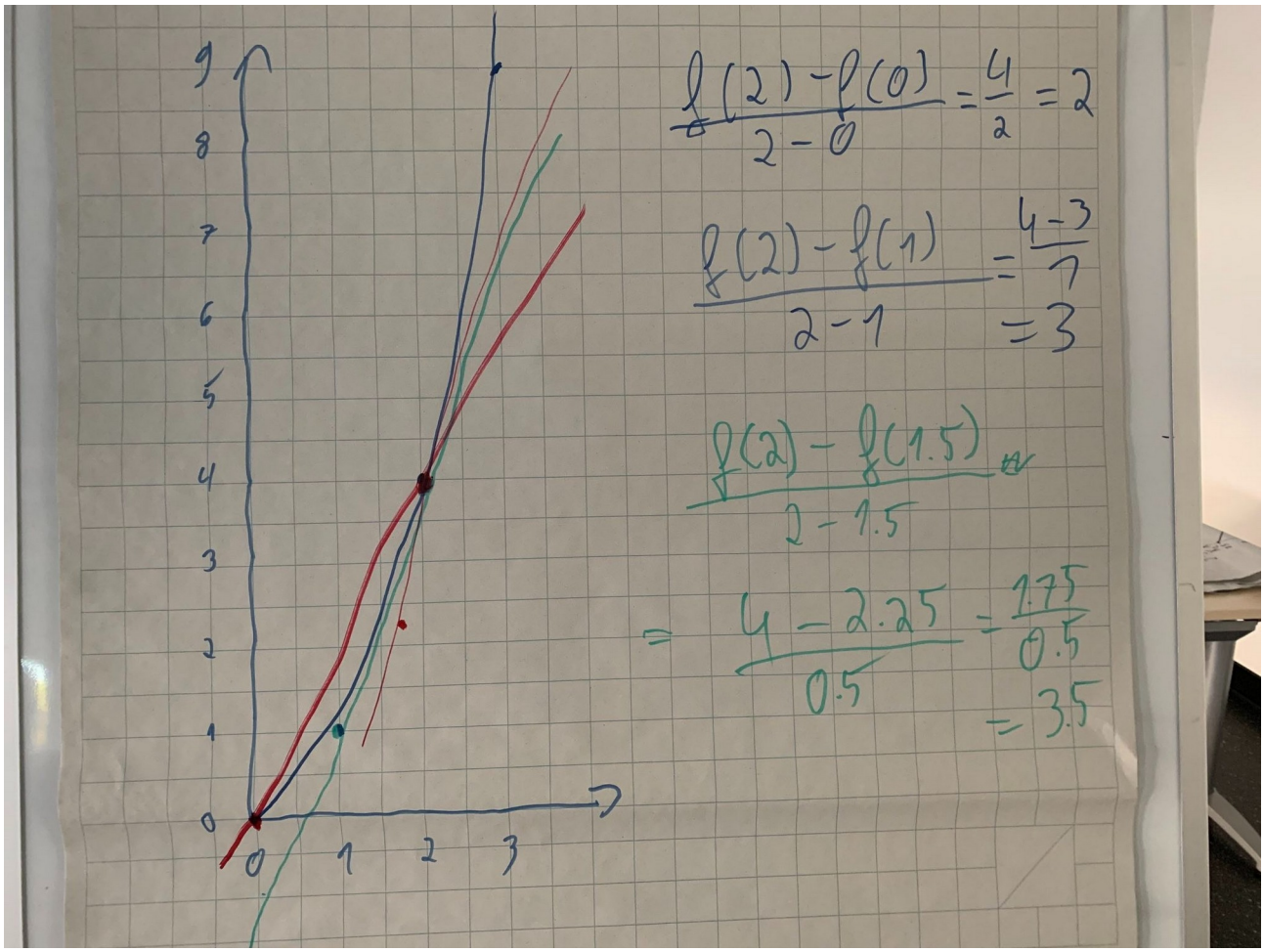
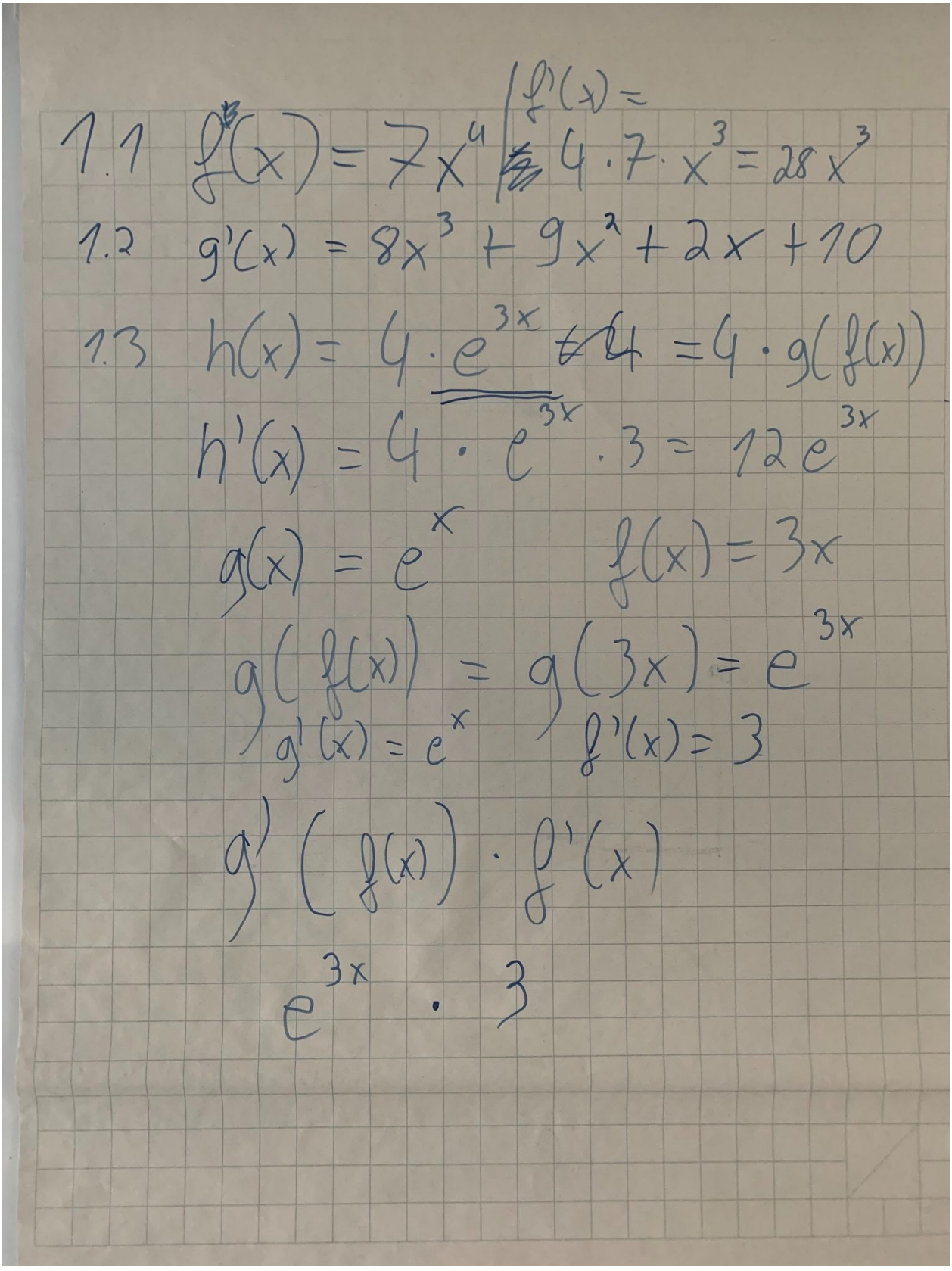
Exercise 1


1. f(4) - f(3) = 30m - 20m = 10m
10m / 1s = 10 m/s
2. f(5s) - f(3s) = 30m - 20m = 10m
f(t2) - f(t1) / t2 - t1 = 10m / 2s = 5 m/s

3.


f(2) - f(0) / 2 - 0 = 4/2 = 2
f(2) - f(1) / 2 - 1 = 4 - 3 / 1 = 3
f(2) - f(1.5) / 2 - 1.5
= 4 - 2.25 / 0.5 = 1.75 / 0.5
= 3.5

Exercise 2


1.1 f(x) = 7x^4 | f'(x) =
4 · 7 · x^3 = 28x^3
1.2 g'(x) = 8x^3 + 9x^2 + 2x + 10
1.3 h(x) = 4 · e^3x = 4 · g(f(x))
h'(x) = 4 · e^3x · 3 = 12e^3x
g(x) = e^x
f(x) = 3x
g(f(x)) = g(3x) = e^3x
g'(x) = e^x
f'(x) = 3
g'(f(x)) · f'(x)
e^3x · 3

1. 4

$i(x) = (12x^2 + 5) \cdot 3x^3 = f(x) \cdot g(x)$

$f(x) = 12x^2 + 5 \qquad f'(x) = 24x$

$g(x) = 3x^3 \qquad g'(x) = 9x^2$

$i'(x) = f'(x) \cdot g(x) + f(x) \cdot g'(x)$

$= 24x \cdot 3x^3 + (12x^2 + 5) 9x^2$

$= 72x^4 + 108x^4 + 45x^2$

$= 180x^4 + 45x^2$

1.5 $j(x) = \frac{3x}{\cos(x)} = \frac{f(x)}{g(x)}$

$f(x) = 3x \qquad g(x) = \cos(x)$

$f'(x) = 3 \qquad g'(x) = -\sin(x)$

$$j'(x) = \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{g^2}$$

$$= \frac{3 \cdot \cos(x) - 3x \cdot (-\sin(x))}{\cos(x)^2}$$

$$= \frac{3}{\cos(x)} + \frac{3x \cdot \sin(x)}{\cos(x)^2}$$

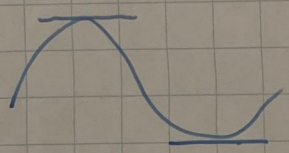
$\frac{\sin(x)}{\cos(x)} = \tan(x)$

$$= \frac{3}{\cos(x)} + \frac{3x \cdot \tan(x)}{\cos(x)}$$

$$= \frac{3x\tan(x) + 3}{\cos(x)}$$

2. $k(x) = 6x^2 + 3x + 2$

$k'(x) = 12x + 3$



$k'(x) = 0$

$\Leftrightarrow 12x + 3 = 0$

$\Leftrightarrow 12x = -3$

$\Leftrightarrow x = -\frac{3}{12} = -\frac{1}{4}$