

Math 148 F07 Quiz 10 Key

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> **restart;**

• Problem 1 (a):

> **y:=100*x^2+3*cos(x);**

$$y := 100 x^2 + 3 \cos(x)$$

> **diff(y,x);**

$$200 x - 3 \sin(x)$$

• Problem 1(b):

> **y:=50*x^3*sin(x);**

$$y := 50 x^3 \sin(x)$$

> **diff(y,x);**

$$150 x^2 \sin(x) + 50 x^3 \cos(x)$$

• Problem 1(c):

> **u:=25*x^4; v:=x-tan(x);**

$$u := 25 x^4$$

$$v := x - \tan(x)$$

> **answer:=diff(u/v,x);**

$$answer := \frac{100 x^3}{x - \tan(x)} + \frac{25 x^4 \tan(x)^2}{(x - \tan(x))^2}$$

> **answer:=combine(answer);**

$$answer := \frac{25 x^4 \tan(x)^2 + 100 x^4 - 100 x^3 \tan(x)}{x^2 - 2 x \tan(x) + \tan(x)^2}$$

> **diff(u,x);**

$$100 x^3$$

> **diff(tan(x),x);**

$$1 + \tan(x)^2$$

> **simplify(sec(x)^2-diff(tan(x),x));**

$$0$$

> **variant:=(v*diff(u,x) - u*(1-sec(x)^2))/(x-tan(x))^2;**

$$variant := \frac{100 (x - \tan(x)) x^3 - 25 x^4 (1 - \sec(x)^2)}{(x - \tan(x))^2}$$

> **result:=combine(answer - variant);**

$$result := \frac{-25 x^4 \sec(x)^2 + 25 x^4 + 25 x^4 \tan(x)^2}{x^2 - 2 x \tan(x) + \tan(x)^2}$$

```
[ > simplify(result);
```

0

```
[ > restart;
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[ • Problem 1(d):
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[ > answer:=diff(sec(x)*tan(x),x);
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$$answer := \sec(x) \tan(x)^2 + \sec(x) (1 + \tan(x)^2)$$

```
[ > variant:=sec(x)*tan(x)^2 + sec(x)*sec(x)^2;
```

$$variant := \sec(x) \tan(x)^2 + \sec(x)^3$$

```
[ > simplify(answer - variant);
```

0

```
[ > restart;
```

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[ • Problem 2(a):
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[ > y:=(1+5*x+3/2*x^2)^100;
```

$$y := \left(1 + 5x + \frac{3}{2}x^2\right)^{100}$$

```
[ > diff(y,x);
```

$$100 \left(1 + 5x + \frac{3}{2}x^2\right)^{99} (5 + 3x)$$

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[ • Problem 2(b):
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[ > y:=sin(cos(x));
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$$y := \sin(\cos(x))$$

```
[ > diff(y,x);
```

$$-\cos(\cos(x)) \sin(x)$$

```
[ > restart;
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[ • Problem 2(c):
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```
[ > y:=sqrt(1+cos(x^2));
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$$y := \sqrt{1 + \cos(x^2)}$$

```
[ > answer:=diff(y,x);
```

$$answer := -\frac{\sin(x^2) x}{\sqrt{1 + \cos(x^2)}}$$

```
[ > variant:=(1/(2*sqrt(1+cos(x^2)))) * (-sin(x^2))*(2*x);
```

$$variant := -\frac{\sin(x^2) x}{\sqrt{1 + \cos(x^2)}}$$

```
[ > answer - variant;
```

0

```
[ > restart;
```

• Problem 2(d):

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> y:=x*cos(x+sin(x));
```

```
y := x cos(x + sin(x))
```

```
> diff(y,x);
```

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cos(x + sin(x)) - x sin(x + sin(x)) (1 + cos(x))
```

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>
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