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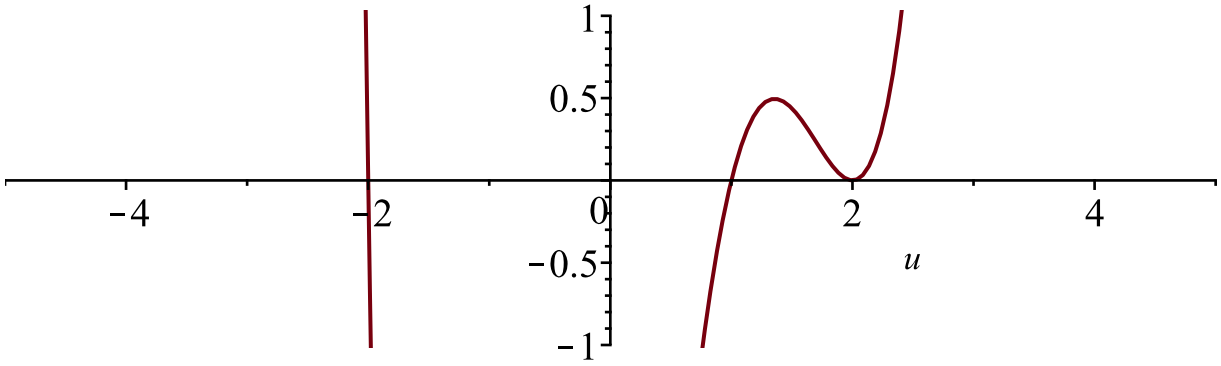
> # ==========================================================
> # Quiz 3, problem 1
> # ==========================================================
> # Make a phase line diagram for f(u)=(u-1)(u-2)^2(u+2)
> # Define f(u)by Maple lambda-notation for a function
> f:=u->(u-1)*(u-2)^2*(u+2);
```

$$f := u \mapsto (u-1)\,(u-2)^2\,(u+2) \tag{1}$$

```
> # find the roots of f(u)=0
> solve(f(u)=0,u);
```

$$-2,\ 1,\ 2,\ 2 \tag{2}$$

```
> plot(f(u),u=-5..5,-1..1);
```




```
> # from the graph, the signs of f(u) are
> # f(u)>0 on (-infinity,-2)
  # f(u)<0 on (-2,1)
  # f(u)>0 on (1,2) and (2,infinity)
> # A clever way to test the accuracy: evaluate f(u)
  # for u=-3,0,1.5,3
> signum(f(-3)), signum(f(0)), signum(f(1.5)), signum(f(3));
```

$$1,\ -1,\ 1,\ 1 \tag{3}$$

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> # ==========================================================
> # Quiz 3, problem 2
> # ==========================================================
> F:=x->cos(x*x);
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$$F := x \mapsto \cos(x^2) \tag{4}$$

```
> # RECT rule
> h:=0.2:x0:=0.6:y0:=0.5972854780:y1:=y0+h*F(x0);x1:=x0+h;
```

$$y1 := 0.7844648427$$

$$x1 := 0.8 \tag{5}$$

```
> # Check the answer, trying to match table answer y=0.9448839943
> h:=0.2:x0:=0.8;y0:=.7844648427;y1:=y0+h*F(x0);x1:=x0+h; # it
  works!
```

$$x0 := 0.8$$

$$y0 := 0.7844648427$$

$$y1 := 0.9448839943$$

$$x1 := 1.0 \tag{6}$$