Functions as Paths - Part II

Linear: f[x] = *a* x + *b* or f[x] = *a*(x - *c*) + *b*

- **Example**

```
f1[x_] := 3 x + 4;
Plot[f1[x], {x, -3, 3}]
```

- **Example**

```
f2[x_] := 3 (x - 2) + 4;
Plot[f2[x], {x, -3, 3}]
```

Aside: Can you tell the difference? Make a Manipulate to determine what "c" does to the graph.

Quadratic: f[*x*] = $a\ x^2 + b$ or f[*x*] = $a\ (x - c)^2 + b$

- **Example**

```
g1[x_] := 3 x^2 + 4;
Plot[g1[x], {x, -3, 3}]
```

- **Example**

```
g2[x_] := 3 (x - 2)^2 + 4;
Plot[g2[x], {x, -3, 3}]
```

Aside: Can you tell the difference? Make a Manipulate to determine what "c" does to the graph.

Trigonometric: f[x] = *a* Sin[*b* x] + *d*

- **Example**

```
h1[x_] := 3 Sin[5 x] + 4;
Plot[h1[x], {x, -6, 6}]
```

Piecewise

- **Examples**

```
k1[x_] := Piecewise[{{x^2, x < 0}, {x, x > 0}}];
k2[x_] := Piecewise[{{Sin[2 x], x <= 0}, {2 x, 0 < x < 2}, {4, x > 2}}];
Plot[Tooltip[{k1[x], k2[x]}], {x, -5, 5}]
```

Plot with Useful Options

```
Plot[h1[x], {x, -6, 6}, PlotRange → {{-10, 10}, {-1, 8}},
 AspectRatio → Automatic, ImageSize → 300, PlotStyle → {Red, Thick}]
```