

In [19]:

```
using Distributions;
using Gadfly, Cairo;

white_panel = Theme(panel_fill = colorant"white",
                    default_color= colorant"blue",
                    major_label_font_size=14pt,
                    minor_label_font_size=10pt,
                    major_label_color=colorant"black",
                    minor_label_color=colorant"black");

# Q1.a Find the probability that the down time is not more than 2 hours.
ans_1a = cdf(Gamma(4,1.5), 2)
```

Out[19]:

0.04649430286533402

In [20]:

```
myplot = plot(layer(x=xa, y=gpdfb, Geom.line, Theme(default_color=colorant"orange"))
Coord.Cartesian(xmin=0, xmax=20), Guide.ylabel("p(x)"));
draw(PNG(8inch, 8inch), myplot)
```

MethodError: no method matching evalmapping(::Void, ::Float64)

Closest candidates are:

```
evalmapping(::Any, ::AbstractArray) at /home/jrun/.julia/v0.6/Gadfly
y/src/mapping.jl:281
evalmapping(::Any, ::Function) at /home/jrun/.julia/v0.6/Gadfly/src/
mapping.jl:282
evalmapping(::Any, ::Distributions.Distribution) at /home/jrun/.julia/
v0.6/Gadfly/src/mapping.jl:283
```

Stacktrace:

```
[1] evalmapping! (::Dict{Symbol,Any}, ::Void, ::Gadfly.Data) at /home/
jrun/.julia/v0.6/Gadfly/src/mapping.jl:320
[2] render_prepare (::Gadfly.Plot) at /home/jrun/.julia/v0.6/Gadfly/sr
c/Gadfly.jl:428
[3] render (::Gadfly.Plot) at /home/jrun/.julia/v0.6/Gadfly/src/Gadfl
y.jl:755
[4] draw (::Compose.Image{Compose.PNGBackend}, ::Gadfly.Plot) at /hom
e/jrun/.julia/v0.6/Gadfly/src/Gadfly.jl:869
[5] include_string (::String, ::String) at ./loading.jl:522
```

WARNING: both Cairo and Gadfly export "circle"; uses of it in module Main must be qualified

WARNING: both Cairo and Distributions export "scale"; uses of it in module Main must be qualified

WARNING: both Gadfly and Base export "cross"; uses of it in module Main must be qualified

In [21]:

```
# Q2.a If $700 is budgeted to cover repairs for next week, what is the probability  
# will exceed the budgeted amount?  
  
p_x_moreThan700 = cdf(Normal(600,40),700);  
p_x_lessThan700 = 1 - p_x_moreThan700
```

Out[21]:

0.006209665325776159

In [55]:

```
ans_2b = 1 - cdf(Normal(600,40),651)
```

Out[55]:

0.10115462099558581

In [36]:

```
# Q3.a Suppose that a batch with more than 30% impurities cannot be sold. What is the  
# a randomly selected batch cannot be sold for this reason? (This is a Beta distrib  
# the parameters and write Julia code)  
  
# alpha=4 beta=2  
p_x_lessThan30 = cdf(Beta(4,2), 0.3);  
p_x_moreThan30 = 1 - p_x_lessThan30
```

Out[36]:

0.96922

In [37]:

```
# Q3 b. Suppose that the dollar value of each batch is given by  $v = 10 - 0.75x$ . Find  
# and variance of  $v$ 
```

```
g_x = 10 - 0.75
```

```
Expected = g_x * pdf(Beta(4,2),)
```

```
Variance = var(Beta(4.2))
```

MethodError: no method matching pdf(::Distributions.Beta{Float64})

Closest candidates are:

pdf(::Distributions.Beta, ::Real) at /home/jrun/.julia/v0.6/Distributions/src/univariates.jl:539

pdf(::Distributions.Distribution{Distributions.Univariate,S} where S<:Distributions.ValueSupport, ::AbstractArray) at deprecated.jl:56

pdf(::Distributions.DiscreteUniform, ::Int64) at /home/jrun/.julia/v0.6/Distributions/src/univariate/discrete/discreteuniform.jl:77

...

Stacktrace:

[1] include_string(::String, ::String) at ./loading.jl:522

In [38]:

```
# 4 What is the probability that a randomly selected bearing of this type will fail  
# hours? (Write Julia code)
```

```
ans_4a = cdf(Weibull(2,4),2)
```

Out[38]:

0.22119921692859512

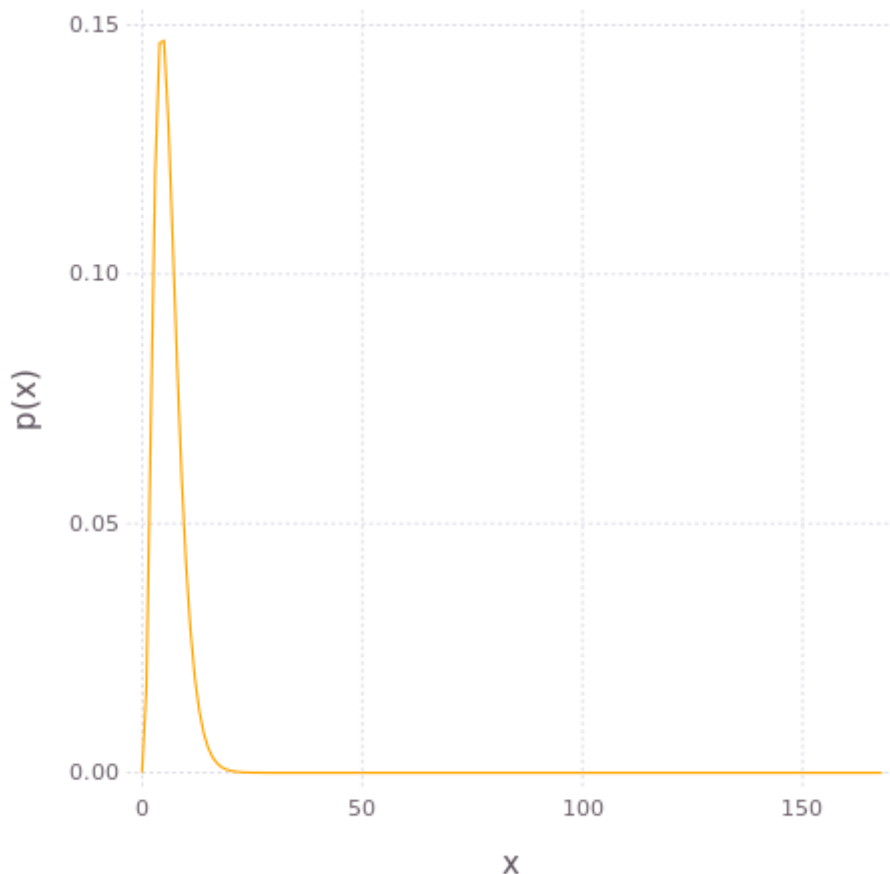
►

In [44]:

```
# pdf of the distributions
# 5.1 Gamma

x1 = collect(0:1:24*7);
y1 = pdf.(Gamma(4,1.5),x1)

myplot = plot(layer(x=x1, y=y1, Geom.line, Theme(default_color=colorant"orange")),
Coord.Cartesian(xmin=0, xmax=24*7), Guide.ylabel("p(x)"));
draw(PNG(5inch, 5inch), myplot)
```



Out[44]:

false

In [*]:

```
# 5.2 Normal

x2 = collect(0:1:1500)
y2 = pdf.(Normal(600,40),x2)
myplot = plot(layer(x=x2, y=y2, Geom.line, Theme(default_color=colorant"orange")),
Coord.Cartesian(xmin=0, xmax=1500), Guide.ylabel("p(x)"));
draw(PNG(5inch, 5inch), myplot)
```

In [46]:

```
# 5.3 Beta
```

In []:

```
# 5.4 Weibull
```