Question 1:

Rocky : 2 km/h
Sandy : 3 km/h
Smooth : 5 km/h

Route 1 : 2 km

Rocky : ~~50%~~ 50% Chance it takes ~~40 minutes~~ 60 minutes
Sandy : 20% Chance it takes 40 minutes
Smooth : 30% Chance it takes 24 minutes

Route 2 : 1.8 km

Rocky = 40% Chance it takes 54 minutes
Sandy = 40% Chance it takes 36 minutes
Smooth : 20% Chance it takes 21.6 minutes

Route 2 is the best route

Route 3 : 3.1 km

Rocky : 10% Chance it takes 93 minutes
Sandy = 50% Chance it takes 62 minutes
Smooth : 40% Chance it takes 37.2 minutes

Route 1 $(.50)(60) + (.2)(40) + (.3)(24) = 45.2$

Route 2 $(.4)(54) + (.4)(36) + (.2)(21.6) = \boxed{40.32}$

Route 3 $(.1)(93) + (.5)(62) + (.4)(37.2) = 55.18$

Part 2

Normalized Minutes Per Route

Route 1 : 45.2 $\longrightarrow$ $45.2 + (.3)(45) + (.7)(0) = 58.7$

Route 2 : 40.32 $\longrightarrow$ $40.32 + (.6)(60) + (.4)(0) = 76.32$

Route 3 : 55.18 $\xrightarrow[\text{Change}]{\text{No}}$ $\boxed{55.18}$

We would choose
Route 3.

Part 3

Route 1 is ~58.7 minutes
Route 2 is ~76.32 minutes
Route 3 is ~55.18 minutes

with new info: $\cancel{55.18}$ $\left(\frac{.1}{.6}\right)(93) + \left(\frac{.5}{.6}\right)(62) = 67.17$

—Since Route 3 would not be the shortest utility with the new information, making Route 1 the best, we would want to wait no longer than about 3 minutes to find out if Route 3 is smooth or not. The value of this new information is worth roughly 3 minutes of our time.

Part 4 on Q1P4.txt