2013 AB 2

a) $G'(t) = \dfrac{-45\sin\left(\frac{t^2}{18}\right)}{9t}$

$G'(5) = \dfrac{-45\sin\left(\frac{25}{18}\right)5}{9} - \sin\left(\frac{25}{18}\right)5 = 24.588$

At t=5 hours, the rate at which unprocessed gravel arrives at the processing plant is <u>increasing</u> at a rate of <u>24.588</u> per hour per hour

b) $\int_0^8 G(t)\,dx = 825.551$ tons

c) $G(t)$

$G(5) = 98.141 < 100$

At time t=5, the rate at which unprocessed gravel is arriving is less than the rate at which it is being processed, thus, the amount of unprocessed gravel at the plant is decreasing at time = 5.

d) $A(t) = 500 + \int_0^t (G(s) - 100)\,dx$

$A'(t) = G(t) - 100 = 0 \rightarrow$

$t = 4.9$

$A(0) = 500$

$A(4.9) = 635.376$

$A(8) = 525.551$

$\boxed{635.376 \text{ tons}}$

2015 AB1

a) $\int_0^8 R(t)\,dt = \boxed{76.570 \text{ ft}^3}$

b) $R(3) - D(3) = -0.3136 < 0$

Since $R(3) - D(3) < 0$, the amount of water in the pipe is <u>decreasing</u> at t=3 hrs.

c) $30 + \int_0^t [R(x) - D(x)]\,dx$

$R(t) - D(t) = 0$

$t = 0, 3.272$

$t = 0 \rightarrow 30$

$t = 3.272 \rightarrow 27.963$

$t = 8 = 48.97$

$\boxed{\text{Minimum at } t = 3.272 \text{ hrs}}$

Scanned with CamScanner

2018 AB 1

a) $\int_0^{300} r(t)\,dt = 270$ people

b) at $t = 300$, there are 80 people

~~$300 + \frac{80}{0.7} = 414.286$~~

c) $300 + \frac{80}{0.7} = 414.286$

$$\boxed{414.2855}$$

d) $20 + \int_0^t r(x)\,dx - 0.7t$

$r(t) - 0.7 = 0$

$t = 33.011,\ 166.575$

at $t = 33.0115$

there are 3.803 people

minimum $t = 33.013$ when 4 people are in line