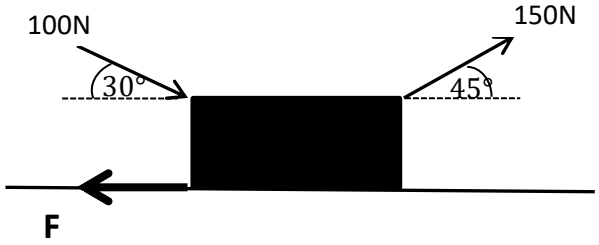
Summer Assignment Test 3 Version O

1) Find the following integrals

(a) $\int \sec 3x \tan 3x \, dx$ (b) $\int cosec\, x \cot x \, dx$ (c) $\int \sec^2 2x \, dx$

2. A box is being pushed and pulled across a rough surface by constant forces as shown in the diagram. The box is moving at a constant speed. By modelling the box as a particle, find the magnitude of the resistance due to friction.



3. A particle P is projected from a point on a horizontal plane with speed U at angle of elevation θ.

a) Find the range of the projectile

b) Hence find, as θ varies, the maximum range of the projectile.

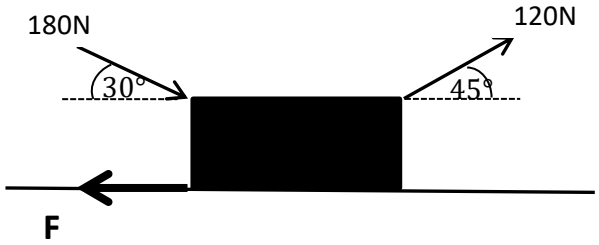
c) Given that the range of the projectile is $\frac{2U^2}{3g}$, find the two possible values of θ

Summer Assignment Test 3 Version P

1) Find the following integrals

(a) $\int \sec 5x \tan 5x \, dx$ (b) $\int cosec\, 2x \cot 2x \, dx$ (c) $\int \sec^2 12x \, dx$

2. A box is being pushed and pulled across a rough surface by constant forces as shown in the diagram. The box is moving at a constant speed. By modelling the box as a particle, find the magnitude of the resistance due to friction.



3. A particle P is projected from a point on a horizontal plane with speed 2U at angle of elevation θ.

a) Find the range of the projectile

b) Hence find, as θ varies, the maximum range of the projectile.

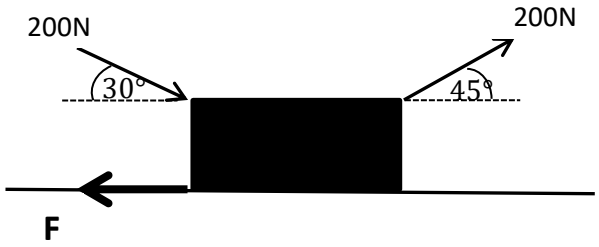
c) Given that the range of the projectile is $\frac{4U^2}{3g}$, find the two possible values of θ

Summer Assignment Test 3 Version Q

1) Find the following integrals

(a) $\int \sec 7x \tan 7x \, dx$ (b) $\int cosec\ 6x \cot 6x \ dx$ (c) $\int \sec^2 22x \, dx$

2. A box is being pushed and pulled across a rough surface by constant forces as shown in the diagram. The box is moving at a constant speed. By modelling the box as a particle, find the magnitude of the resistance due to friction.



3. A particle P is projected from a point on a horizontal plane with speed 3U at angle of elevation θ.

a) Find the range of the projectile

b) Hence find, as θ varies, the maximum range of the projectile.

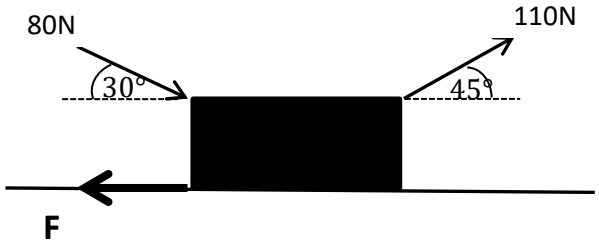
c) Given that the range of the projectile is $\frac{3U^2}{g}$, find the two possible values of θ

Summer Assignment Test 3 Version R

1) Find the following integrals

(a) $\int \sec ax \tan ax \, dx$ (b) $\int cosec\ px \cot px \ dx$ (c) $\int \sec^2 x \, dx$

2. A box is being pushed and pulled across a rough surface by constant forces as shown in the diagram. The box is moving at a constant speed. By modelling the box as a particle, find the magnitude of the resistance due to friction.



3. A particle P is projected from a point on a horizontal plane with speed 4U at angle of elevation θ.

a) Find the range of the projectile

b) Hence find, as θ varies, the maximum range of the projectile.

c) Given that the range of the projectile is $\frac{8U^2}{3g}$, find the two possible values of θ

Answers Version O

1a) $\frac{1}{3}\sec 3x + c$ $(b) - \operatorname{cosec} x + c$ c) $\frac{1}{2}\tan 2x + c$

2) $25(3\sqrt{2} + 2\sqrt{3})$ = 192.7

3) a) $\frac{U^2 sin2\theta}{g}$ b) $\frac{U^2}{g}$ c) $20.9°, 69.1°$

Answers Version P

1a) $\frac{1}{5}\sec 5x + c$ b) $-\frac{1}{2} cosec\ 2x + c$ c) $\frac{1}{12}\tan 12x + c$

2) $30(2\sqrt{2} + 3\sqrt{3})$ = 240.7

3) a) $\frac{4U^2 sin2\theta}{g}$ b) $\frac{4U^2}{g}$ c) $9.74°, 80.3°$

Answers Version Q

1a) $\frac{1}{7}\sec 7x + c$ b) $-\frac{1}{6} cosec\ 6x + c$ c) $\frac{1}{22}\tan 22x + c$

2) $100(\sqrt{2} + \sqrt{3})$ = 314.6

3) a) $\frac{9U^2 sin2\theta}{g}$ b) $\frac{9U^2}{g}$ c) $9.74°, 80.3°$

Answers Version R

1a) $\frac{1}{a}\sec ax + c$ b) $-\frac{1}{p} cosec\ px + c$ c) $\tan x + c$

2) $5(11\sqrt{2} + 8\sqrt{3})$ = 147.1

3) a) $\frac{16U^2 sin2\theta}{g}$ b) $\frac{16U^2}{g}$ c) $15°, 75°$