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10.3 Forces and Acceleration

1) $F=ma$ $F=160N$
$a=\frac{160}{250}$ $M=250kg$

$a=0.64ms^{-2}$

2) $F=ma$ $M=6kg$
$a=4ms^{-2}$
$F=6\times4$

$F=24N$

3) $W=Mg$ $M=9kg$
$g=9.8N$
$W=9\times9.8$

$W=88.2N/kg$

4) a) $F=Ma$

$a=\frac{F}{M}$ $M=3kg$
$F=0.9N$

$a=0.3ms^{-2}$

b)

S	15
U	0
V	
A	0.3
T	

$S=ut+\frac{1}{2}at^2$

$15=0t+\frac{1}{2}(0.3)t^2$

$15=0.15t^2$

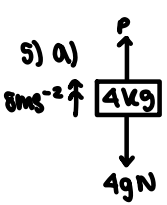
$t^2=\frac{15}{0.15}$

$t^2=100$

$t=\sqrt{100}$

$t=10$ seconds

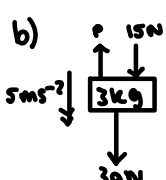
5) a)



$P-4g=8(4)$
$P=32+4(9.8)$

$P=71.2N$

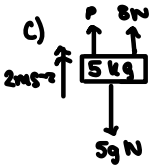
b)



$3g+15-P=3(5)$

$P=29.4N$

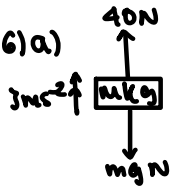
c)



$P+8N-5g=2(5)$
$P=5(9.8)-8+10$

$P=51N$

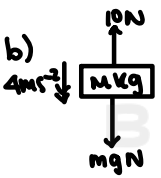
6) a)



$40-mg=3m$
$3m+mg=40$
$3m+9.8m=40$
$12.8m=40$

$m=3.125kg$

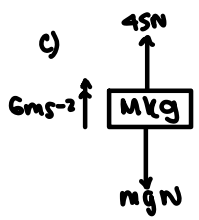
b)



$mg-10=4m$
$mg-4m=10$
$9.8m-4m=10$
$5.8m=10$

$m=1.72kg$

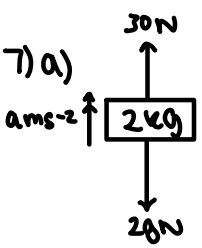
c)



$45-mg=6m$
$6m+mg=45$
$6m+9.8m=45$
$15.8m=45$

$m=2.85kg$

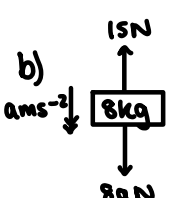
7) a)



$30-2g=2a$
$2a=30-2(9.8)$
$2a=10.4$

$a=5.2ms^{-2}$

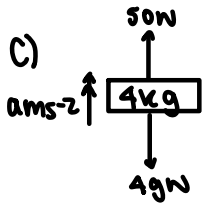
b)



$8g-16=8a$
$8a=63.4$

$a=7.93ms^{-2}$

c)



$50 - 4g = 4a$

$4a = 50 - 4(9.8)$

$4a = 10.8$

$a = 2.7 ms^{-2}$

b) $F = ma$

$120 = 60a$

$a = 2 ms^{-2}$

S	
U	0
V	3
A	2
T	

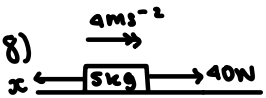
$v^2 = u^2 + 2as$

$3^2 = 0^2 + 2(2)s$

$4s = 9$

$s = 2.25 ms^{-2}$

8)



$5 \times 4 = 20$

$40 - x = 20$

$x = 20N$

9) a) $W = mg \quad m = 60kg$

$W = 60 \times 9.8$

$W = 588N$

b) $F = ma$

$F = 60 \times 0.5$

$F = 30$

$588 + 30 = 618N$

10) a)

S	
U	0
V	12
A	
T	10

$v = u + at$

$12 = 0 + 10a$

$10a = 12$

$a = 1.2 ms^{-2}$

b) $F = ma$

$F = 6000 \times 1.2$

$F = 7200N$

$7200N + 1800N = 9000N$

11) a) $F = ma$

$F = 60 \times 3.5$

$F = 210N$

$330 - 210 = 120N$

$K = 120$

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