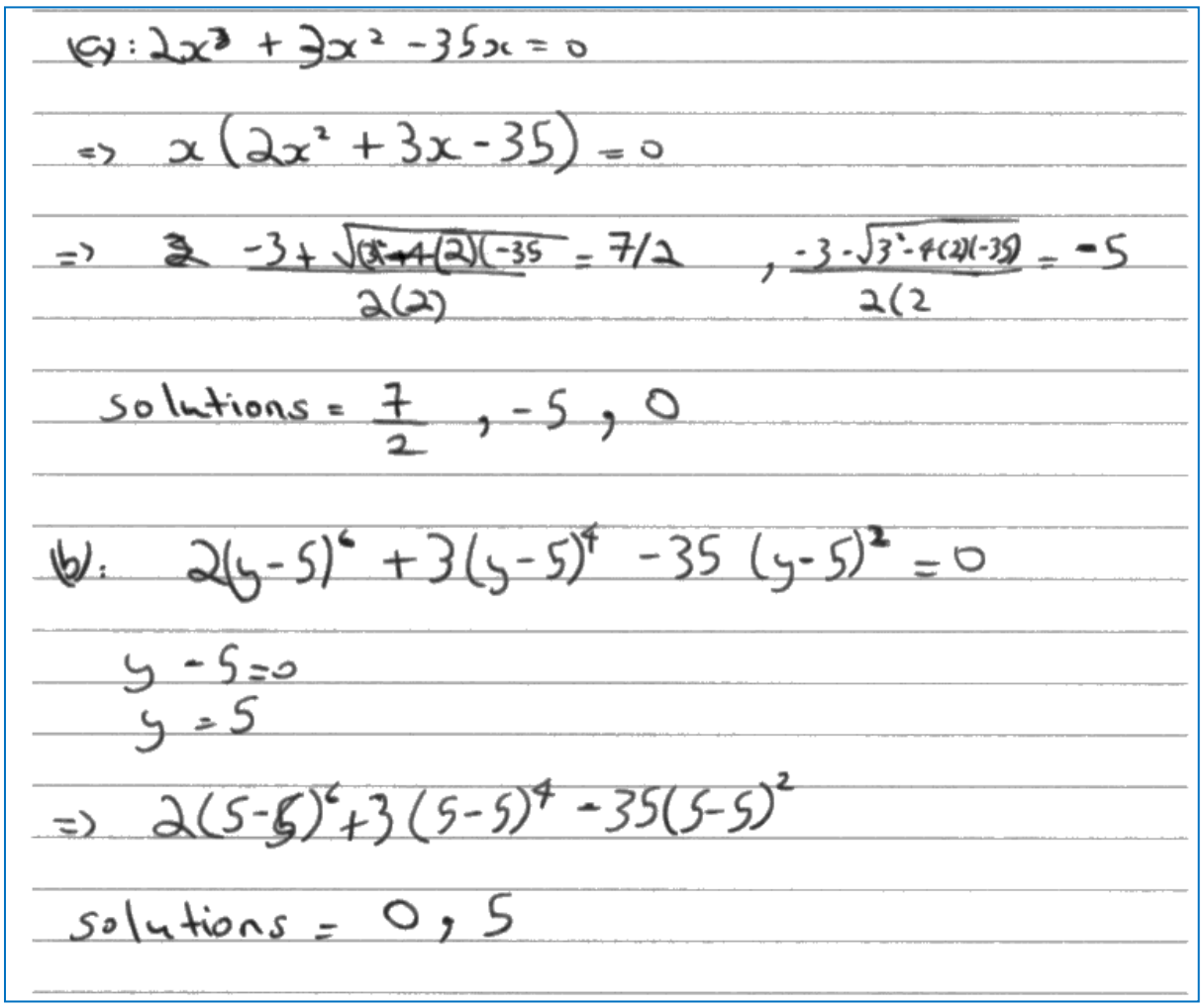
Module 1

## Activity 4

In each case make a judgement of where the student has gone wrong.

**A**



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**B**

a.) $2x^3 + 3x^2 - 35x = 0$

$x(2x^2 + 3x - 35) = 0$

$2x^2 + 3x - 35 = 0$

~~$2x^2 + 7x$~~

$2x^2 + 10x - 7x - 35 = 0$

$2x(x+5) - 7(x+5) = 0$

$(x+5)(2x-7) = 0$

$x = -5$ or $x = \frac{7}{2}$

b.) $(y-5)^2 = x$

$(y-5)^2 = -5$ or $(y-5)^2 = \frac{7}{2}$

$y(y-5) - 5(y-5) = -5$ or $y(y-5) - 5(y-5) = \frac{7}{2}$

$y^2 - 5y - 5y + 25 = -5$ or $y^2 - 5y - 5y + 25 = \frac{7}{2}$

$y^2 - 10y + 30 = 0$ or $2y^2 - 20y + 318 = 0$

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**C**

(4)

(a) $2x^3 + 3x^2 - 35x = 0$

$x(2x^2 + 3x - 35) = 0$

$2x^2 + 3x - 35 = 0$

$2x^2 + 10x - 7x - 35 = 0$

$2x(x+5) - 7(x+5) = 0$

$(2x-7)(x+5) = 0$

$2x = 7 \qquad x = -5$

$x = \frac{7}{2} \qquad x = -5$

(b) $2(y-5)^6 + 3(y-5)^4 - 35(y-5)^2$ let $(y-5)^2 = a$

$2((y-5)^2)^3 + 3((y-5)^2)^2 - 35(y-5)^2$

$2a^3 + 3a^2 - 35a = 0$

$a(2a^2 + 3a - 35) = 0$

$2a^2 + 3a - 35 = 0$

$2a^2 + 10a - 7a - 35 = 0$

$2a(a+5) - 7(a+5) = 0$

$(2a-7)(a+5) = 0$

$a = \frac{7}{2} \qquad a = -5$

$\sqrt{(y-5)^2} = \sqrt{\frac{7}{2}}$

$y - 5 = \pm\sqrt{\frac{7}{2}}$

$y = +5 \pm \sqrt{\frac{7}{2}}$

$\sqrt{(y-5)^2} = \sqrt{-}$

negative numbers don't have square root.

→

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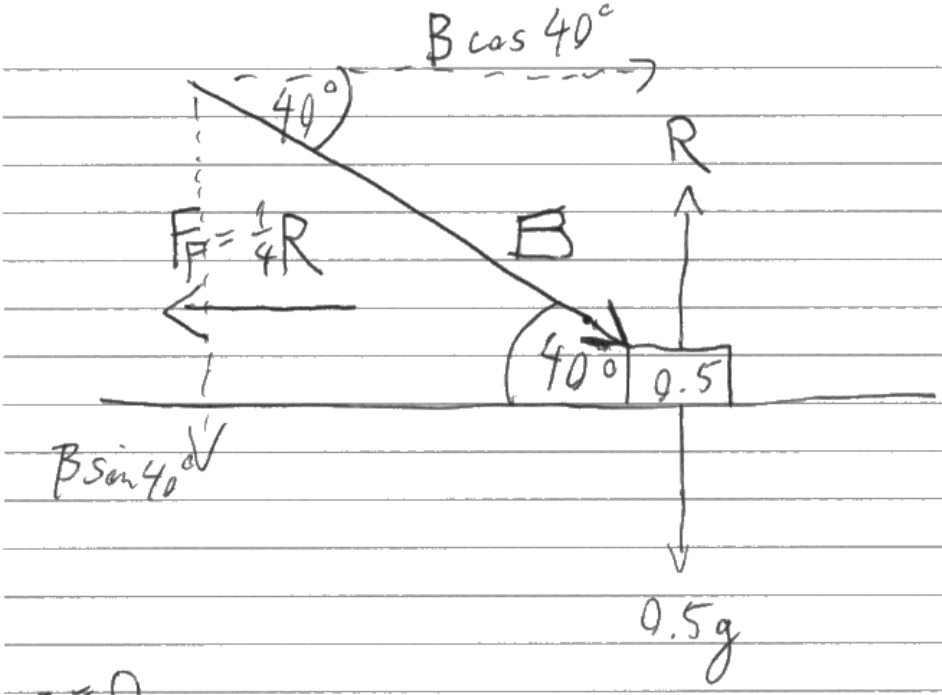
D

the force that is being applied along the handle of the broom to the broom head.] **(6)**




$a = 0$

$R = 0.5g + B\sin(40^\circ)$

$F = ma$

$F = 0.5 \cdot 0$

$F = 0$

$B\cos 40^\circ - \frac{1}{4}R = 0$

$B\cos 40^\circ = \frac{0.5g + B\sin 40^\circ}{4}$

$0.766B = 1.23 + 0.161B$

**Question 2 continued**

$0.766B = 1.23 + 0.161B$ (3 s.f.)

$0.605B = 1.23$

$\boxed{B = 2.03}$ (3 s.f.)

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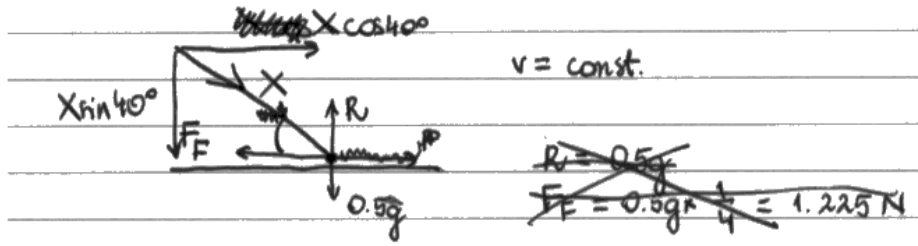
E

(6)




$R = 0.5g + X\sin 40°$

$F_F = (0.5g + X\sin 40°)\frac{1}{4}$

$X\cos 40° = F_F \rightarrow$ as $v = \text{const.}$

$X\cos 40° = \frac{1}{4}(0.5g + X\sin 40°)$

$4X\cos 40° = 0.5g + X\sin 40°$

$4X\cos 40° - X\sin 40° = 0.5g$

$X(4\cos 40° - \sin 40°) = 0.5g$

$X = \frac{0.5g}{4\cos 40° - \sin 40°}$

$X = 2.02\,(3\text{sf})\ \text{N}$

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F

the force that is being applied along the handle of the broom to the broom head.

(6)

$(\uparrow)$ $R - 0.5g - 0.5g \sin 40 = 0$

$R = 0.5g + 0.5g \sin 40$

$R = 15.4\text{N}$

$F_{max} = \mu R$

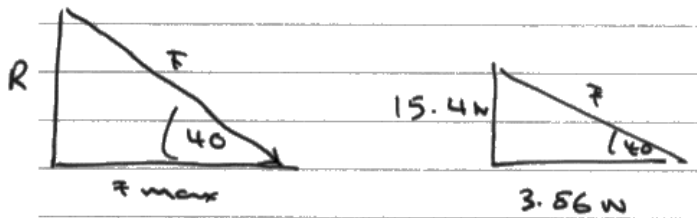
$= \frac{1}{4} \times 15.4$

$= 3.86\text{N}$

$(\rightarrow)$ $0.5g \cos 40 - F_{max} + x = 0.5a$

$0.5g \cos 40 - 3.86 + x = 0.5a$

$-0.106 + x = 0.5a$




$F = \sqrt{3.86^2 + 15.4^2}$

$= 15.9\text{N}$