St Andrew's Academy

Mathematics Department


## COURSE 2 BLOCK 7

PRE-ASSESSMENT
LEARNING EVALUATION

## NUMBER

- I can use non-calculator strategies to perform calculations using the four operations.
- I can confidently use the negative number line and answer problems in context.
- I can add and subtract with negative numbers:
e.g. a) $-5+4=-1$
b) $3-7=-4$
c) $3+(-2)=1$
d) $5-(-2)=7$
e) $(-4)+(-8)=-12$
e) $(-1)-(-9)=8$
- I can multiply positive and negative numbers together:
e.g. a) $(-6) \times 5=-30$
b) $(-2) \times(-7)=14$
- I can divide positive and negative numbers together:
e.g. a) $(-16) \div 8=-2$
b) $(-12) \div(-3)=4$



## ALGEBRA

- I can remove brackets and simplify
e.g. a) $5(x+4)-7$

$$
\begin{aligned}
& =5 x+20-7 \\
& =5 x+13
\end{aligned}
$$

b) $8(x+2)-3(2 x-5)$

$$
\begin{aligned}
& =8 x+16-6 x+15 \\
& =2 x+31
\end{aligned}
$$

- I can solve equations with letters and numbers on both sides:

$$
\begin{array}{cc}
\text { e.g. } 8 x+4 & =2 x+40 \\
-4 & -4 \\
8 x & =2 x+36 \\
-2 x & -2 x \\
6 x & =36 \\
\div 6 & \div 6 \\
x & =6
\end{array}
$$

- I can solve equations with brackets:
e.g. a) $4(y-3)=20$
$4 y-12=20$
$+12+12$
$\begin{aligned} 4 y & =32 \\ \div 4 & =8\end{aligned}$
b) $5(3 x-2)=4(x+3)$
$15 x-10=4 x+12$
$+10 \quad+10$
$15 x=4 x+22$
$-4 x \quad-4 x$
$11 x=22$
${ }^{\div 11} x=2^{\div 11}$
- I can solve equations involving fractions:
e.g. a) $\begin{aligned} & \frac{1}{2} x-5=2 \\ & +5 \quad+5\end{aligned}$
$\times 2 \begin{aligned} \frac{1}{2} x & =7 \\ x & =14\end{aligned}$
-Algebra Exercise 1 Q1




| - I can work out the area of a Kite and a Rhombus, ensuring I show all line of working: e.g. <br> a) A kite $\begin{aligned} & A=\frac{1}{2} \times D \times d \\ & A=\frac{1}{2} \times 12 \times 7 \\ & A=\frac{1}{2} \times 84 \\ & A=42 \mathrm{~cm}^{2} \end{aligned}$ <br> b) A Rhombus $\begin{aligned} & A=\frac{1}{2} \times D \times d \\ & A=\frac{1}{2} \times 8 \times 5 \\ & A=\frac{1}{2} \times 40 \\ & A=20 \mathrm{~mm}^{2} \end{aligned}$ <br> - I can work out the area of a Trapezium, ensuring I show all line of working: e.g. $\begin{aligned} & A=\frac{1}{2}(a+b) \times h \\ & A=\frac{1}{2}(8+6) \times 7 \\ & A=\frac{1}{2}(14) \times 7 \\ & A=7 \times 7 \\ & A=49 \mathrm{~cm}^{2} \end{aligned}$ <br> - I can work out the area of a Composite, ensuring I show all line of working: e.g. $\begin{array}{ll} A_{1}=L X B & A_{2}=L X B \\ A_{1}=9 \times 4 & A_{2}=6 \times 2 \\ A_{1}=36 \mathrm{~cm}^{2} & A_{2}=12 \mathrm{~cm}^{2} \\ \text { Total Area }=36+12=48 \mathrm{~cm}^{2} \end{array}$ |  | - Length, Perimeter, Area and Volume Exercise 4 Q3a + b <br> - Length, Perimeter, Area and Volume Exercise 4 Q3c + d <br> - Length, Perimeter, Area and Volume Exercise 4 Q2 <br> - Length, Perimeter, Area and Volume Exercise 6 |
| :---: | :---: | :---: |


b) A cuboid


- I understand that $1 \mathrm{~cm}^{3}=1 \mathrm{ml}$ and can use this information to calculate liquid volume.
- I can solve problems involving area and volume.
- I recognise 3D objects by their nets.
- I can find the surface area of cubes and cuboids.
e.g.
a)


4 cm
b)
Surface Area of cuboid:
First face: $\mathrm{A}=\mathrm{I} \times \mathrm{b}$

$$
\begin{aligned}
& A=7 \times 3 \\
& A=21 \mathrm{~cm}^{2}
\end{aligned}
$$

Second face: $\mathrm{A}=\mathrm{l} \times \mathrm{b}$

$$
\begin{aligned}
& A=7 \times 4 \\
& A=28 \mathrm{~cm}^{2}
\end{aligned}
$$

Third face: $\mathrm{A}=\mathrm{I} \times \mathrm{b}$

$$
\begin{aligned}
& A=3 \times 4 \\
& A=12 \mathrm{~cm}^{2}
\end{aligned}
$$

Total Surface Area $=21+21+28+28+12+12=122 \mathrm{~cm}^{2}$


- I can find the surface area of triangular prism. e.g.


Surface area of triangular prism:

First face: $A=1 \times b$
$A=5 \times 4$
$\mathrm{A}=20 \mathrm{~cm}^{2}$

Second face: $A=\frac{1}{2} \times b \times h$

$$
\begin{aligned}
& A=\frac{1}{2} \times 4 \times 3 \\
& A=6 \mathrm{~cm}^{2}
\end{aligned}
$$

Total Surface Area $=20+20+20+6+6=72 \mathrm{~cm}^{2}$

- I can find the surface area of a cylinder.


Surface area of cylinder:
Finding the length of the rectangle: $\mathrm{C}=\pi \times \mathrm{D}$
First face: $\mathrm{A}=\pi \times \mathrm{r}^{2}$

$$
\begin{array}{lr}
A=\pi \times 3^{2} & C=\pi \times 6 \\
\left.A=28.27 \mathrm{~cm}^{2} \text { (to } 2 \mathrm{dp}\right) & \mathrm{C}=18.85 \mathrm{~cm} \\
& \text { (to } 2 \mathrm{dp} \text { ) }
\end{array}
$$

Second face: $A=I \times b$

$$
\begin{aligned}
& A=18.85 \times 5 \\
& A=94.25 \mathrm{~cm}^{2}(\text { to } 2 \mathrm{dp})
\end{aligned}
$$

Total surface area $=28.27+28.27+94.25=150.79 \mathrm{~cm}^{2}$
b)


Surface area of cylinder: Finding the length of the
First face: $\mathrm{A}=\pi \mathrm{xr}^{2}$
rectangle: $\mathrm{C}=\pi \times \mathrm{D}$

$$
\begin{array}{lr}
\mathrm{A}=\pi \times 5^{2} & \mathrm{C}=\pi \times 10 \\
\mathrm{~A}=78.54 \mathrm{~cm}^{2} \text { (to } 2 \mathrm{dp} \text { ) } & \mathrm{C}=31.42 \mathrm{~cm} \\
& \text { (to } 2 \mathrm{dp} \text { ) }
\end{array}
$$

Second face: $A=I \times b$

$$
\begin{aligned}
& A=31.42 \times 8 \\
& A=251.36 \mathrm{~cm}^{2} \text { (to } 2 \mathrm{dp} \text { ) }
\end{aligned}
$$

Total surface area $=78.54+78.54+251.36=408.44 \mathrm{~cm}^{2}$


COURSE 2 BLOCK 7 REVISION

## NUMBER REVISION

## Exercise 1

1. Read the following thermometers and state the temperature:
b)

2. Put these temperatures in order, the lowest first.

$$
2^{0} \mathrm{C},-8^{0} \mathrm{C},-1^{0} \mathrm{C},-6^{0} \mathrm{C},-4^{0} \mathrm{C}
$$

3. Which of these temperatures is lowest?
i) $-4^{0} \mathrm{C}$ or $-2^{0} \mathrm{C}$
ii) $-16^{\circ} \mathrm{C}$ or $-17^{\circ} \mathrm{C}$
4. The temperature in Paisley one day in December was $6^{\circ} \mathrm{C}$. The temperature fell by 8 degrees by lam. What is the temperature now?
5. What is the difference in temperature between $-4^{\circ} \mathrm{C}$ and $14^{\circ} \mathrm{C}$ ?
6. What number is 10 up from -37.
7. What number is 8 down from -23 .
8. The temperature in Moscow was $-12^{\circ} \mathrm{C}$ at 4 am . By 2 pm the temperature had risen by $7^{\circ}$. What was the temperature at 2pm?
9. The temperature in Russia one afternoon was $-7^{\circ} \mathrm{C}$. By night fall the temperature had fallen by $11^{\circ}$. What was the temperature at night fall?

## Exercise 2

1. State which of following statements are true or false.
a) $8>3$
b) $-2<5$
c) $0<-1$
d) $-9>-4$
2. Complete the following calculations:
a) $2-7$
b) $(-3)+8$
C) $(-5)-9$
d) $12-20$
e) $(-18)+6$
f) $(-13)+7$
g) $3+(-10)$
h) $10+(-4)$
i) $0+(-18)$
j) $(-6)+(-8)$
k) $(-2)+(-16)$
I) $(-19)+(-20)$
3. Complete the following calculations:
a) 4-18
b) $(-6)-15$
c) $7-(-10)$
d) $0-(-19)$
e) $(-8)-(-3)$
f) $(-17)-(-5)$
g) $(-2)-(-11)$
h) $(-39)-(-20)$
i) $(-6)-(-4)$
j) $(-10)-(-9)$
k) $(-20)-(-15)$
I) $(-50)-(-30)$

## Exercise 3

Complete the following calculations:
a) $35 \div(-7)$
b) $(-2) \times 9$
c) $(-30) \div 5$
d) $(-9) \times(-8)$
e) $7 \times(-4)$
f) $(-12) \times 5$
h) $(-54) \div(-9)$
i) $(-48) \div 6$
k) $(-8) \times(-4)$
I) $7 \times(-13)$
m) $(-100) \div(-20)$
n) $50 \div(-2)$

## Exercise 4

1. Complete the following calculations:
a) 7-19
b) $(-5)+12$
C) $(-4) \times 8$
d) $1+(-16)$
e) $(-8)+(-15)$
f) $(-9)-(-14)$
g) $(-63) \div 9$
h) $(-28)-(-10)$
i) $(-14) \times(-6)=$
j) $(-8)-13$
k) $(-15)+(-12)$
1) $120 \div(-2)$
m) $(-49) \div 7$
n) $(-17)-(-21)$
o) $2+(-14)$
p) $(-6) \times 5$
a) $7-(-10)$
r) $32 \div(-8)$
s) $(-4)+(-9)$
t) $(-1)-(-17)$
u) $13 \times(-4)$
v) $(-66) \div(-11)$
w) $(-18)-(-12)$
x) $5+(-16)$
y) $(-9) \times(-7)$
z) $(-2)+(-11)$

## Exercise 5

Complete the following calculations:

1. $(-7)+8$
2. $3-10$
3. $4+(-18)$
4. $(-9) \times 6$
5. $6-(-17)$
6. $(-3)-(-5)$
7. $63 \div(-7)$
8. $(-4) \times(-8)$
9. $(-25)-(-12)$
10. $2+(-19)$
11. $(-54) \div 6$
12. $(-10)+(-36)$
13. $5 \times(-13)$
14. $(-42) \div(-7)$
15. $(-50)-(-28)$

## ALGEBRA REVISION

## Exercise 1

1. Remove the brackets and simplify:
(a) $2(q+4)+3$
(b) $3(e+1)+6$
(c) $5(t+4)+2$
(d) $6(u+2)-7$
(e) $4(p+2)-7$
(f) $80 v+10(7 v+n)$
g) $12-2(x-5)$
2. Remove the brackets and simplify:
(a) $3(m+2)+4(m+1)$
(b) $5(b+2)+2(b+4)$
(c) $8(c+1)+3(c+6)$
(d) $2(8 t-2)+5(2 t+4)$
(e) $6(4-5 e)+7(2+4 e)$
(f) $4(2 x+1)-3(x+2)$
(g) $9(x+1)-6(x-2)$
(h) $x(8 x-2)-2(3 x-8)$

## Exercise 2

Solve the following equations:

1. $x+3=9$
2. $2 x=6$
3. $4-x=5$
4. $2 x+3=13$
5. $2 x=1$
6. $3 x=2$
7. $4 x=20$
8. $4 x-1=19$
9. $4 x=-20$
10. $2 x=-6$
$11.4 x=-8$
11. $4 x=-1$
12. $2 x+3=-5$
13. $2 x-3=5$
14. $2 x-3=x+2$
15. $7 x-3=2 x+12$
16. $7 y-8=5 y+2$
17. $4 x+5=2 x-11$
18. $5 x-6=2 x-15$
19. $x+2 x=-15$
20. $3 x-5=4 x-7$
21. $2 x+7=5 x-3$
22. $2 x+7=12-3 x$
23. $6 y-2=8 y-5$
24. $8-4 x=10-2 x$

## Exercise 3

Remove the brackets and solve the following equations:
a) $3(x-5)=12$
b) $5(2 x-3)=15$
C) $5(3-2 x)=30$
d) $3(2 x-4)=8$
e) $7 x+2=5(x-2)$
f) $22-3 x=2(x+6)$
g) $13-3 x=4(x-2)$
h) $x-18=2(2 x-3)$
i) $4(2 x-3)=3 x-27$
j) $3(x-2)+2(x+4)=17$
(k) $5(2 x+1)+6(1-2 x)=1$
(I) $2(3 x+1)+3(x-4)=4 x+5$
(m) $4(3 x-6)+5(x+1)=5 x+5$
(n) $4(x+5)-2(x+1)=30$
(o) $2(4 x+1)-3(x-3)=x+35$

## Exercise 4

1. Solve the following equations:
a) $\frac{1}{2} \mathrm{x}+6=10$
b) $\frac{1}{4} y-5=2$
C) $\frac{1}{7} a+3=-4$
d) $\frac{2}{3} x-4=6$
e) $\frac{3}{5} x+3=9$
f) $\frac{3}{8} x+10=19$
2. Solve the following equations:
(a) $\frac{x+1}{2}=3$
(b) $\frac{w-4}{3}=2$
(c) $\frac{x-2}{7}=6$
(d) $\frac{w+9}{4}=8$
(e) $\frac{w-25}{3}=-7$
(f) $\frac{x+2}{4}=-1$
(g) $\frac{w+20}{8}=-2$
(h) $\frac{x-9}{4}=-2$
3. Solve the following equations:
(a) $\frac{3 x+5}{2}=7$
(b) $\frac{5 x-12}{3}=11$
(c) $\frac{4 x+2}{6}=5$
(d) $\frac{10 x+3}{4}=4$
(e) $\frac{5 x-8}{2}=10$
(f) $\frac{8 x+4}{5}=12.8$
(g) $\frac{2 x+13}{3}=1$
(h) $\frac{3 x-4}{7}=-4$

## LENGTH, PERIMETER AND AREA REVISION

## Exercise 1

1. Convert each of the following units:
a) 6 cm to mm
b) 7.2 cm to mm
c) 850 mm to cm
d) 9 mm to cm
e) 8 m to cm
f) 12.3 m to cm
g) 800 cm to m
h) 1.8 m to cm
i) 0.7 m to cm
j) 3 km to m
k) 6.3 km to m
I) 42700 m to km

## Exercise 2

1. Calculate the perimeter of the following shapes:
a)


c)

d)


## Exercise 3

1. Calculate the area of the following rectangles:
(a)

(b)

(c)
(d)

2. Calculate the area of the following squares:
(a)

(b)

(c)

(d) 14 cm

3. Calculate the area of the following triangles

b)

c)

d)



## Exercise 4

1. Calculate the area of the following shapes:
(a)

(b)

(c)

(d)

(e)

2. Calculate the area of the following shapes:
(a)

(b)

(c)

3. Calculate the area of the following shapes:
a)


c)

d)


## Exercise 5

1. Calculate the circumference of each of the following circles:
a)



2. Calculate the area of each of the following circles:
a)

b)

C)

$3 m$


c)

d)

4.1 cm
e)

f)

3. Calculate the shaded area in each of the
(a) $13 m$

(b)


## Exercise 7

1. Calculate the volume of each of the following shapes:
(a)

(b)

(c)

(d)

(e)

(f)


## Exercise 8

1. Find the volume of a water tank that is 80 cm long, 40 cm wide and 20 cm high. Give your answer in litres.
2. William is painting the side of his house.

He has 8 litres of paint and each litre of paint covers $16 \mathrm{~m}^{2}$.
Does William have enough paint


15 m

## Exercise 9

Copy and complete the table:

| Mame of shape | What shapes are the faces? | Which net? |
| :---: | :---: | :---: |
| Triangular prism | 2 triangles, 3 rectangles | C |
|  |  |  |
|  |  |  |



Exercise 10

1. Calculate the surface area of each of the following shapes:
a)

e)

b)

f)

c)

g)

d)

2. Calculate the surface area of each of the following triangular prisms:
a)

b)

c)


3. Use the nets below to find the surface area of the cylinders.

Give your answer to two decimal places.

4. Find the surface area of the cylinders, to 2 decimal places:
a)

b)

c)

d)


