YSGOL CREUDDYN
DAWN DYSG DAIONI

The Mathematics Department

8

The End of Year 8

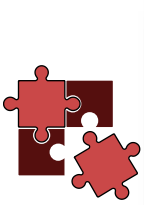
Name:

Contents

Directed Numbers

Numbers with a **–** sign before them are **negative numbers**.

Other numbers (with the exception of zero) are **positive numbers**. Sometimes we write positive numbers with a **+** sign before them, e.g. **+5**.

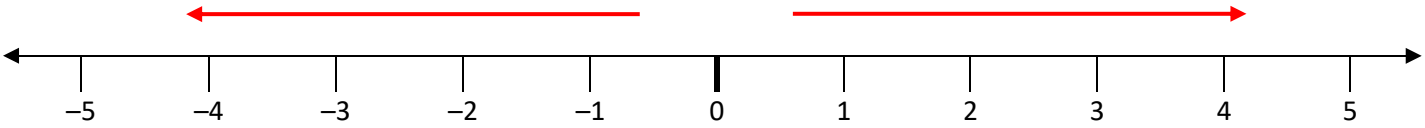


Zero is neither positive nor negative.

We can show positive and negative numbers on a number line:

Negative direction; the numbers are decreasing

Positive direction; the numbers are increasing



Exercise 1

Skill 5

Write the following numbers in order, from least to greatest.

(a) 4, –3, 1, –5, 2
(b) –1, 4, 0, –2, 3
(c) –2, 4, –5, 5, 3
(d) –4, 7, –8, 9, –3
(e) 0, –12, 14, 1, –3
(f) –25, 27, –21, 29, –23
(g) 102, –94, –120, 96, –100
(h) 35, –42, 17, –54, 26
(i) –35, –32, –38, –37, –33
(j) –3, 5, –9, –1, 4
(k) –14, 17, –12, 13, –15
(l) 276, –156, 623, –312, 76

'Less than' and 'Greater than'

It is possible to write the symbols < or > between two different numbers.
The symbol < means 'less than'. The symbol > means 'greater than'.

The arrow always points towards the **least** number.

Example

7 is less than 10, so we can write 7 < 10.
3 is greater than –4, so we can write 3 > –4.

Exercise 2

Write the symbol < or > between the following pairs of numbers.

(a) 8 ____ 18
(b) 17 ____ 11
(c) 4 ____ –2
(d) 3 ____ –5
(e) –2 ____ –4
(f) –5 ____ –1
(g) –3 ____ 0
(h) –4 ____ 2
(i) –5 ____ –8
(j) 7 ____ –8
(k) –102 ____ –98
(l) 14 ____ –16
(m) –4 ____ 8
(n) –12 ____ –3
(o) 87 ____ 165
(p) –87 ____ –165

Exercise 3

True or False?

(a) 8 > 5
(b) 3 > 9
(c) –4 > 2
(d) –8 < –5
(e) –10 > –7
(f) –4 < 8
(g) 9 > –14
(h) –21 > –19
(i) –12 < 10
(j) 180 < –190
(k) –120 > –90
(l) –4 < –3
(m) –4 > –7
(n) 0 < –4
(o) 8 > 0
(p) –9 > –11

Challenge!

Search for "*Cool Cash Confusion*" on the internet. Write a short report on your findings.

Exercise 4

Applying 5

Fill in the blanks in the following table.

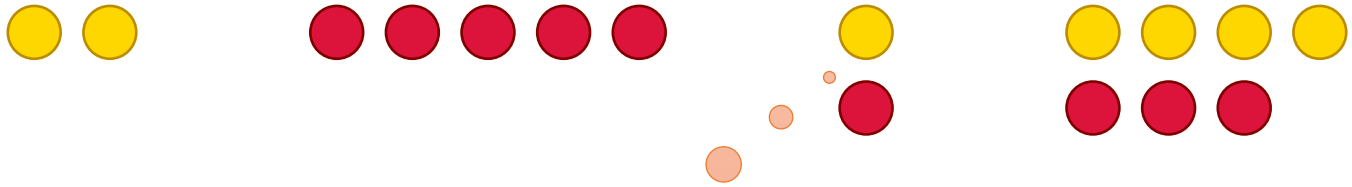
Temperature at 10:00	Temperature at 17:00	Change in temperature
12°C	15°C	3°C increase
18°C		3°C decrease
4°C	–3°C	
	–1°C	3°C increase
–9°C	–4°C	
–8°C		4°C decrease
	3°C	9°C increase

Calculating with Directed Numbers

Two sided counters have a yellow face and a red face. The yellow face represents +1 (positive one) and the red face represents –1 (negative one).

Example

+2 –5 0 +1



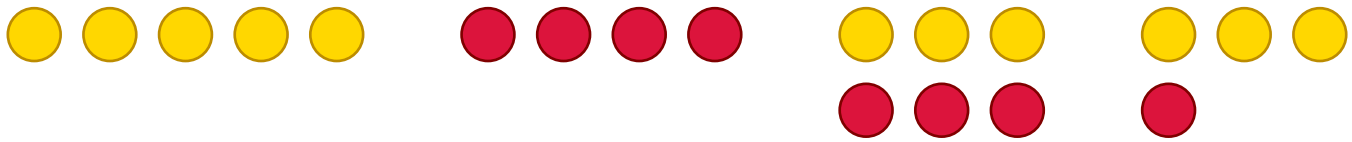
One yellow counter and one red counter gives a **zero pair**. It is possible to remove or add zero pairs to any set of counters without affecting the value of the counters.

Exercise 5

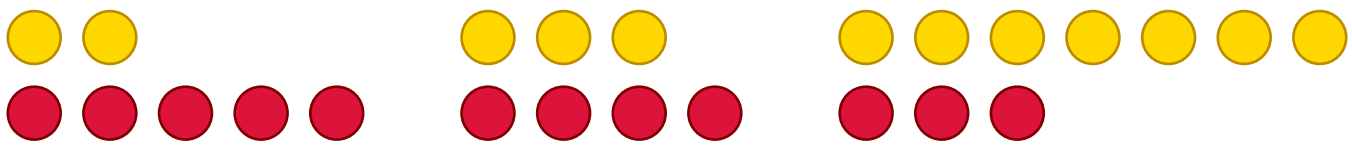
Skill 5

Which numbers are shown below?

(a) (b) (c) (d)



(e) (f) (g)



Speaking Sums

Example

3 + –2	3 – –2	–3 – –2
'Three add negative two'	'Three subtract negative two'	'Negative three subtract negative two'

Exercise 6

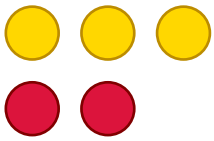
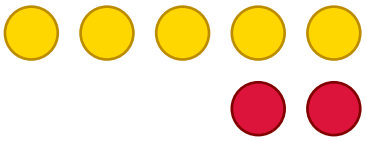
5

Write down how you would say the following sums.

(a) 8 + 2	(b) 8 – 2	(c) –8 + 2	(d) –8 – 2
(e) 8 + –2	(f) 8 – –2	(g) –8 + –2	(h) –8 – –2

It is possible to use two sided counters to find the answers to addition or subtraction sums involving negative numbers.

Example

3 + –2	3 – –2	–3 – –2
Start with 3 yellow counters	Start with 3 yellow counters	Start with 3 red counters
		
Add 2 red counters	Add 2 zero pairs (**Why?**)	Subtract two red counters
		
Remove any zero pairs	Subtract two red counters	Count what is left: **–1**
		
Count what is left: **1**	Count what is left: **5**	

Exercise 7

Use two sided counters to answer the following sums.

(a) 5 + 2	(b) 5 – 2	(c) 5 + –2	(d) –5 + –2
(e) –5 + 2	(f) 5 – –2	(g) –5 – –2	(h) –5 – 2
(i) 2 + 5	(j) 2 – 5	(k) –2 + 5	(l) –2 + –5
(m) 2 + –5	(n) –2 – 5	(o) –2 – –5	(p) 2 – –5

Exercise 8

Use two sided counters to answer the following sums.

(a) 6 + –4	(b) 7 + –3	(c) 5 + –3	(d) 6 + –1
(e) –6 + –4	(f) –7 + –3	(g) –5 + –3	(h) –6 + –1

(i) Complete the following sentence: Adding a negative number is the same as _____.

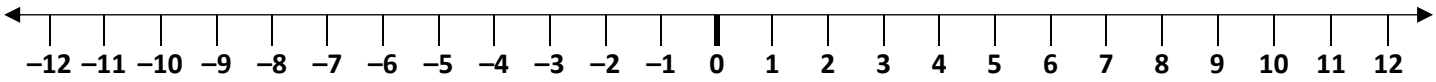
Exercise 9 5

Use two sided counters to answer the following sums.

(a) 4 – –3 (b) 3 – –4 (c) 5 – –2 (d) 1 – –7
(e) –4 – –3 (f) –3 – –4 (g) –5 – –2 (h) –1 – –7

(i) Complete the following sentence: Subtracting a negative number is the same as _____.

Adding and Subtracting Negative Numbers



Example

(a) 9 + –2 = 9 – 2
= 7

(b) –4 + –3 = –4 – 3
= –7

(c) 7 – –2 = 7 + 2
= 9

(d) –4 – –1 = –4 + 1
= –3

Exercise 10

(a) 4 + –2 (b) 10 + –2 (c) 9 + –4 (d) 2 + –9
(e) –5 + –2 (f) –9 + –2 (g) –3 + –3 (h) –1 + –7
(i) 6 + –8 (j) 2 + –5 (k) 9 + –11 (l) 7 + –7
(m) –14 + –3 (n) –18 + –8 (o) –24 + –8 (p) –38 + –5

Exercise 11

(a) 6 – –4 (b) 8 – –4 (c) 1 – –3 (d) 4 – –5
(e) –8 – –2 (f) –7 – –3 (g) –2 – –9 (h) –6 – –2
(i) –2 – –5 (j) –4 – –8 (k) –1 – –2 (l) –8 – –8
(m) –20 – –5 (n) –2 – –17 (o) 14 – –8 (p) –101 – –4

Exercise 12

(a) 8 + –3 (b) 8 – –3 (c) –8 + –3 (d) –8 – –3
(e) 14 – –2 (f) 2 – –14 (g) 14 + –2 (h) 2 + –14
(i) –7 + –9 (j) –7 – –9 (k) –9 + –7 (l) –9 – –7
(m) 24 – –2 (n) –12 + –2 (o) –9 – –12 (p) 3 + –8
(q) 2.5 + –0.3 (r) 5.4 – –1.2 (s) –2.1 – –0.5 (t) –4.2 + –0.7
(u) 25 + –2 + –3 (v) 25 + –2 – –3 (w) 25 – –2 – –3 (x) 25 – –2 + –3

Challenge!

What should the answers be to the following?

(a) 16 + +4 (b) 16 – +4 (c) 1 + –2 – –3 + –4 – –5

Applying 5

Exercise 13

(a) In a golf championship, players complete four rounds of golf on the golf course.
Out of the following four players, who has the best score? (In golf, the lower the score, the better the score.)

Name	Round 1	Round 2	Round 3	Round 4
Jordan Speith	+2	–3	–1	+1
Rickie Fowler	–2	–1	+4	–3
Rory McIlroy	0	–3	+1	–2
Justin Rose	–3	+2	+4	–2

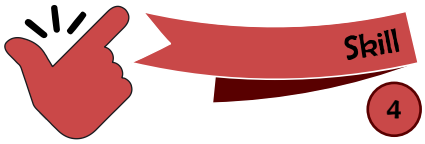
(b) The temperature at midnight in Llanrwst was recorded each day during one week in January.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
–3°C	–4°C	1°C	–3°C	–2°C	0°C	4°C

What was the **mean** temperature at midnight in Llanrwst during this week?

(c) At the end of May, Trefor had £200 in his bank account. He spent £800 during the first week of June. He was paid £500 during the second week of June. In the third week, he spent £400. During the final week of June, he was paid £900. How much money has Trefor got in his bank account at the end of June?

Multiplying and Dividing Directed Numbers



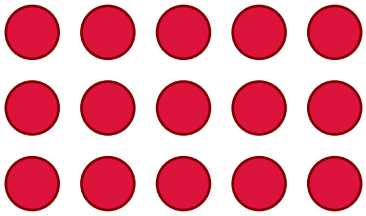
Exercise 14 (Revision)

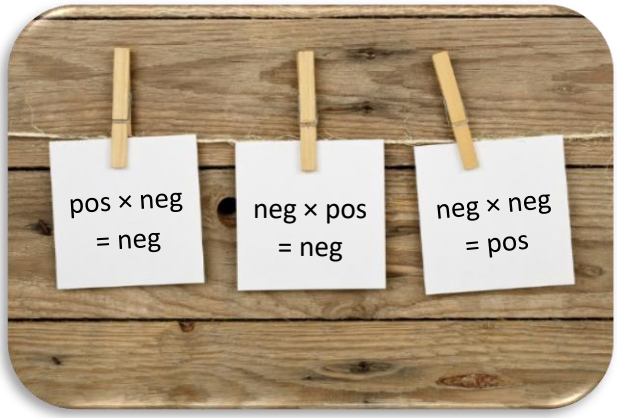
(a) 5 × 6	(b) 7 × 2	(c) 3 × 8	(d) 6 × 7
(e) 9 × 4	(f) 2 × 9	(g) 4 × 7	(h) 7 × 7
(i) 8 × 7	(j) 9 × 6	(k) 8 × 9	(l) 10 × 8
(m) 5 × 9	(n) 12 × 6	(o) 8 × 11	(p) 9 × 7

Multiplying Directed Numbers

What is 3 × –5?

We can think of 3 × –5 as 'three lots of negative five', which is three rows of five red counters. We can see from the diagram below that this gives –15. So, 5 × –3 = –15.

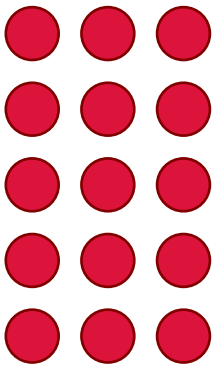




In general, multiplying a positive number by a negative number gives a negative answer.

What is –3 × 5?

The order in which we multiply numbers is not important, so we can think of –3 × 5 as 5 × –3, which is five rows of three red counters. We can see from the diagram below that this gives –15. So, –3 × 5 = –15.



In general, multiplying a negative number by a positive number gives a negative answer.

What is –3 × –5?

–3 × –5 = –1 × 3 × –5 Write the –3 as –1 × 3
= –1 × –15 Calculate 3 × –5 = –15
= 15 Multiplying by –1 changes the sign of the number / changes the colour of the counters

In general, multiplying a negative number by a negative number gives a positive answer.

Example

(a) 8 × –3 = –24 (b) –4 × 5 = –20 (c) –6 × –2 = 12

Exercise 15

5

(a) 7 × –3	(b) –3 × 7	(c) –3 × – 7	(d) –7 × –3
(e) 4 × –8	(f) –2 × 6	(g) –4 × –6	(h) 6 × –8
(i) –9 × 3	(j) –7 × –5	(k) –9 × –4	(l) –5 × 8
(m) 11 × –2	(n) 4 × 12	(o) –9 × 6	(p) –8 × 7
(q) –8 × –8	(r) 12 × –6	(s) –7 × 9	(t) –5 × –9
(u) 13 × –3	(v) –1 × 10	(w) –8 × 0	(x) –1 × –1
(y) 9 × –8	(z) –14 × –3	(α) –6 × 5	(β) 15 × –6

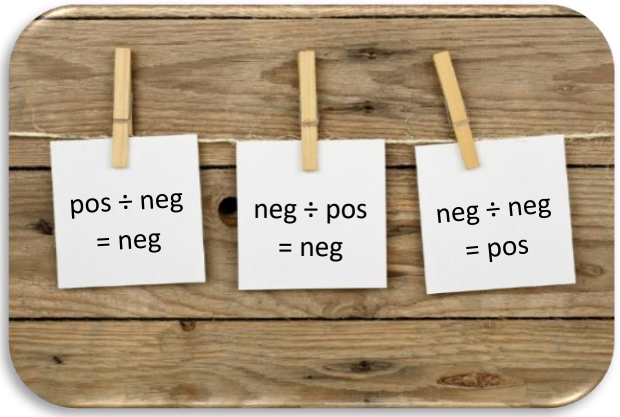
Exercise 16

Evaluate the answers to the following. Use your calculator to check your answers.

(a) 8 + –5	(b) 8 – –5	(c) 8 × –5	(d) –8 × –5
(e) –4 + –2	(f) –4 – –2	(g) –4 × –2	(h) –4 × 2
(i) 14 × –2	(j) 14 + –2	(k) –14 + –2	(l) –14 – –2
(m) 4 – –9	(n) –4 + –9	(o) –4 × 9	(p) 4 × –9

Exercise 17

Write 10 different sums whose answer is 4.



Dividing Directed Numbers

The rules for dividing directed numbers are the same as for multiplication. These rules are shown in the diagram on the right.

Example

(a) 32 ÷ 4 = 8 (b) 32 ÷ –4 = –8
(c) –32 ÷ 4 = –8 (d) –32 ÷ –4 = 8

Exercise 18

(a) 16 ÷ –2	(b) –24 ÷ 4	(c) –12 ÷ –3	(d) –20 ÷ –5
(e) 28 ÷ –4	(f) –30 ÷ 2	(g) 36 ÷ –9	(h) –40 ÷ –10
(i) 48 ÷ –6	(j) 50 ÷ –25	(k) –39 ÷ –13	(l) 64 ÷ –8
(m) 66 ÷ –2	(n) –72 ÷ 8	(o) 63 ÷ –7	(p) –80 ÷ –8
(q) –100 ÷ 20	(r) –120 ÷ –40	(s) 2 ÷ –4	(t) 0 ÷ –3
(u) –125 ÷ –5	(v) 1000 ÷ 100	(x) –1 ÷ –10	(y) –7 ÷ 0

Exercise 19 5

Calculate the following. (Be careful with the order of operations.)

(a) $8 + 2 \times -3$ (b) $8 - 2 \times -3$ (c) $-8 \times 2 - 3$ (d) $-8 \div -2 - -3$
(e) $3 + 6 \div -3$ (f) $-3 + -6 \div 3$ (g) $3 \times 6 \div -3$ (h) $-3 + -6 - -3$
(i) $(4 + -2) \times -5$ (j) $4 + (-2 \times -5)$ (k) $4 + -2 \times -5$ (l) $(5 \times -6) \div (-20 \div 5)$

Exercise 20

Calculate the following.

(a) 2^2 (b) $(-2)^2$ (c) 2^3 (d) $(-2)^3$
(e) 2^4 (f) $(-2)^4$ (g) 2^5 (h) $(-2)^5$
(i) $(-1)^2$ (j) $(-1)^3$ (k) $(-1)^4$ (l) $(-1)^{50}$

Exercise 21

Complete the following tables.

×	3	–6	
4	12		–32
	6		
5			
–10			

÷	2	–4	
16	8		2
	16		
–16			
48			

Exercise 22 (Revision)

(a) Write the following numbers in order, from least to greatest.
(i) 8, –2, –10, 5, 7 (ii) –3, 6, –5, 8, –7, 0 (iii) 23, –21, 18, 25, –4, –12, 8, –1, 3, –19
(b) Write the symbol < or > between the following pairs of numbers.
(i) –3 ____ 2 (ii) –8 ____ –4 (iii) –15 ____ 12
(c) $8 + -2$ (d) $14 - -3$ (e) 2×-3 (f) $-14 \div -2$
(g) $-8 + -2$ (h) $-14 - -3$ (i) -2×-3 (j) $14 \div -2$
(k) Copy and complete the following sentences.
(i) Adding a negative number is the same as _____ (ii) Subtracting a negative number is the same as _____
(iii) Multiplying a negative number by a positive number gives an answer that is _____
(iv) Dividing a negative number by a negative number gives an answer that is _____

Evaluation

Key Words	Corrections	I am happy with…	I need to revise…

Decimals

Revision 5

Revising Year 7 Work

Exercise 23 (Adding Decimals)

(a) 37.24 + 42.41	(b) 7.17 + 1.45	(c) 26.725 + 97.476	(d) 13.427 + 42.645
(e) 8.23 + 24.14	(f) 824.4 + 2.45	(g) 2834.2 + 25.324	(h) 52.498 + 8273.24
(i) 0.23 + 39.2	(j) 34 + 4.28	(k) 2989.4 + 399.8	(j) 0.23 + 0.062

Exercise 24 (Subtracting Decimals)

(a) 46.87 – 12.31	(b) 8.6 – 2.5	(c) 274.66 – 52.4	(d) 45.2 – 23.8
(e) 18 – 6.3	(f) 39 – 6.23	(g) 6.4 – 5.21	(h) 700.2 – 263.8
(i) 200 – 12.625	(j) 90 – 27.2	(k) 7.2 – 0.06	(l) 6.01 – 0.185

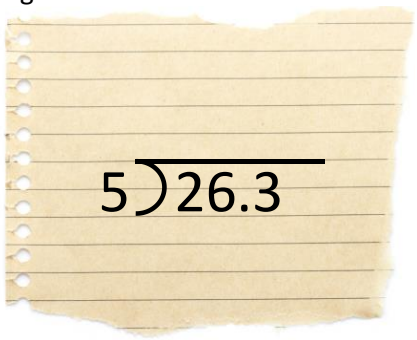
Exercise 25 (Multiplying a Decimal by a Whole Number Less Than Ten)

(a) 43.27 × 5	(b) 9.3 × 4	(c) 2.65 × 2	(d) 823.4 × 6
(e) 723.45 × 8	(f) 92.463 × 9	(g) 8274.9 × 7	(h) 0.264 × 3
(i) 5.036 × 6	(j) 30.46 × 8	(k) –4.25 × 5	(l) –423.7 × –9

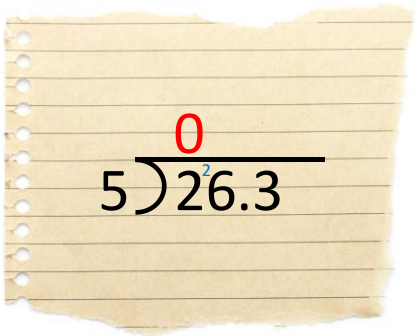
Dividing a Decimal by a Whole Number Less Than Ten

In order to calculate a sum such as 26.3 ÷ 5, follow these steps.

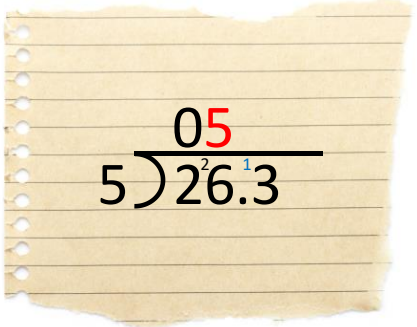
1. Set the sum out using a division frame; the 26.3 goes inside and the 5 goes outside.



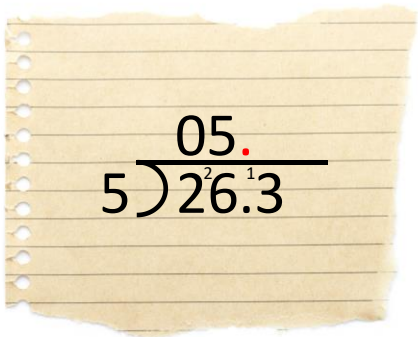
2. "How many times does 5 fit into 2?" 5 is too big to fit into 2, so it fits in 0 times, with remainder 2.



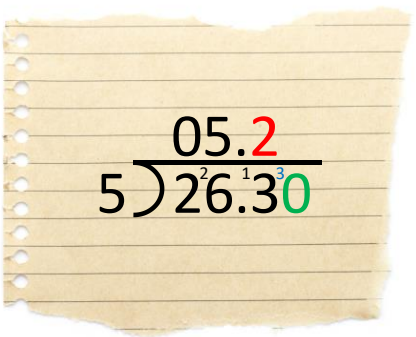
3. "How many times does 5 fit into 26?" It fits into twenty-six 5 times, with remainder 1.



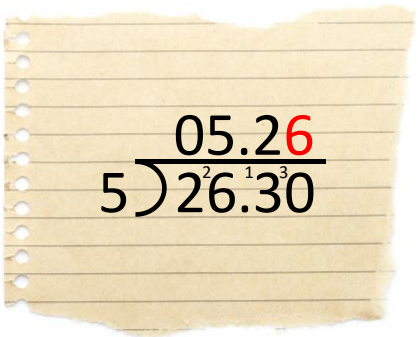
4. Remember to add the decimal point in the correct position.



5. "How many times does 5 fit into 13?" It fits into thirteen 2 times, with remainder 3. Note that we need to write an extra 0 before writing the remainder.



6. "How many times does 5 fit into 30?" It fits into thirty 6 times, with remainder 0. So, the answer to 26.3 ÷ 5 is 5.26.



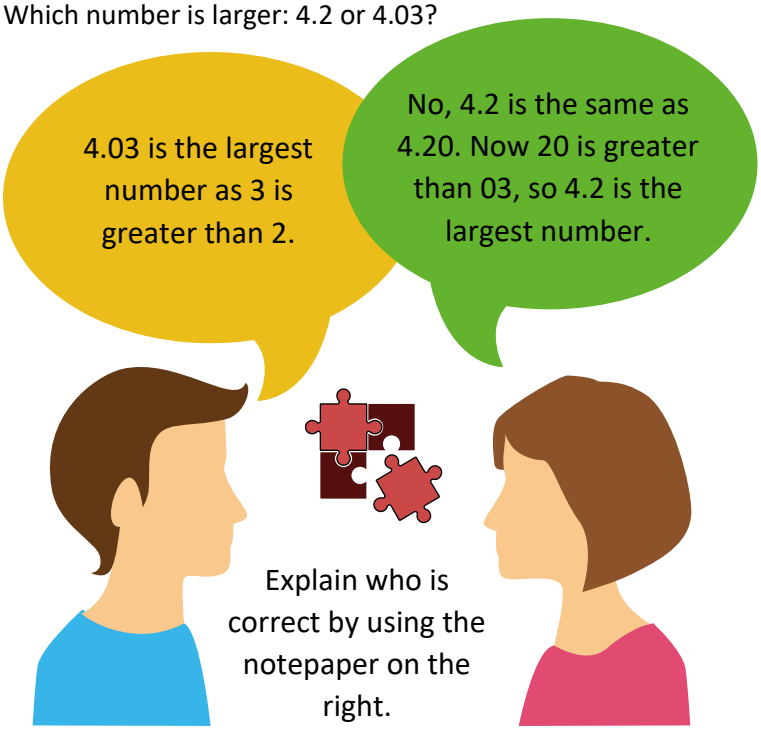
Exercise 26

Skill 5

(a) 7.35 ÷ 3	(b) 26.88 ÷ 4	(c) 842.6 ÷ 2	(d) 213.5 ÷ 5
(e) 252.6 ÷ 6	(f) 75.6 ÷ 9	(g) 341.84 ÷ 8	(h) 29.61 ÷ 7
(i) 2531.1 ÷ 6	(j) 72.32 ÷ 8	(k) 186.06 ÷ 3	(l) 371 ÷ 5
(m) 0.85 ÷ 2	(n) 297 ÷ 4	(o) 37941.75 ÷ 9	(p) 305.004 ÷ 7

Ordering Decimals

Which number is larger: 4.2 or 4.03?



Exercise 27

Write the following numbers in order, from least to greatest.

(a) 4.2, 4.02, 4.03, 4.3	(b) 8.42, 2.84, 4.82, 8.24, 4.28, 2.48	(c) 7.503, 7.053, 7.53, 7.005, 7.3
(d) 9.008, 9.8, 9.08, 9	(e) 3.96, 3.09, 3.6, 3.06, 3.096, 3.009	(f) 14.07, 4.71, 7.14, 14.1, 7.04, 4.07
(g) 0.26, 0.18, 0.3, 0.21, 0.33	(h) 3.8, 3.07, 4.09, 3.54, 4.81, 3.05	(i) 23.7, 20.3, 21.78, 20.09, 22.7
(j) 0.9, 0.78, 0.98, 0.09, 0.87	(k) 0.821, 0.281, 0.128, 0.218, 0.812	(l) 0.7, 0.68, 0.702, 0.689, 0.73, 0.679
(m) 5.9, 6.8, 5.09, 5.83, 6.88	(n) 1.8, 1.03, 1.24, 1.043, 1.003, 1.51	(o) 45.08, 5.8, 45.8, 5.004, 45.50, 5.08

Exercise 28

Applying

	Runner 1	Runner 2	Runner 3	Runner 4
Canada	10.31 seconds	10.04 seconds	10.46 seconds	10.09 seconds
Jamaica	9.98 seconds	10.68 seconds	10.10 seconds	10.18 seconds
U.S.A.	10.06 seconds	10.13 seconds	10.24 seconds	10.01 seconds
France	10.53 seconds	10.96 seconds	10.42 seconds	10.18 seconds

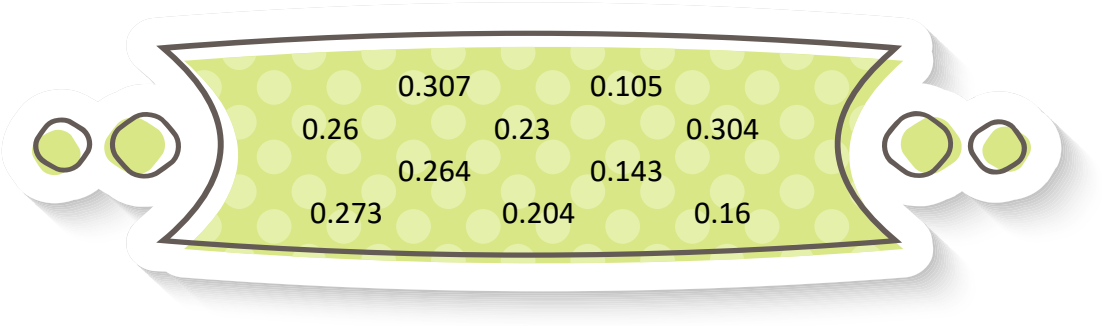
The table above shows the times taken by each runner in a 400 m relay race at an athletics championship.

(a) How many different teams were competing?
(b) How many runners were in each team?
(c) Which runner, from which team, was fastest?
(d) Which runner was slowest?
(e) Which team won the relay race?
(f) Which team came last?

Exercise 29

5

Add some of the following decimals, aiming to reach a total as close as possible to 1.
You may only use each number once.



Converting a Percentage to a Decimal

In order to change a **percentage** to be a **decimal**, divide the percentage by 100.

Example

(a) As a decimal, 62% is 62 ÷ 100 = 0.62.

(b) As a decimal, 3% is 3 ÷ 100 = 0.03.

Exercise 30

Skill 6

Write the following percentages as decimals.

(a) 27%	(b) 86%	(c) 29%	(d) 35%
(e) 40%	(f) 8%	(g) 70%	(h) 2%
(i) 156%	(j) 250%	(k) 400%	(l) 0%
(m) 25.8%	(n) 4.7%	(o) 0.3%	(p) 0.08%

Converting a Decimal to a Percentage

In order to change a **decimal** to be a **percentage**, multiply by 100 and add the % symbol.

Example

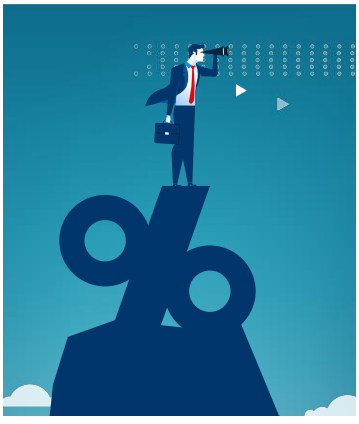
(a) As a percentage, 0.45 is 0.45 × 100 = 45%.

(b) As a percentage, 0.06 is 6 × 100 = 6%.

Exercise 31

Write the following decimals as percentages.

(a) 0.31	(b) 0.57	(c) 0.73	(d) 0.66
(e) 0.2	(f) 0.9	(g) 0.04	(h) 0.09
(i) 3.54	(j) 5.5	(k) 6	(l) 12
(m) 0.728	(n) 0.035	(o) 0.002	(p) 0.0006



Exercise 32

Write the following numbers in order, starting from the smallest.

54% 0.35 7% 0.8 40% 0.09 2.1 92%

Rounding Off to a Specified Number of Decimal Places

Exercise 33

Complete the following table.

Original Number	Round off to the nearest unit	Round off to the nearest 10	Round off to one decimal place	Round off to two decimal places	Round off to three decimal places
432.4385	432	430	432.4	432.44	432.439
273.8924					
348.8753					
219.5541					
199.7502					
537.8025					
1,549.1087					
3,845.6355					
10,293.54					
28,479.5997					

Exercise 34 (Revision) 6

(a) 154.2 + 87.9 (b) 275.3 – 184.9 (c) 835.6 × 7 (d) 145.8 ÷ 6

(e) Write the following numbers in order, from least to greatest.

4.1 3.05 3.5 3.124 4.12 4.214 3.99

(f) Change the following percentages to be decimals.

(i) 34% (ii) 8% (iii) 81% (iv) 0.4%

(g) Round off the number 283.4672

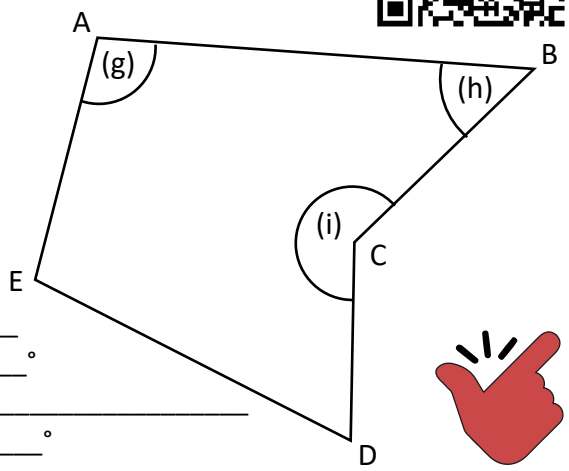
(i) to one decimal place (ii) to two decimal places (iii) to three decimal places.

Key Words	Corrections	I am happy with…	I need to revise…

Angles 2

Exercise 35 (Revision of Year 7 work)

6



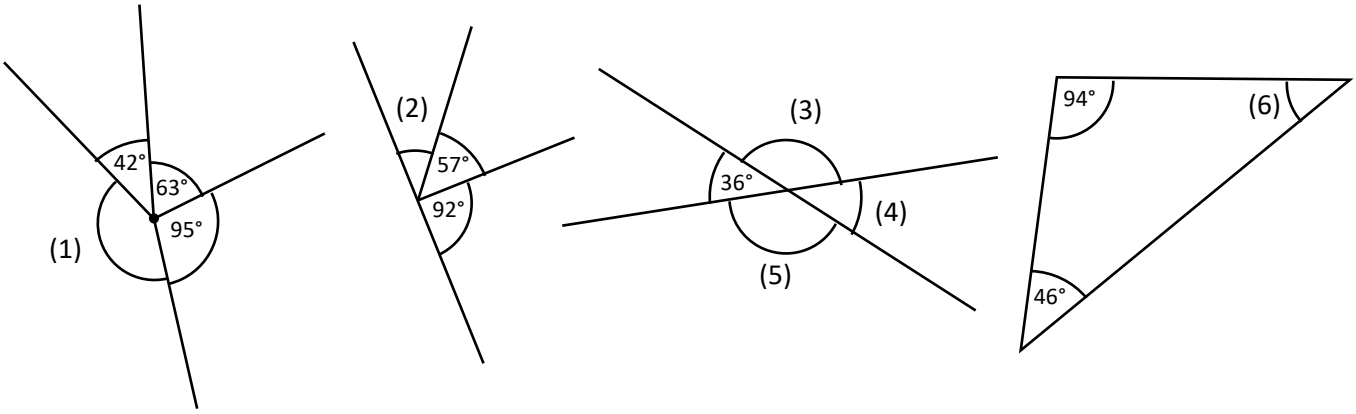
(a) An acute angle is any angle between ____° and ____°.
(b) A _____ angle is any angle that is exactly 90°.
(c) An _____ angle is any angle between 90° and 180°.
(d) A straight line is any angle that is exactly _____°.
(e) A reflex angle is any angle between _____° and _____°.
(f) A _____ is any angle that is exactly 360°.

(g) Name the angle labelled (g) in the diagram to the right. _____
(h) Measure the angle labelled (h) in the diagram to the right. _____°
(i) What type of angle is angle (i) in the diagram to the right? _____
(j) Measure the **reflex** angle $C\widehat{D}E$ in the diagram to the right. _____°

(k) Draw an angle of 126° in the box below.

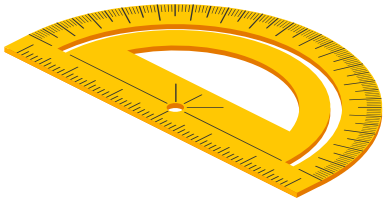
(l) Draw a right-angled triangle with angles of 30° and 60°.

(m) Calculate the size of the angles in the following diagrams. (The diagrams are not drawn to scale.)



(1) _____° (2) _____° (3) _____° (4) _____° (5) _____° (6) _____°

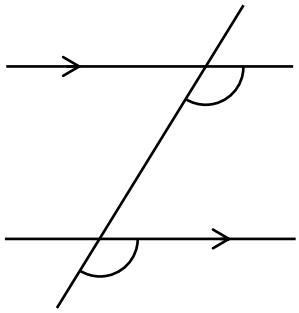
(n) An isosceles triangle has _____ equal angles.
(o) The size of each angle in an equilateral triangle is _____°.
(p) Any triangle with no equal sides is named a _____ triangle.



Angles with Parallel Sides

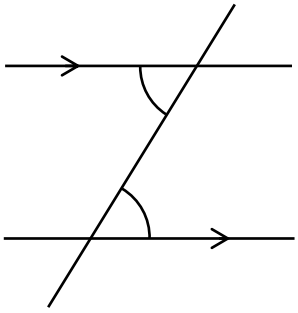
If a line crosses a pair of parallel lines, it is possible to recognise some links between some of the angles.

(1) **Corresponding** Angles



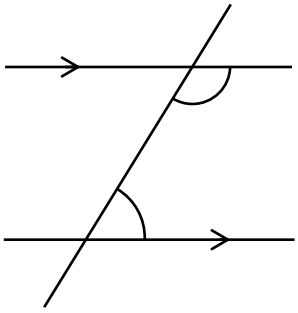
Corresponding angles are **equal**.

(2) **Alternate** Angles



Alternate angles are **equal**.

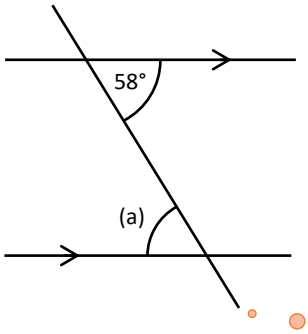
(3) **Internal** Angles



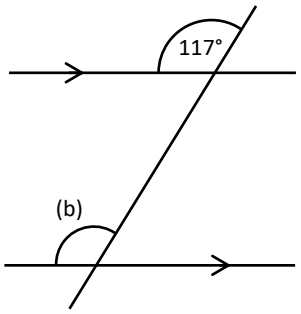
Internal angles **add up to 180°**.

Example

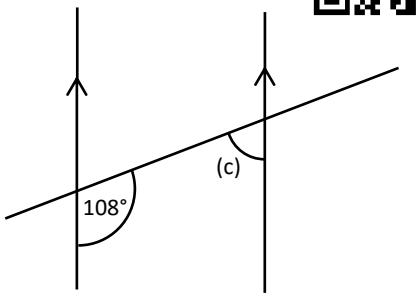
(a) 58° (alternate angles).



(b) 117° (corresponding angles).



(c) 72° (internal angles).

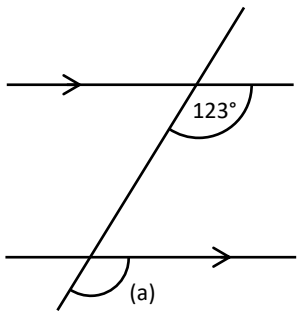


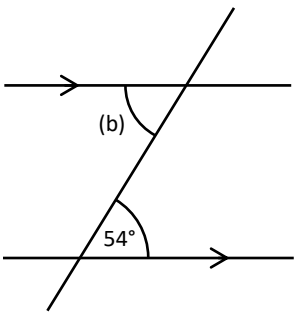
The **transversal** is the line that intersects the parallel lines.

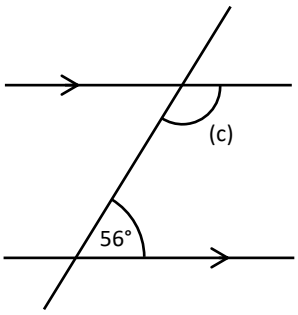
Exercise 36

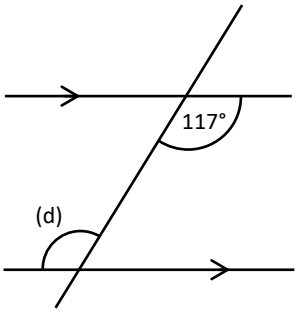
Skill 6

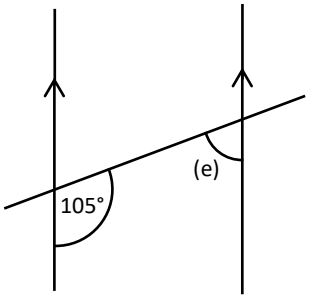
Calculate the size of the marked angles. (The diagrams are not drawn to scale.)

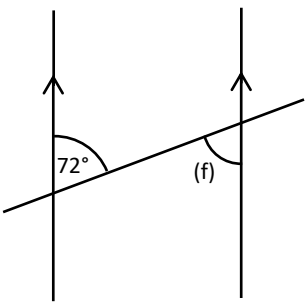


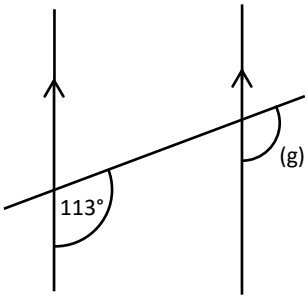


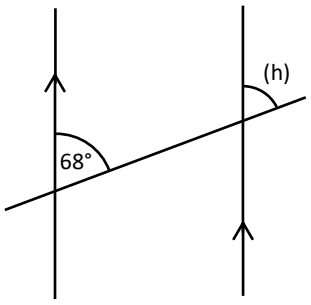










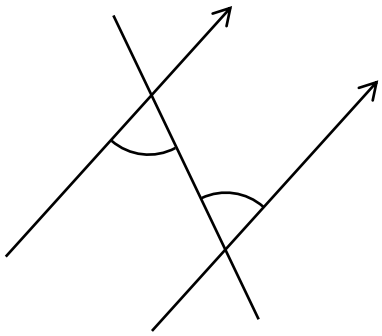


Exercise 37

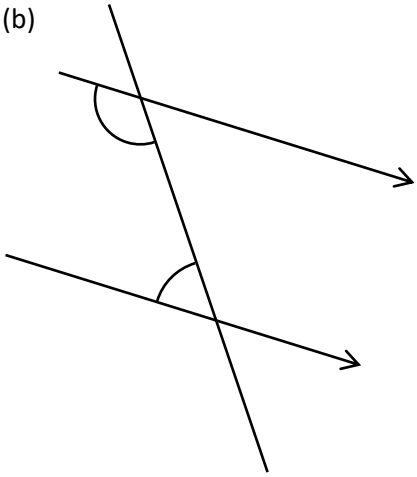
6

Are the following pairs of angles corresponding angles, alternate angles or internal angles?

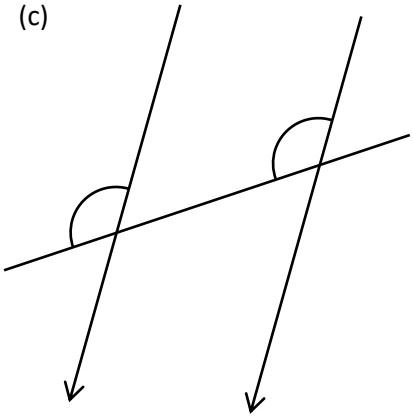
(a)



(b)

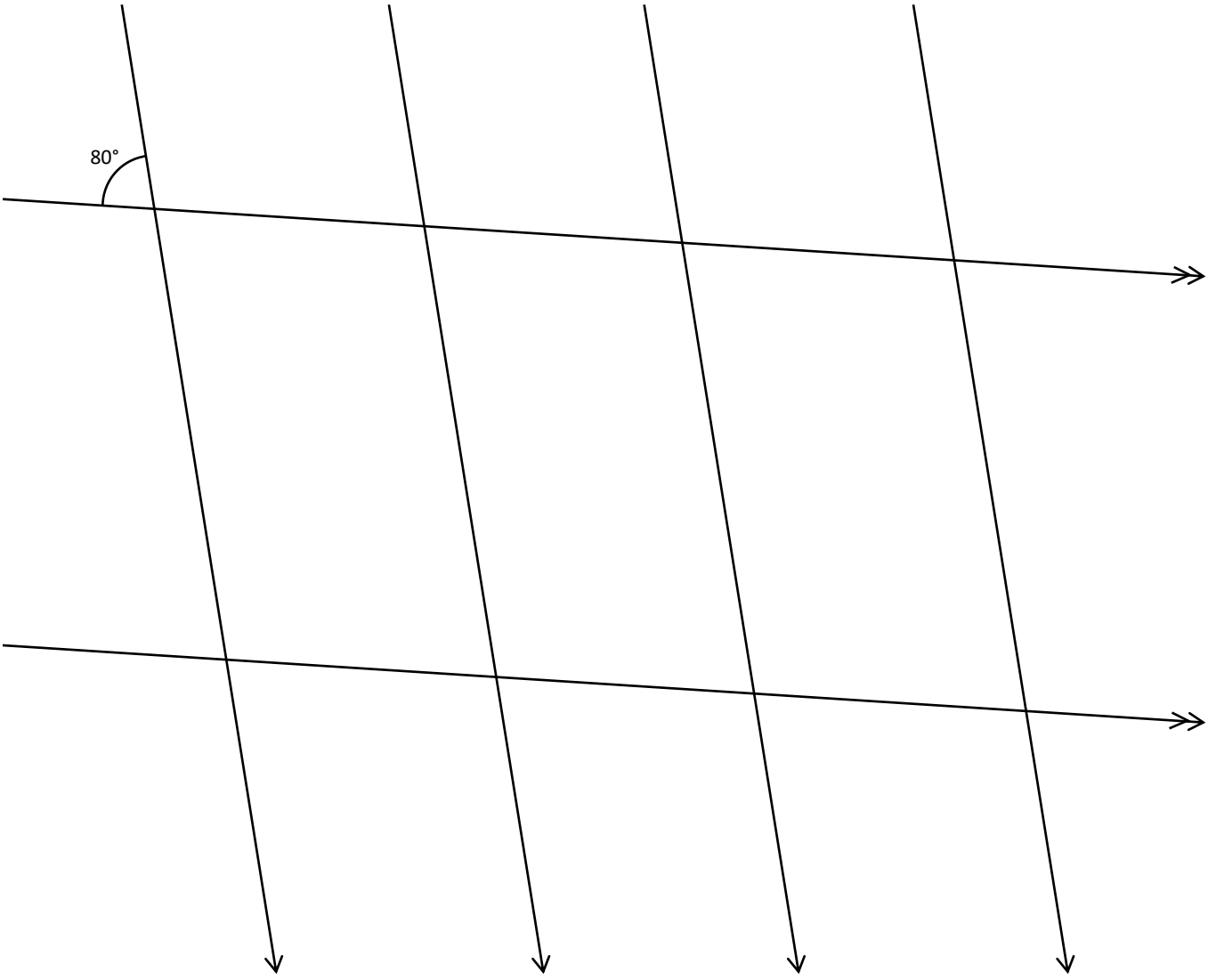


(c)

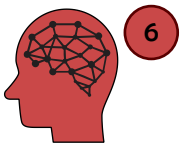


Exercise 38

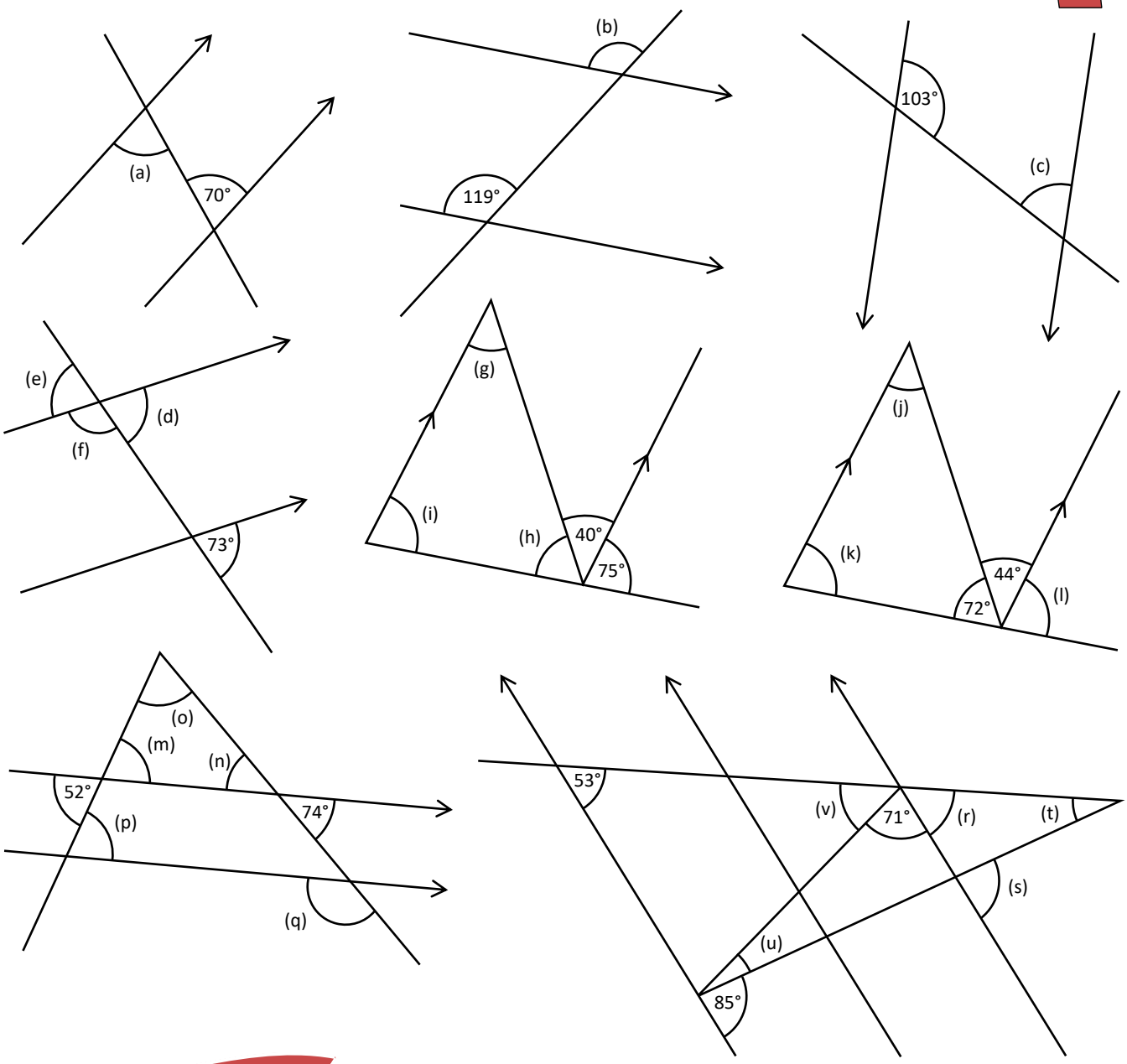
Find as many angles as you can in the following diagram. (The diagram is not drawn to scale.)



Exercise 39



Calculate the size of the marked angles. (The diagrams are not drawn to scale.)



Key Words	Corrections	I am happy with…	I need to revise…

Transformations: Rotation

Rotation is one of the four transformations.

Year 7	Year 8	Year 9	Year 10
Translation	**Rotation**	Reflection	Enlargement

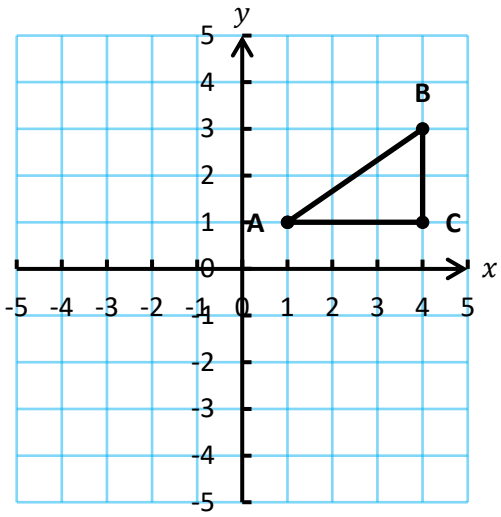
In order to rotate a shape, we need to know

- the **centre of rotation**, e.g. the point (3, 5);
- **how** to rotate the shape, e.g. 90° clockwise.

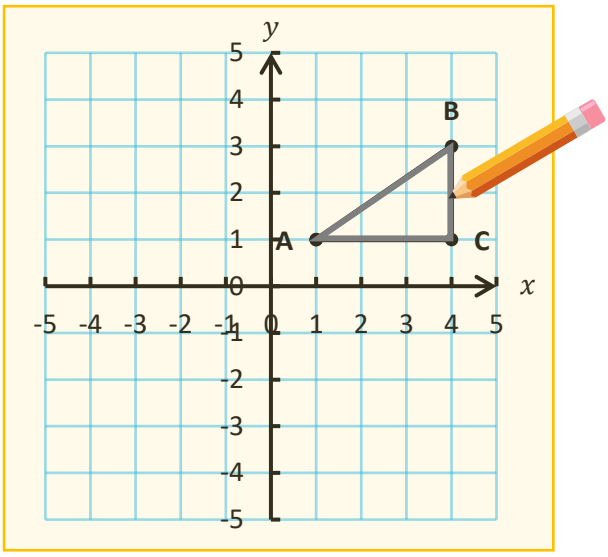
3 to the right, 5 up

It is good practice to use a piece of tracing paper to complete a rotation question.

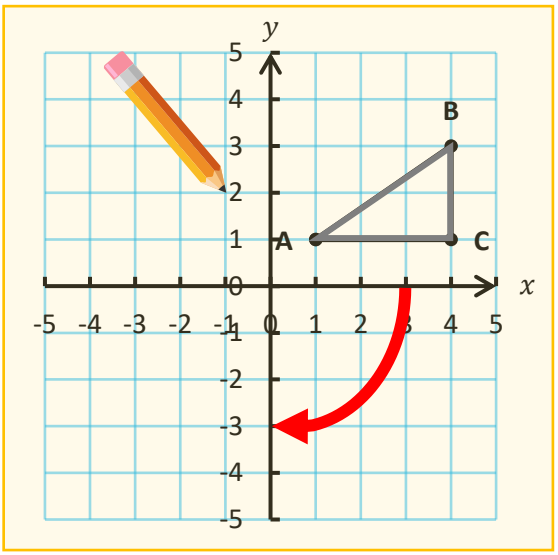
Example: Rotate the triangle **ABC** by 90° clockwise around the point (–1, 2).



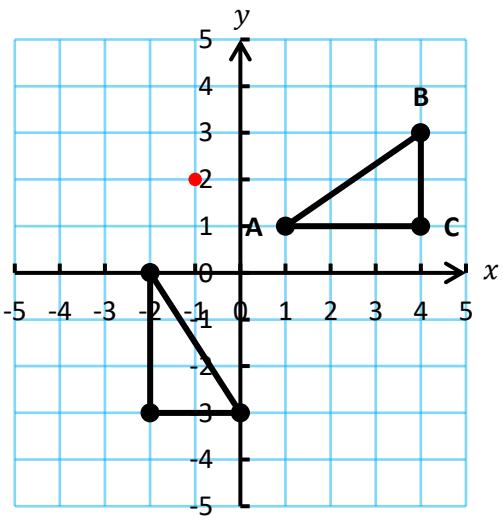
Step 1: Place a piece of tracing paper over the grid and trace the shape **ABC**.



Step 2: Place your pencil on the centre of rotation (–1, 2) and rotate the tracing paper 90° clockwise.



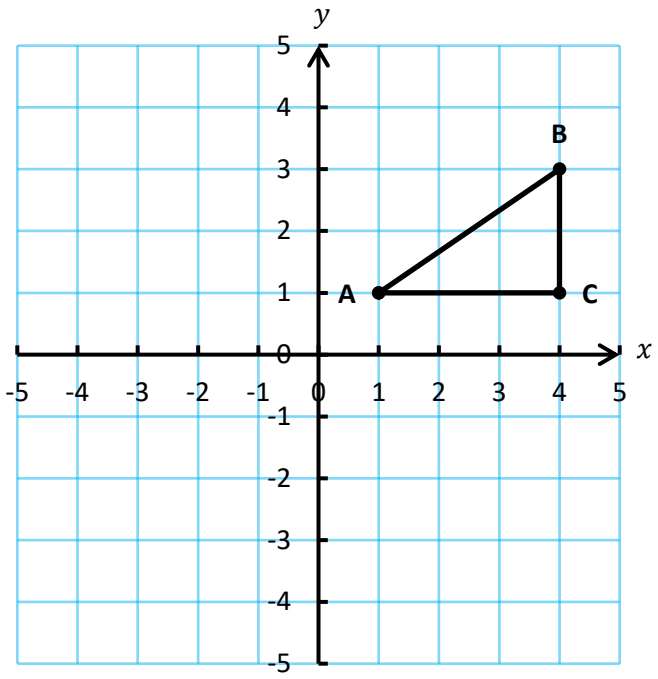
Step 3: Draw the new shape on the squared paper.



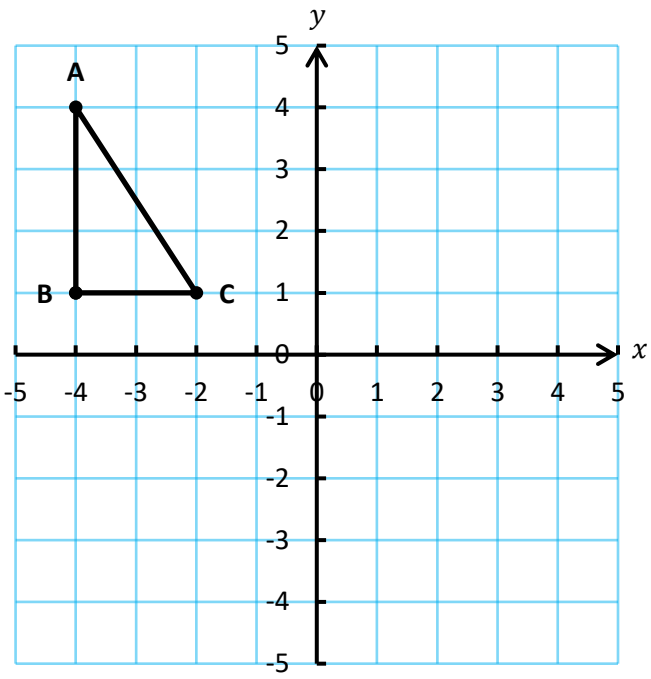
Exercise 40

Skill 6

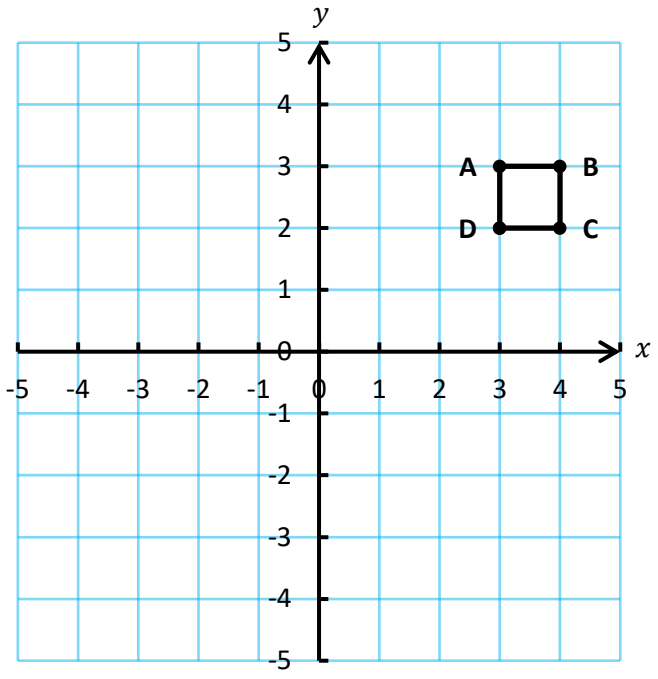
(a) Rotate the triangle **ABC** by 90° clockwise around the origin.



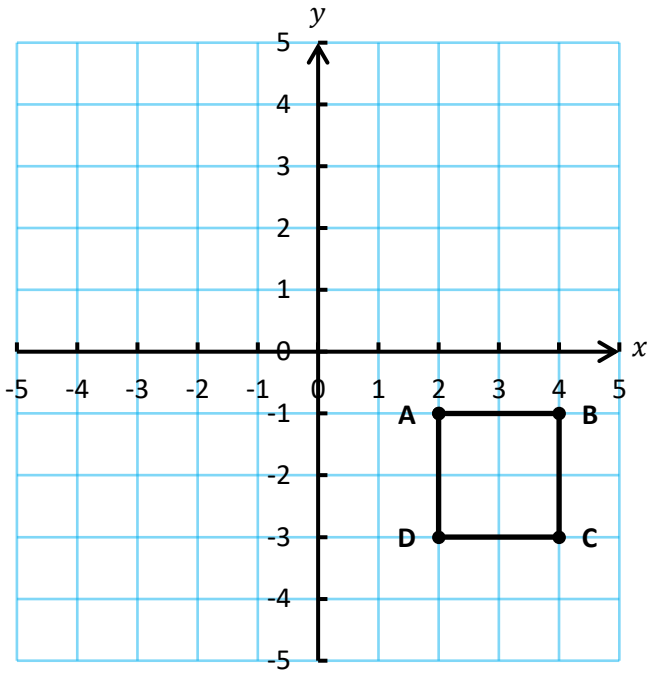
(b) Rotate the triangle **ABC** by 90° counter-clockwise around the origin.



(c) Rotate the square **ABCD** by 180° clockwise around the origin.



(d) Rotate the square **ABCD** by 270° counter-clockwise around the origin.



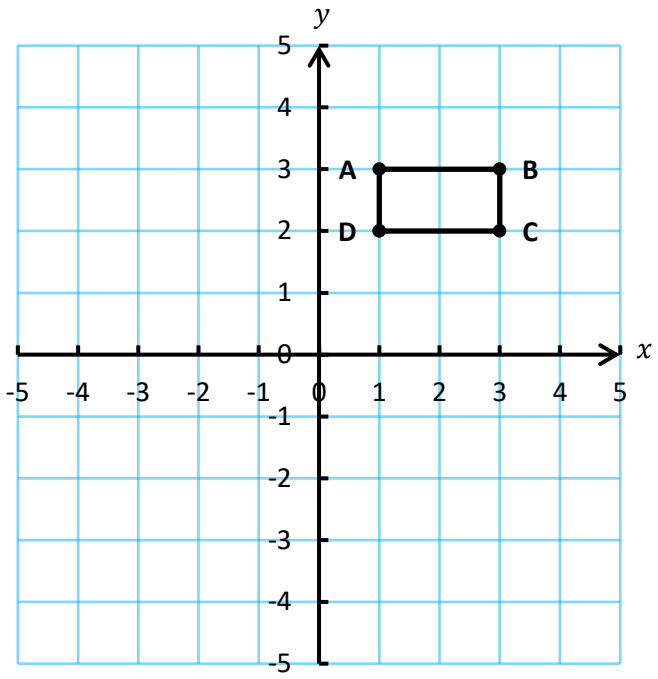
(e) Would the answer to question (c) change if the word "clockwise" was changed to the word "counter-clockwise"?

(f) Complete the sentence: a counter-clockwise rotation of 270° is the same as a clockwise rotation of _____°.

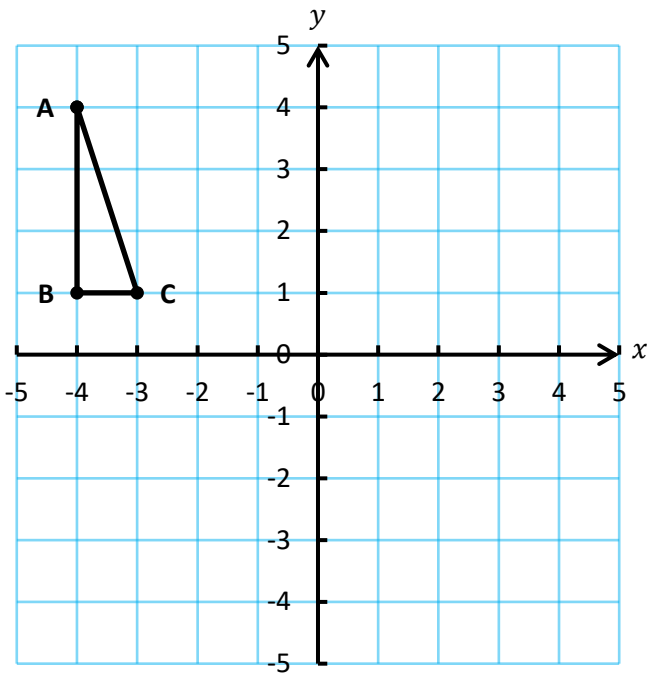
Exercise 41

6

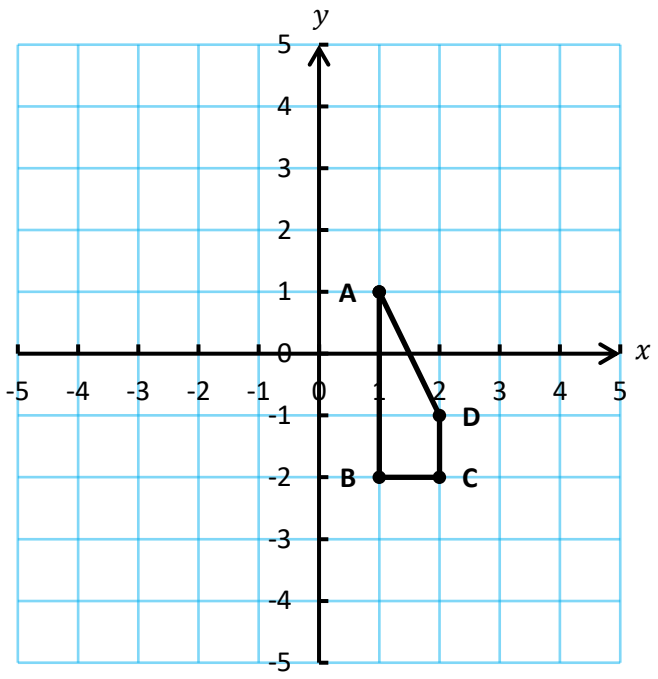
(a) Rotate the rectangle **ABCD** by 90° clockwise around the point (–1, 2).



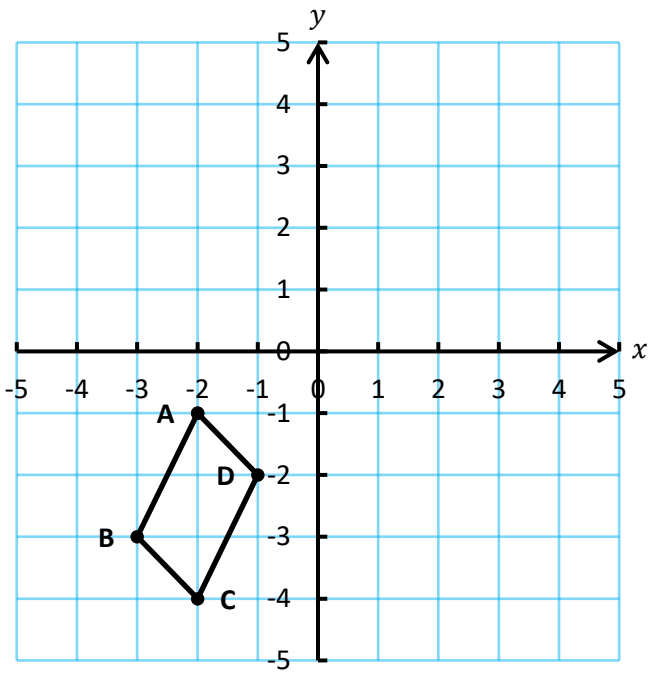
(b) Rotate the triangle **ABC** by 180° counter-clockwise around the point (–2, 2).



(c) Rotate the quadrilateral **ABCD** by 90° counter-clockwise around the point (0, 1).



(d) Rotate the quadrilateral **ABCD** by 270° counter-clockwise around the point (2, –4).



(e) What is the name of the quadrilateral in question (c)?

(f) What is the name of the quadrilateral in question (d)?

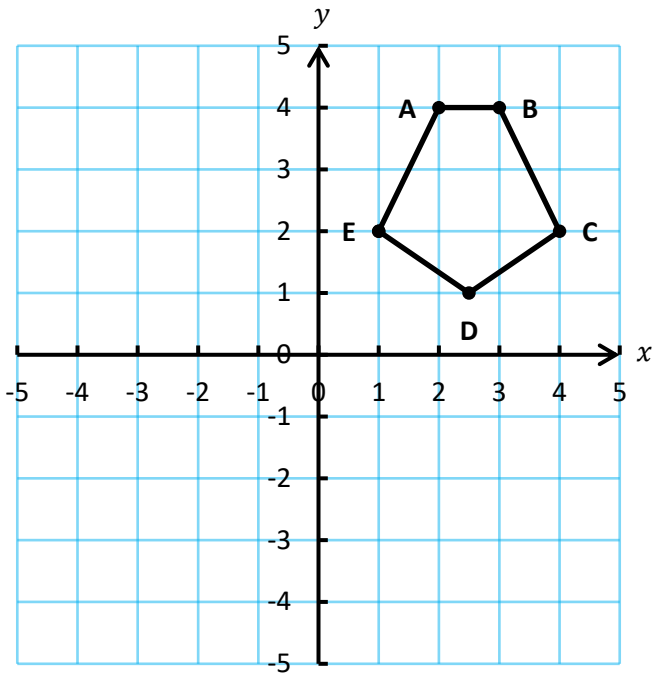
(g) Calculate the area of the quadrilateral in question (c). Give your answer in square units.

(h) Calculate the area of the quadrilateral in question (d). Give your answer in square units.

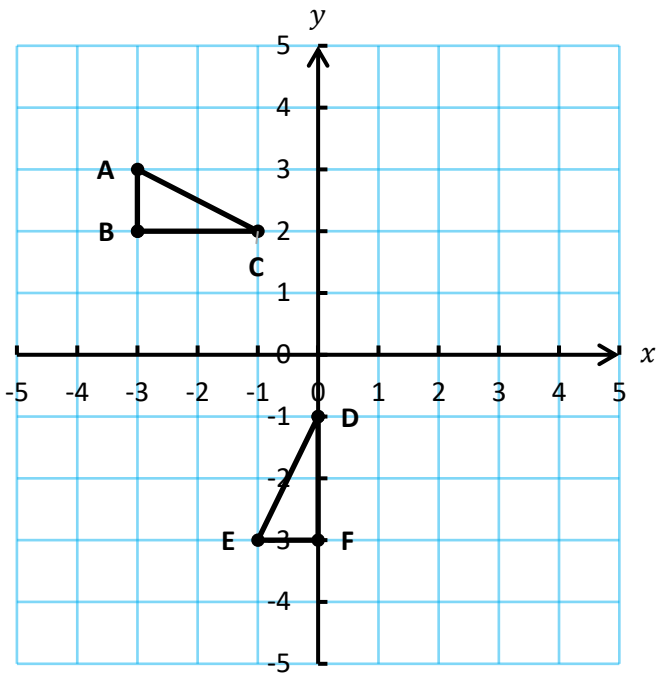
Exercise 42

6

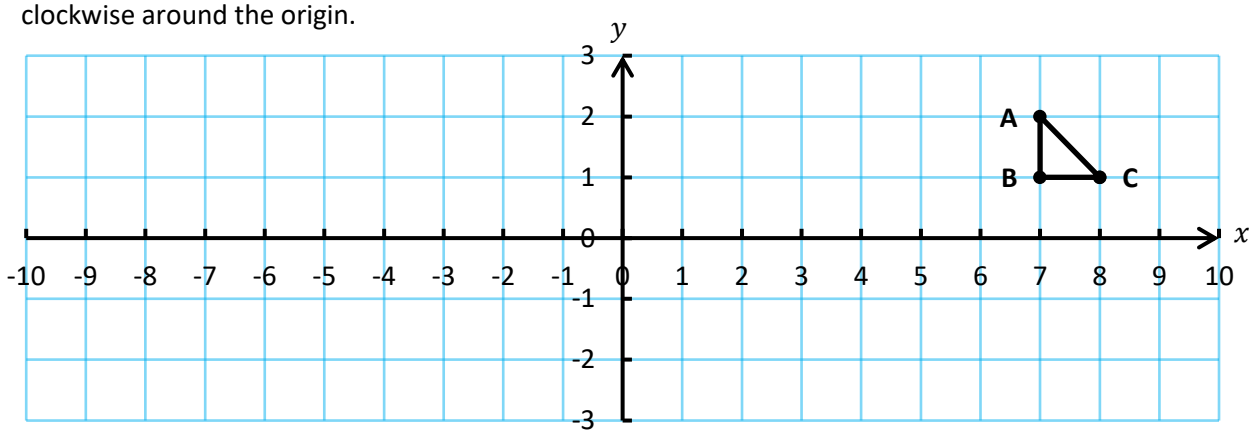
(a) Rotate the pentagon **ABCDE** by 90° clockwise around the point (–1, 1).



(b) What **type** of rotation changes the triangle **ABC** to the triangle **DEF**?



(c) First, translate the triangle **ABC** using the column vector $\begin{pmatrix} -5 \\ -1 \end{pmatrix}$. Then, rotate the translated triangle by 90° clockwise around the origin.



Evaluation

Key Words	Corrections	I am happy with…	I need to revise…

The End of Year 8

Reflection Sheet

Name: .....

Percentage in the test: .....

	I know this. 	I need to revise this. 	Question in the test:	Correct in the test?
I know how to **order positive and negative numbers from least to greatest**.			2, 7	
I know when to write the symbols **< or >** between a pair of numbers, e.g. 5 > –8.			3	
I can **add negative numbers**, e.g. 3 + –9.			4	
I can **subtract negative numbers**, e.g. 4 – –7.			4	
I can **multiply and divide by directed numbers**, e.g. 4 × –5, –20 ÷ –10.			4	
I can **add, subtract and multiply using decimals**, e.g. 37.24 + 42.41, 14 – 4.21, 45.65 × 6.			5, 6, 8	
I can **divide a decimal by a whole number less than 10**, e.g. 75.6 ÷ 9.			6	
I can **change a percentage into a decimal**.			9	
I can **change a decimal into a percentage**.			10	
I can **round off a number to a specified number of decimal places**.			1	
Given parallel lines, I can recognise and use **corresponding angles**, **alternate angles** and **internal angles**.			11	
I can **rotate a shape around a specified point**.			12, 13	