

Week 4

1. Simplify

a. $6y - 8y - 2y$

b. $t + t + t - t - t = t$

c. $5x + 3y - 4x - 5y = x - 2y$

d. $5a - 3b - 3a + b = 2a - 2b$

2. Expand

a. $5(3x - y) = 15x - 5y$

b. $a(a + 4) = a^2 + 4a$

c. $4(x - 2) = 4x - 8$

d. $2x(4x - 4y) = 8x^2 - 8xy$

3. Expand and Simplify

a. $2(3x - 5) + 4(x + 3)$

$$6x + 10 + 4x + 12 \\ = \underline{10x + 22}$$

b. $3(2x - 3) - 4(x - 3)$

$$6x - 9 - 4x + 12 = \underline{2x + 3}$$

4. Expand and Simplify

a. $(x + 6)(x + 2)$
 $x^2 + 6x + 2x + 12$
 $x^2 + 8x + 12$

b. $(x + 4)(x - 5)$
 $x^2 + 4x - 5x - 20$
 $x^2 - x - 20$

c. $(x - 9)(x - 1)$
 $x^2 - 9x - x + 9$
 $x^2 - 10x + 9$

d. $(3x - 5)(2x - 4)$
 $6x^2 - 10x - 12x + 20$
 $6x^2 - 22x + 20$

5. Factorise

a. $3c + 9$
 $3(c + 3)$

b. $ab + 5b$
 $b(a + 5)$

c. $x^2 - 3x - 18$
 $(x - 6)(x + 3)$

d. $x^2 - 100$
 $(x + 10)(x - 10)$

6. Solve

a. $2x + 3 = 4$
 $2x = 1$
 $x = 0.5$

b. $4x + 10 = 2x - 4$
 $2x = -14$
 $x = -7$

7. Simplify

a. $8x^5 \div 4x^2$
 $4x^3$

b. $t^2 \times t^2 \div t^2$
 t^2

c. $(y^4)^3$
 y^{12}

8. Nth Term

a. Find the Nth Term of
4 7 10 13

$$3n + 1$$

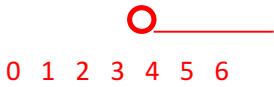
Is 301 in the sequence?

$$3n + 1 = 301 \\ 3n = 300 \quad \text{so } n = 100 \text{ yes}$$

9. Inequalities

a. Solve $3x - 1 \geq 17$
 $3x \geq 18$
 $x \geq 6$

b. Represent $x > 4$ on a number line.



10. Units

Fill in the blanks

$4.2\text{m} = 420\text{cm}$

$1800\text{g} = 1.8\text{kg}$

$0.9 \text{ litres} = 900\text{ml}$

$5420\text{m} = 5.42 \text{ km}$

11. Factors and Multiples

- a. Write down the factors of 40. 1,2,4,5,8,10,20,40
- b. Write down the first 5 multiples of 21. 21, 42, 63, 84, 105
- c. Work out the Highest Common Factor of 30 and 45. 15
- d. Work out the Lowest Common Multiple of 30 and 45. 90

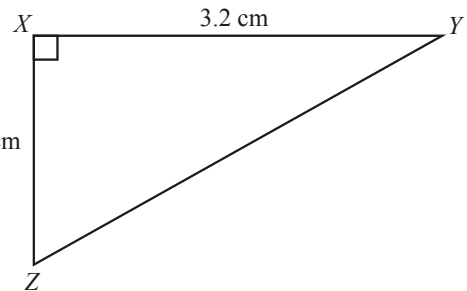
12. Primes

- a. Write down the 10th prime number. 29
- b. Write 160 as a product of prime factors. $2 \times 2 \times 2 \times 2 \times 2 \times 5$

13. Pythagoras

Work out the length of YZ.

Give your answer correct to 3 significant figures.

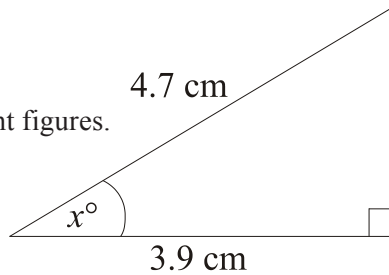


$3.2^2 + 1.7^2 = 13.13 \quad \sqrt{13.13} = 3.62\text{m}$

14. Trigonometry

Work out the length x.

Give your answer correct to 3 significant figures.



$X = \cos^{-1}(3.9/4.7) = 33.9$

..... cm

..... cm

15. Speed

Daniel leaves his house at 07 00.

He drives 87 miles to work.

He drives at an average speed of 36 miles per hour.

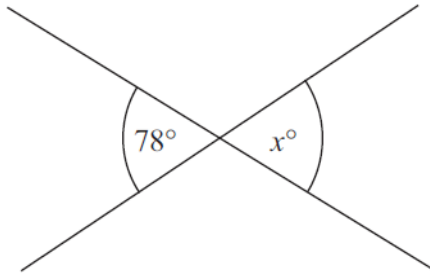
At what time does Daniel arrive at work?

$T = D/S = 87/36 = 2.416... \text{hr} = 2\text{h}25\text{min}$ so arrives at 0925

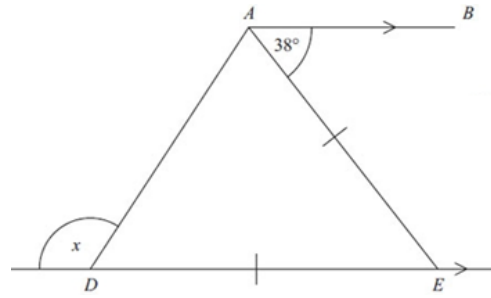
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16. Angle Facts.

Find x . Give all reasons.



$X = 78$ (Vertically opposite angles are equal angles)



$AED = 38$ (Alternate angles)

$ADE = 71$ (Isosceles triangle)
 $X = 109$ (Straight line)

17. Ratio

- a. David and Michael share £200 in the ratio 5:3.
 How much do they each get?

$5 + 3 = 8$ $200/8 = 25$ $D = 5 \times 25 = \text{£}125$ $M = 3 \times 25 = \text{£}75$

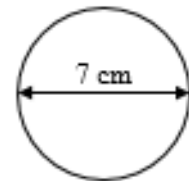
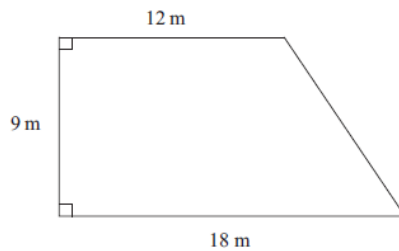
- b. The ratio of the number of boys to the number of girls in a school is 4:7.
 There are 30 more girls than boys.
 Work out how many boys there are.

3 more parts represents 30 so 1 part = 10 people Boys = $4 \times 10 = 40$

18. Area

Calculate the area.

$A = \frac{12 + 18}{2} \times 9$
 $= 135\text{cm}^2$

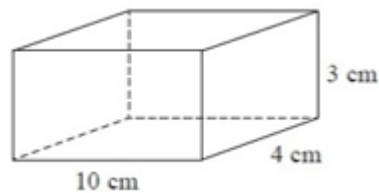


$A = \pi \times 3.5^2$
 $= 38.5\text{cm}^2$

19. Surface Area.

Calculate the surface area of this cuboid.

$2 \times 10 \times 3 +$
 $2 \times 10 \times 4 +$
 $2 \times 4 \times 3$
 164cm^2



20. Proportion

- a. 7 cakes cost £13.93.
 How much would 5 cost?

$13.93 / 7 \times 5 = \text{£}9.95$

- b. Convert £90 to dollars.

$90 \times 1.54 = \text{\$}138.60$

- c. Convert \$3000 to pounds.

$3000 / 1.54 = \text{£}1948.05$

21. Averages.

7 5 6 1

Calculate the:

- a. Mode no mode

- c. Median 5.5



22. Four Functions

a. $8 - 0.26$

7.74

b. $837 \div 9$

93

c. 1.37×0.8

1.096

23. Fractions. Calculate

a. $\frac{4}{5} - \frac{1}{2}$

b. $\frac{3}{7} \div \frac{3}{4}$

c. $3\frac{2}{7} + 1\frac{1}{3}$

d. $2\frac{3}{4} \times \frac{2}{3}$

a. $\frac{8}{10} - \frac{5}{10} = \frac{3}{10}$ b. $\frac{3}{7} \times \frac{4}{3} = \frac{12}{21}$ c. $\frac{23}{7} + \frac{4}{3} = \frac{69}{21} + \frac{28}{21} = \frac{97}{21} = 4\frac{13}{21}$ d. $\frac{11}{4} \times \frac{2}{3} = \frac{22}{12} = 1\frac{5}{6}$

24. Estimate

$$\frac{23 \times 0.48}{2.1} = \frac{20 \times 0.5}{2} = 5$$

25. Percentages

a. Calculate 45% of 300

$0.45 \times 300 = 135$

b. Decrease £80 by 15%

$15\% = £12$

$\text{New} = 80 - 12 = £68$

26. FDP

a. Write 0.14 as a percentage. 14%

b. Write $\frac{13}{50}$ as a percentage. 26%

27. FDP

Write the following in order from smallest to s largest.

0.3

38%

$\frac{1}{3}$

0.3

0.38

0.333

so $0.3, \frac{1}{3}, 38\%$

28. Probability

a. I roll a normal dice. What is the probability I get a 7? 0

Pupils are asked about their favourite colour.

b. Find the probability of choosing green.

Colour	Red	Blue	Green
Probability	0.3	0.47	

$1 - 0.47 - 0.3 = 0.23$

c. 400 pupils were asked. How many said red? $0.3 \times 400 = 120$