

Week 3

1. Simplify

a. $5x - 2x + x = 4x$

b. $t + t + t + t - t = 3t$

c. $4x + 2y - 3x + 5y = x + 7y$

d. $6a - 2b - 5a + 6b = a + 4b$

2. Expand

a. $3(3x - 2) = 9x - 6$

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

c. $2(x + 7) = 2x + 14$

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

3. Expand and Simplify

a. $2(3x - 2) + 4(x - 1)$
 $6x - 4 + 4x - 4$
 $10x - 8$

b. $4(2x + 3) - 3(x - 5)$
 $8x + 12 - 3x + 15$
 $5x + 27$

4. Expand and Simplify

a. $(x + 5)(x + 1)$
 $x^2 + 1x + 5x + 5$
 $x^2 + 6x + 5$

b. $(x + 4)(x - 2)$
 $x^2 - 2x + 4x - 8$
 $x^2 + 2x - 8$

c. $(x - 4)(x - 3)$
 $x^2 - 3x - 4x + 12$
 $x^2 - 7x + 12$

d. $(3x + 1)(2x + 5)$
 $6x^2 + 15x + 2x + 5$
 $6x^2 + 17x + 5$

5. Factorise

a. $9x - 12$
 $3(3x - 4)$

b. $8y + 4x$
 $4(2y + x)$

c. $x^2 + 2x - 15$
 $(x + 5)(x - 3)$

d. $x^2 - 36$
 $(x + 6)(x - 6)$

6. Solve

a. $4x - 5 = 5$
 $+5 \quad +5$
 $4x = 10$
 $x = 2.5$

b. $3x + 3 = 2x - 8$
 $-2x \quad -2x$
 $x + 3 = -8$
 $x = -11$

7. Simplify

a. $y^6 \div y^2 = y^4$

b. $4s^5t \times st^4 = 4s^6t^5$

c. $(y^6)^2$
 $y^6 \times y^6 = y^{12}$

8. Nth Term

a. Find the Nth Term of

2 8 14 20
 $6n - 4$

b. Is 596 in the sequence?

$6n - 4 = 596$
 $6n = 600$
 $n = 100$ so Yes.

9. Inequalities

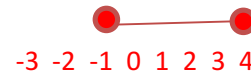
a. Solve $4x - 7 \leq 13$

$$+7 \quad +7$$

$$4x \leq 20$$

$$x \leq 5$$

b. Represent $-1 \leq x \leq 4$ on a number line.



10. Units

Fill in the blanks

2.6m = 2600mm

500g = 0.5kg

12.1 litres = 12100ml

75mm = 7.5 cm

11. Factors and Multiples

a. Write down the factors of 18. 1, 18, 2, 9, 3, 6

b. Write down the first 5 multiples of 16. 16, 32, 48, 64, 80

c. Work out the Highest Common Factor of 12 and 24.

1, 12, 2, 6, 3, 4

1, 24, 2, 12, 3, 8, 4, 6

12

d. Work out the Lowest Common Multiple of 15 and 40.

15, 30, 45, 60, 75, 90, 105, 120...

40, 80, 120...

120

12. Primes

a. Write down the 7th prime number.

2, 3, 5, 7, 11, 13, 17...

17

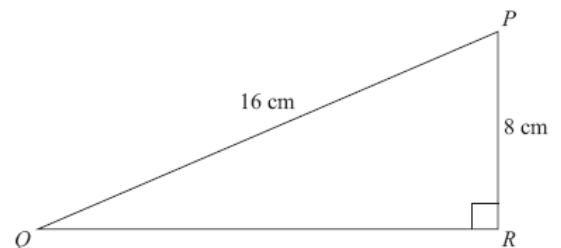
b. Write 40 as a product of prime factors.

$2 \times 2 \times 2 \times 5 = 2^3 \times 5$

13. Pythagoras

Work out the length of QR.

Give your answer correct to 3 significant figures.



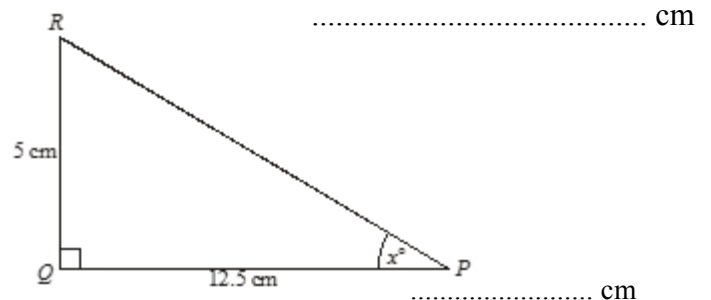
$16^2 - 8^2 = 192 \quad \sqrt{192} = 13.9\text{cm}$

14. Trigonometry

Work out the length x.

Give your answer correct to 3 significant figures.

$\text{Tan}^{-1}(5 \div 12.5) = 21.8$



15. Speed

A car travels for 3 hours.

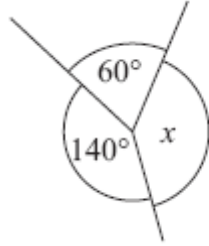
Its average speed is 75 km/h.

Work out the total distance the car travels.

$S = \frac{d}{t} \quad d = s \times t = 75 \times 3 = 225\text{km}$

16. Angle Facts.

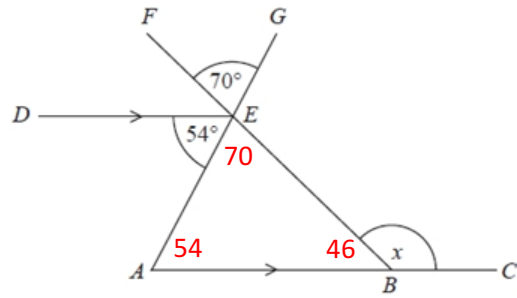
Find x . Give all reasons.



$$140 + 60 = 200$$

$$360 - 200 = 160$$

$$x = 160 \text{ because angles around a point add up to } 360$$



$$AEB = 70 \text{ vertically opposite angles are equal}$$

$$EAB = 54 \text{ alternate angles are equal}$$

$$ABE = 46 \text{ angles in a triangle add up to } 180$$

$$x = 134 \text{ angles on a straight line add up to } 180$$

17. Ratio

- a. David and Michael share £300 in the ratio 5:1.
How much does David get?

$$5 + 1 = 6$$

$$300 \div 6 = 50$$

$$5 \times 50 : 1 \times 50$$

$$250 : 50 \quad \text{David gets } \pounds 250$$

- b. The ratio of the number of boys to the number of girls in a school is 2:3.
There are 120 children in total.
How many boys and girls are there?

$$2 + 3 = 5$$

$$120 \div 5 = 24$$

$$2 \times 24 : 3 \times 24$$

$$48 : 72$$

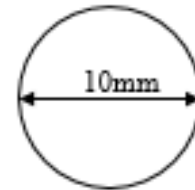
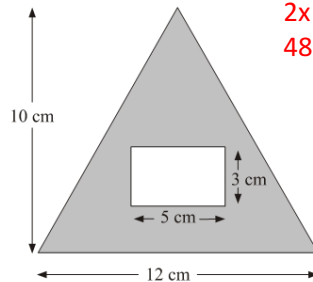
18. Area

Calculate the area.

$$(12 \times 10) \div 2 = 60$$

$$5 \times 3 = 15$$

$$60 - 15 = 45 \text{ cm}^2$$



$$\pi \times 5^2 = 78.5 \text{ mm}^2$$

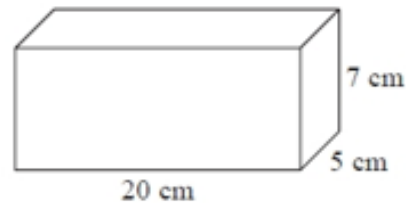
19. Volume.

Calculate the volume of this cuboid.

$$\text{Vol} = \text{area of Front face} \times \text{length}$$

$$\text{Area} = 20 \times 7 = 140$$

$$\text{Vol} = 140 \times 5 = 700 \text{ cm}^3$$



20. Proportion

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

$$1 \text{ cake} = 1.99$$

$$5 \times 1.99 = \pounds 9.95$$

£1 = \$1.54,

- b. Convert £90 to dollars.

$$90 \times 1.54 = \$138.60$$

- c. Convert \$3000 to pounds.

$$3000 \div 1.54 = \pounds 1948.05$$

21. Averages.

6 1 3 3 3

Calculate the:

- a. Mode = 3
- b. Range = $6 - 1 = 5$
- c. Median 1 3 3 3 6 3
- d. Mean $6 + 1 + 3 + 3 + 3 = 16$ $16 \div 5 = 3.2$



22. Four Functions

a. $8.2 + 0.06$

8.26

b. $732 \div 6$

122

c. 2.07×1.2

2.484

23. Fractions. Calculate

a. $\frac{5}{6} - \frac{3}{4}$
 $\frac{10}{12} - \frac{9}{12}$
 $\frac{1}{12}$

b. $\frac{2}{3} \times \frac{3}{4}$
 $\frac{2 \times 3}{3 \times 4}$
 $\frac{6}{12} = \frac{1}{2}$

c. $1\frac{3}{4} + 1\frac{3}{5}$
 $\frac{7}{4} + \frac{8}{5}$
 $\frac{35}{20} + \frac{32}{20}$
 $\frac{67}{20} = 3\frac{7}{20}$

d. $1\frac{2}{3} \div 1\frac{4}{5}$
 $\frac{5}{3} \div \frac{9}{5}$
 $\frac{5}{3} \times \frac{5}{9}$
 $\frac{5 \times 5}{3 \times 9} = \frac{25}{27}$

24. Estimate

$$\frac{3.2 \times 11.2}{0.53}$$

$$\frac{3 \times 10}{0.5} = \frac{30}{0.5} = 60$$

25. Percentages

a. Calculate 35% of 160

$10\% = 16, 30\% = 48, 5\% = 8 \quad 35\% = 56$

b. Decrease £80 by 20%

$10\% = 8, 20\% = 16 \quad 80 - 16 = £64$

26. FDP

a. Write 0.9 as a percentage. 90%

b. Write 0.12 as a fraction, in its simplest form. $\frac{12}{100} = \frac{3}{25}$

27. FDP

Write the following in order from smallest to largest.

0.63

$64\% = 0.64$

$\frac{3}{5} = \frac{6}{10} = 0.6$

$\frac{3}{5}, 0.63, 64\%$

28. Probability

a. I roll a normal dice. What is the probability I get an even number? $\frac{1}{2}$

b. Find the value of x. $0.3 + 0.2 = 0.5 \quad 1 - 0.5 = 0.5 \quad 0.5 \div 2 = 0.25$

| | | | | |
|-------------|---|-----|-----|---|
| Number | 1 | 2 | 3 | 4 |
| Probability | x | 0.3 | 0.2 | x |

c. The spinner is spun 200 times. Estimate how many times it landed on 3?

0.2×200 or 20% of $200 = 40$