

Week 2

1. Expand and Simplify

a. $4(2x + 4) + 3(x - 3)$
 $8x + 16 + 3x - 9$
 $11x + 7$

b. $5(x - 2) - 2(x + 3)$
 $5x - 10 - 2x - 6$
 $3x - 16$

2. Expand and Simplify

a. $(x + 2)(x - 7)$
 $x^2 + 2x + 7x + 14$
 $x^2 + 9x + 14$

b. $(3x + 1)(x - 4)$
 $3x^2 + x - 12x - 4$
 $3x^2 - 11x - 4$

3. Factorise

a. $x^2 - 12x + 20$
 $(x - 10)(x - 2)$

c. $x^2 - 25$
 $(x + 5)(x - 5)$

b. $x^2 - 6x$
 $x(x - 6)$

d. $3x^2 - 14x + 8$
 $(3x - 2)(x - 4)$

4. Solve

a. $2x + 10 \leq 14$
 $2x \leq 4$
 $x \leq 2$

b. $5x - 2 = 2x + 16$
 $3x = 18$ so $x = 6$

5. Simplify

a. $x^7 \div x^3$
 x^4

b. $4s^2t \times 3s^5t^3$
 $12s^7t^4$

c. $(y^5)^3$
 y^{15}

6. Nth Term

a. Find the Nth Term of
5 8 11 14

$$3n + 2$$

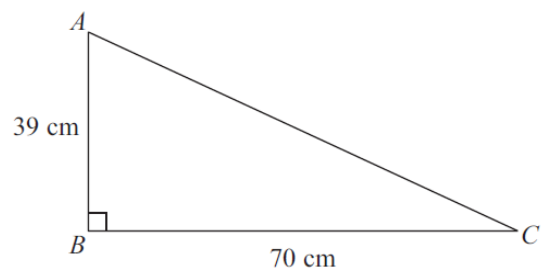
b. Is 301 in the sequence?
 $3n + 2 = 301$

$$3n = 299$$
$$n = 99.7 \text{ so not in sequence}$$

7. Pythagoras

Work out the length of AC.
Give your answer correct to 3 significant figures.

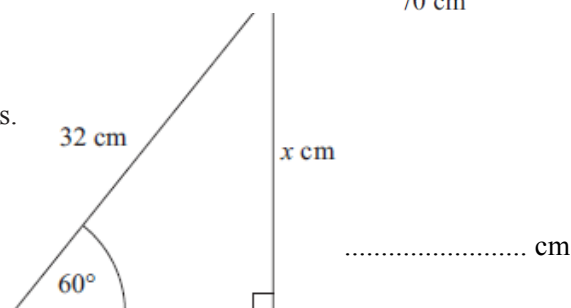
$$39^2 + 70^2 = 6421 \quad \sqrt{6421} = 80.1 \text{ cm}$$



8. Trigonometry

Work out the length x.
Give your answer correct to 3 significant figures.

$$32 \times \sin(60) = 27.7 \text{ cm}$$

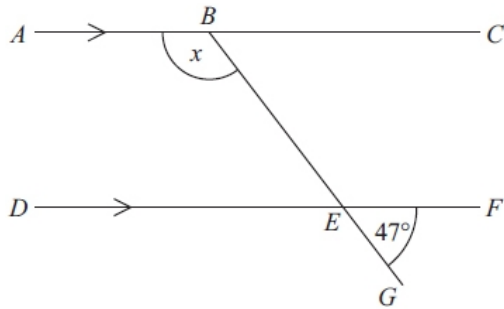


9. Speed

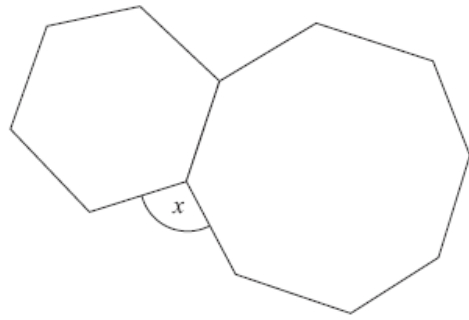
The distance from Liverpool to Prague is 1200 km.
A plane travels at an average speed of 480 km/h.

10. Angle Facts.

Find x . Give all reasons.



$CBE = 47$ (Corresponding angles)
 $X = 133$ (Angles on a straight line)



Exterior angle of hexagon = 60
 Exterior angle of octagon = 45
 $X = 60 + 45 = 105$

11. Ratio

a. Share £80 in the ratio 7:3.

$7 + 3 = 10$ $80 / 10 = 8$ $7 \times 8 = 56, 3 \times 8 = 24$ so 56 : 24

b. The ratio of the number of boys to the number of girls in a school is 4:5.
 There are 135 girls in the school.
 What's the total number of pupils in the school.

B : G

4 : 5

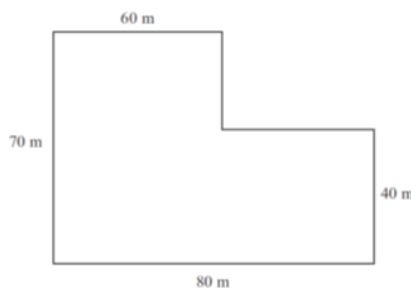
? : 135 so multiplier is 27

$4 \times 27 = 108$ boys so total is

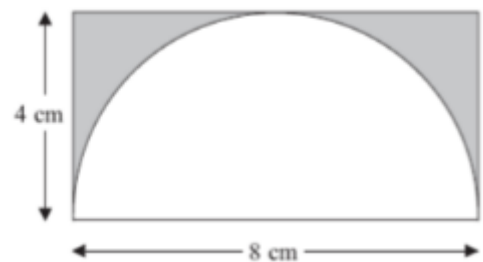
$108 + 135 = 243$

12. Area

Calculate the area.



Top = $60 \times 30 = 1800$
 Bottom = $80 \times 40 = 3200$
 TOTAL = 5000m^2

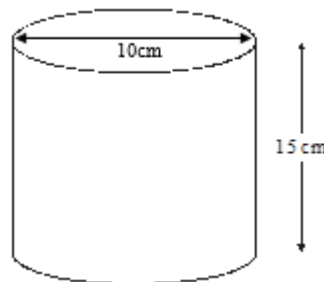


Area semicircle = $0.5 \times (\pi \times r^2)$
 $= 0.5 \times \pi \times 16 = 8\pi$
 Shaded = $8 \times 4 - 8\pi$
 $= 6.87\text{cm}^2$

13. Volume.

Calculate the volume of this cylinder.

$V = \pi r^2 h = \pi \times 5^2 \times 15 = 1178\text{cm}^3$



14. Error Intervals

$x = 3.2$. x has been rounded to the nearest one decimal place.
 Write the **error interval** for x .

15. Solve these Simultaneous Equations

$$2x + 3y = 2$$

$$3x - y = 14 \times 3$$

$$2x + 3y = 2$$

$$9x - 3y = 42$$

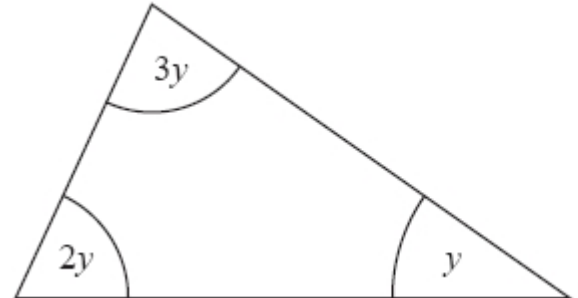
(+) $11x = 44$ so $x = 4$

Sub in $12 - y = 14$ so $y = -2$

16. Forming and Solving Equations

Find the value of y.

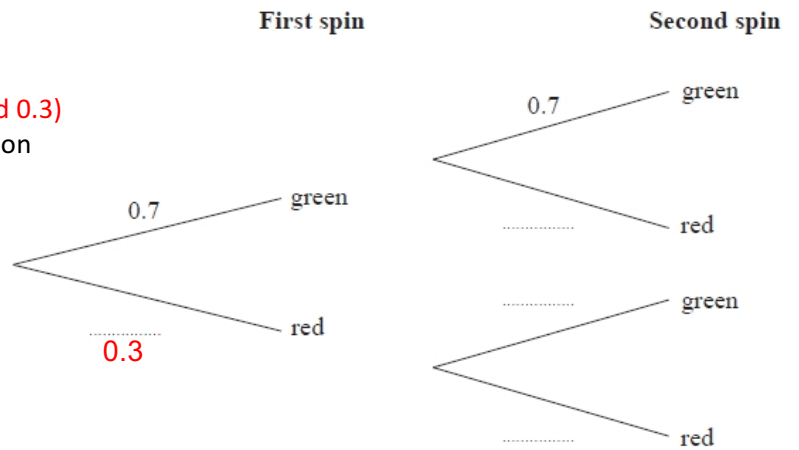
$$6y = 180$$
 so $y = 30$



17. Tree Diagrams

- a. Complete the tree diagram (all 0.7 and 0.3)
- b. Find the Probability the spinner lands on Green both times.

$$0.7 \times 0.7 = 0.49$$



18. Compound Percentages

I invest £800 for 3 years at 6% compound interest. How much will I have in my account after 3 years.

$$800 \times 1.06^3 = \text{£}952.81$$

19. Direct and Inverse Proportion

y is directly proportional to the x.

$$y = kx$$

When $x = 12$, $y = 3$.

$$3 = 12k$$
 so $k = 0.25$

Find x when $y = 240$.

$$y = 0.25x$$

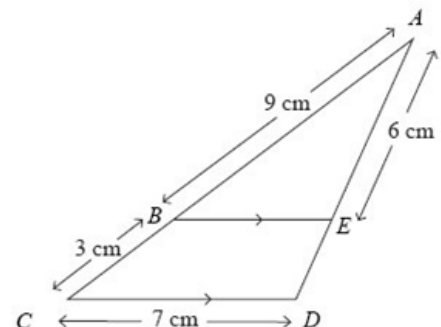
$$240 = 0.25x$$
 so $x = 960$

20. Similar Shapes

Triangles ABE and ACD are similar. S.F. = $12/9 = 4/3$

a) Calculate length BE. $7 \div 4/3 = 5.25\text{cm}$

b) Calculate length ED. $AD = 6 \times 4/3 = 8$ so $ED = 2\text{cm}$





21. Multiplying Decimals

Calculate 1.3×4.6

$$5.98$$

22. Fractions. Calculate

a. $\frac{1}{3} + \frac{5}{9}$

$$a. \frac{3}{9} + \frac{5}{9} = \frac{8}{9}$$

b. $\frac{4}{5} \times \frac{1}{2}$

$$b. \frac{4}{5} \times \frac{1}{2} = \frac{4}{10}$$

c. $2\frac{1}{4} - 1\frac{2}{3}$

$$c. \frac{9}{4} - \frac{5}{3} = \frac{27}{12} - \frac{20}{12} = \frac{7}{12}$$

d. $2\frac{1}{4} \div 1\frac{2}{3}$

$$d. \frac{9}{4} \times \frac{3}{5} = \frac{27}{20}$$

23. Estimate

$$\frac{4.1 \times 21}{0.48} = \frac{4 \times 20}{0.5} = 160$$

24. Powers

a. 4^{-2}

$$1/16$$

b. $64^{\frac{1}{3}}$

$$4$$

c. $\left(\frac{3}{7}\right)^{-2}$

$$49/9$$

25. Standard Form

a. Write 3.8×10^5 as an ordinary number

$$380000$$

b. Write 0.0037 in standard form

$$3.7 \times 10^{-3}$$

c. Calculate $(7.7 \times 10^4) + (3.5 \times 10^3)$

$$77000 + 3500 = 80500 = 8.05 \times 10^4$$

d. $(6 \times 10^5) \div (2 \times 10^{-4})$

$$3 \times 10^9$$

26. Surds

Simplify:

a. $\sqrt{75}$

$$5\sqrt{3}$$

b. $(2 + \sqrt{3})(5 - \sqrt{3})$

$$10 - 3 - 2\sqrt{3} + 5\sqrt{3}$$

$$7 + 3\sqrt{3}$$

c. $\frac{4}{\sqrt{3}}$

$$\frac{4\sqrt{3}}{3}$$

27. Recurring Decimals

Convert $0.\dot{3}6$ to a fraction in its simplest form.

$$100x = 36.363636\dots$$

$$\underline{x = 0.36363636\dots}$$

$$99x = 36$$