Week 5

1. Expand and Simplify

a. $5(2x - 1) + 4(x + 3)$

$10x - 5 + 4x + 12$

$14x + 7$

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

$8x - 20 - 2x - 6$

$6x - 26$

2. Expand and Simplify

a. $(x - 8)(x - 3)$

$X^2 - 3x - 8x + 24$

$X^2 - 11x + 24$

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

$6X^2 + 12x - 10x - 20$

$6X^2 + 2x - 20$

3. Factorise

a. $x^2 + x - 20$

$(x + 5)(x - 4)$

b. $2y^2 - 6y$

$2y(y - 3)$

c. $2x^2 + 7x - 9$

$(2x - 1)(x + 3)$

d. $9x^2 - 4y^2$

$(3x + 2y)(3x - 2y)$

4. Solve

a. $2x - 10 = 4$

$+10 \quad +10$

$2x = 14$

$X = 7$

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

$4 - 2x = 4x + 8$

$+2x \quad +2x$

$2 = 6x + 8$

$-6 = 6x$

$X = -1$

5. Simplify

a. $a^5 \times a^2 = a^7$

b. Find n. $3^n \times 9 = 3^5$

$9 = 3^2$

$N = 3$

c. $(2y^5)^3$

$2y^5 \times 2y^5 \times 2y^5 = 8y^{15}$

6. Nth Term

a. Find the Nth Term of

3 7 11 15

$4n - 1$

b. Is 48 in the sequence?

$4n - 1 = 48$

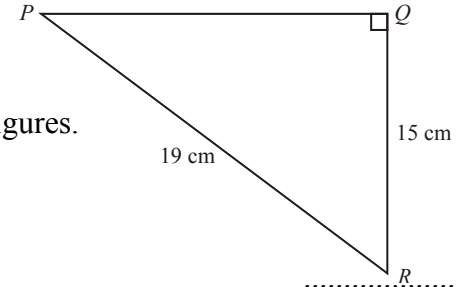
$4n = 49$

$N = 12.25$ so No.

7. Pythagoras

Work out the length of YZ.

Give your answer correct to 3 significant figures.



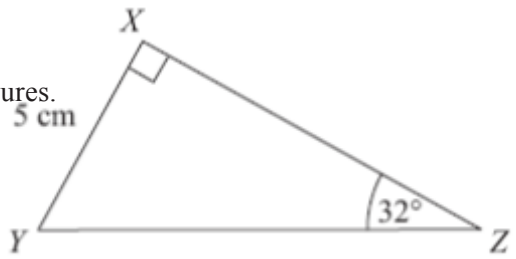
$19^2 - 15^2 = 136 \quad \sqrt{136} = 11.7cm$

..... cm

8. Trigonometry

Work out the length x.

Give your answer correct to 3 significant figures.



$XZ = 5 \div \tan 32 = 8.00cm$

$YZ = 5 \div \sin 32 = 15.1cm$

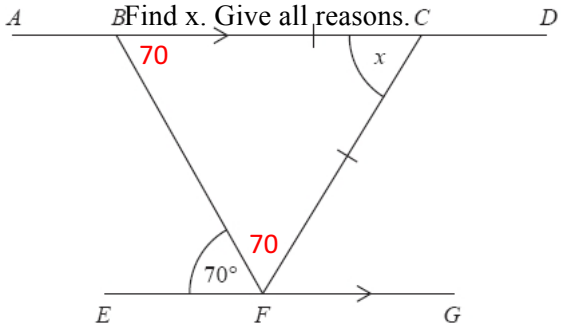
..... cm

9. Speed

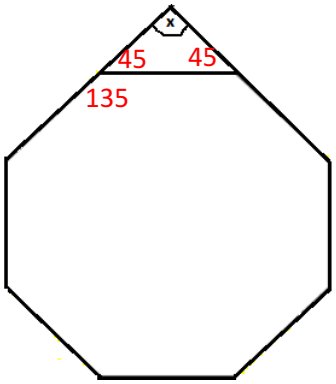
The London airport is 200 miles from Manchester airport.
A plane leaves Manchester airport at 10 am to fly to the London airport.
The plane flies at an average speed of 120 mph. What time does the plane arrive at the London airport? $S = \frac{d}{t}$ $T = \frac{d}{s} = \frac{200}{120} = 1.66\ldots$ $1.66\ldots x\ 60 = 100\ minutes$

10am + 100 minutes = 11.40am.....

Angle Facts.



FBC = 70 alternate angles are equal
BFC = 70 base angles in an isosceles triangle are equal
70 + 70 = 140 180 – 140 = 40
X = 40 angles in a triangle add up to 180



360/8 = 45
180 – 45 =135
45 + 45 = 90
180 – 90 = 90

10. Ratio

a. David and Michael share £360 in the ratio 5:4.
How much more does David get?

5 + 4 = 9
360 ÷9 = 40
5x 40 : 4 x 40
200 : 1600 David gets £40 more

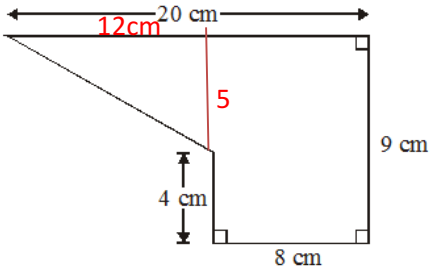
b. The ratio of the number of boys to the number of girls in a school is 3:5.
There are 64 more girls in the school than boys.
What's the total number of pupils in the school.

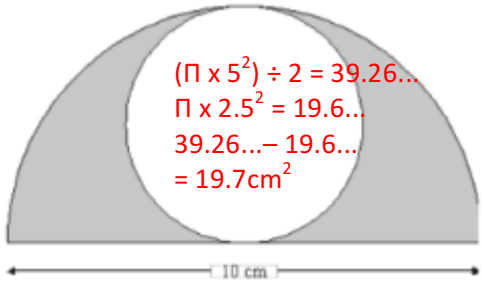
64 more ....2 parts = 64
1 part = 32
8 parts in total = 8 x 32 = 256

11. Area

Calculate the area.

(12 x 5) ÷ 2 = 30
8 x 9 = 72
30 + 72 = 102cm^2



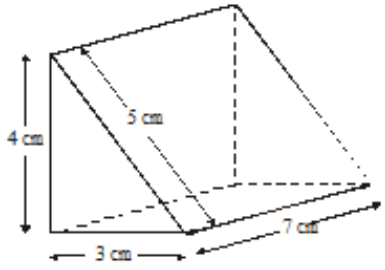


(Π x 5^2) ÷ 2 = 39.26...
Π x 2.5^2 = 19.6...
39.26...– 19.6...
= 19.7cm^2

12. Surface Area.

Calculate the surface area of this triangular prism.

Front/back = (4 x 3) ÷ 2 = 6
Front/back = (4 x 3) ÷ 2 = 6
Bottom = 3 x 7 = 21
Left = 4 x 7 = 28
Slope = 5 x 7 = 35 Total = 96cm^2



13.Error Intervals

x = 6. x has been rounded to the nearest two significant figures.
Write the **error interval** for x.

14. Solve these Simultaneous Equations

$2x + 2y = 2$ x3

$3x - 3y = 6$ x2

$6x - 6y = 6$

$6x + 6y = 12$ +

$12x = 18$

$X = 1.5$

Sub it in

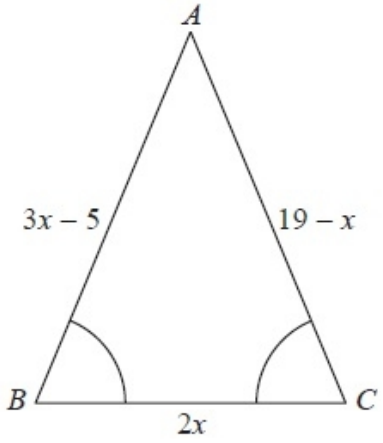
$2x + 2y = 2$

$3 + 2y = 2$

$2y = -1$

$Y = -0.5$

15.Find the value of x.



$3x - 5 = 19 = x$

$4x - 5 = 19$

$4X = 24$

$X = 6$

16. Tree Diagrams

Sarah has a bag of sweets.

There are 3 orange sweets, 2 red sweets and 5 yellow sweets in a bag.

Sarah takes a sweet at random.

She eats the sweet.

She then takes another sweet at random.

Work out the probability that both the sweets are the same colour.

Tree Diagram

$\frac{3}{10} \times \frac{2}{9} = \frac{6}{90}$

$\frac{2}{10} \times \frac{1}{9} = \frac{2}{90}$

$\frac{5}{10} \times \frac{4}{9} = \frac{20}{90}$

$\frac{6}{90} + \frac{2}{90} + \frac{20}{90} = \frac{28}{90}$

17. Compound Interest and Depreciation

A value of a car costing £7500 depreciates at 12.5% per year. What will the value of the car be after 4 years?

$7500 \times 0.875^3 = £6562.50$

18. Direct and Inverse Proportion

y is directly proportional to x^2.

When x = 3, y = 36.

Find y when x = 5.

$y = kx^2$

$36 = k \times 3^2$

$K = 36 \div 9 = 4$

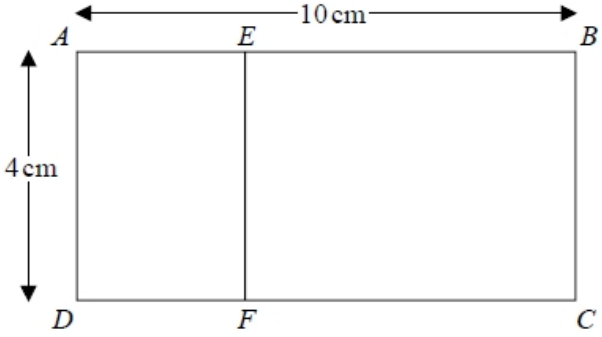
$y = 4x^2$

$y = 4 \times 5^2 = 100$

19. Similar Shapes

Rectangle *ABCD* is mathematically similar to rectangle *DAEF*.

. Work out the area of rectangle *DAEF*.



$10 \div 4 = 2.5$

$40 \div 2.5^2 = 6.4 cm^2$

20. Multiplying Decimals

Calculate 1.29 x 1.8

2.322

21.Fractions. Calculate

a. $\frac{2}{3}+\frac{5}{6}$ b. $\frac{3}{7}$ x $\frac{5}{6}$ c. $3\frac{3}{4}$ - $1\frac{1}{2}$ d. $3\frac{3}{4} \div 1\frac{1}{5}$

$\frac{4}{6}+\frac{5}{6}$

$\frac{9}{6}=\frac{3}{2}=1\frac{1}{2}$

$\frac{3x5}{7x6}$

$\frac{15}{42}=\frac{5}{14}$

$\frac{11}{4}-\frac{3}{2}$

$\frac{11}{4}-\frac{6}{4}$

$\frac{5}{4}=1\frac{1}{4}$

$\frac{11}{4} \div \frac{6}{5}$

$\frac{11}{4} \times \frac{5}{6}$

$\frac{11x5}{4x6}=\frac{55}{24}=2\frac{7}{24}$

22. A theatre has 31 rows, with 17 seats in each row. Tickets cost £18.50 each. The theatre sells out. **Estimate** how much money is made through ticket sales.

30 x 20 = 600 seats

20 x 600 = £12000

23.Powers

a. y^0 b. $125^{-\frac{1}{3}}$ c. $9^{\frac{3}{2}}$

1

$\left(\frac{1}{125}\right)^{\frac{1}{3}}$

$=\sqrt[3]{\frac{1}{125}}=\frac{1}{5}$

3^3

27

24.Standard Form

a. Write 3.08 x 10^3 as an ordinary number

3080

b. Write 0.0408 in standard form

4.08 x 10^{-2}

c. Calculate (2.3 x 10^5) - (4.2 x 10^3)

230000 – 4200 = 225800 = 2.258 x 10^5

d. (3 x 10^4) ÷ (6 x 10^{-3})

0.5 x 10^7 = 5 x 10^6

25.Surds

Simplify:

a. $\sqrt{75}-\sqrt{27}$ b. (2 - $\sqrt{7}$)(2 - $\sqrt{7}$) c. $\frac{9}{2\sqrt{3}}$

$\sqrt{25\ x\ 3}\ -\sqrt{9\ x\ 3}$

$5\sqrt{3}$ - $3\sqrt{3}$ = $2\sqrt{3}$

$4-2\sqrt{7}-2\sqrt{7}+7$

$11-4\sqrt{7}$

$\frac{9}{2\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}=\frac{9\sqrt{3}}{2\ x\ 3}=\frac{3\sqrt{3}}{2}$

26. Recurring Decimals

Convert $0.\dot{0}\dot{4}$ to a fraction in its simplest form.

$X = 0.\dot{0}\dot{4}$

$100X = 4.\dot{4}$

$X = \frac{4}{99}$