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Year 10

Topics 1 - 9

Practice Exam

Mark Scheme and revision:
www.addvancemaths.com/year10

Name:	
Teacher:	
Score:	/67 %

1 Hour 15 min

Instructions

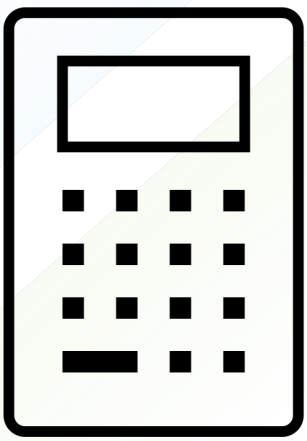
- Use black or blue ball-point pen.
- Answer all the questions in the spaces provided; blank paper is provided if needed.
- You will need: **ruler, protractor, pencil, compass, calculator**

Information

- The marks for each question are shown in brackets.
- The total marks available for this exam is 67.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.



Calculators are allowed in this paper. AddvanceMaths recommends the Casio Classwiz fx-991

Designed by: Imad Raheel

Year 10 Topics 1-9 exam

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Y:M:A

1. Yusef, Mohamed and Ali always share profit in the ratio 3:5:4 .

(a) They get a profit of 4020 rupees. How much do they each receive?

4020 ÷ 12 = 335

Yusef: 1005 ..... rupees

Mohamed: 1675 ..... rupees

Ali: 1340 ..... rupees 3

(b) If Yusef and Ali together have 100 rupees more than Mohamed, how much does each person receive?

7a + 100 = 5a

2a = 100

a = 50

Yusef: 150 ..... rupees

Mohamed: 250 ..... rupees

Ali: 200 ..... rupees 3

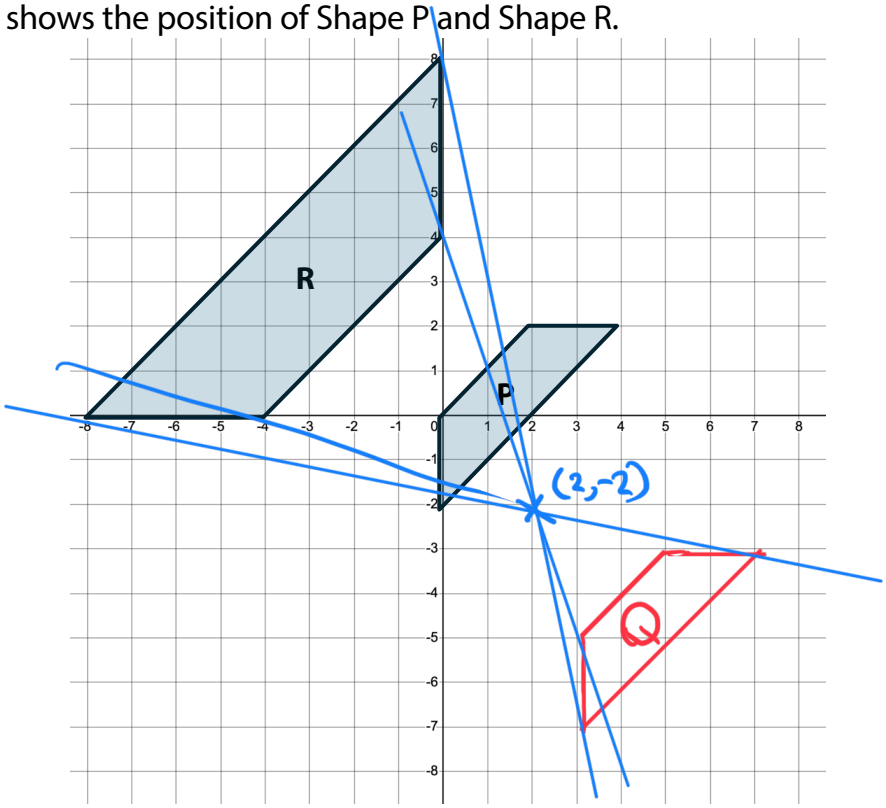
2. Calculate the following, showing all your working.
The final answer scores zero marks, you only get credit for your working out.

$$2\frac{7}{8} \times 1\frac{3}{5} =$$

$\frac{23}{8} \times \frac{8}{5} = \frac{23}{5} = 4\frac{3}{5}$

..... 2

3. The graph shows the position of Shape P and Shape R.



(a) Translate Shape P with the vector $\begin{pmatrix} 3 \\ -5 \end{pmatrix}$ Label the new shape as Q.

2

(b) Describe the singe transformation that maps Shape Q onto Shape R.

Enlarged by scale factor −2
around centre (2,−2).

2

4. Solve the below equations.

(a) $(2x+3)^2 = \pi^0 + 3$

$4x^2 + 6x + 6x + 9 = 1 + 3$

$4x^2 + 12x + 5 = 0$

$(2x+1)(2x+5) = 0$

$x = -\frac{1}{2}$ $x = -\frac{5}{2}$

..... 3

(b) Rearrange the following.
Give your answer in the form $(ax+b)(cx+d) = 0$

(i) $\frac{4}{x+1} = 3x+2$

$4 = (3x+2)(x+1)$

$4 = 3x^2 + 5x + 2$

$0 = 3x^2 + 5x - 2$

$0 = (3x-2)(x+2)$

..... 3

(ii) $2(x+3) = (2x)^2 - 5(3-2x)$

$2x + 6 = 4x^2 - 15 + 10x$

$0 = 4x^2 + 8x - 21$

$14 \times -6 = -84$

$14 + -6 = 8$

$0 = 4x^2 + 14x - 6x - 21$

$0 = 2x(2x+7) - 3(2x+7)$

$0 = (2x-3)(2x+7)$

..... 3

5. Simplify the following, giving your answer in its simplest form:
Show clear algebraic working

(a) $\dfrac{x^2 - 49}{2x^2 - 11x - 21}$ $= \dfrac{(x-7)(x+7)}{(2x+3)(x-7)}$

$= \dfrac{x+7}{2x+3}$

..... 4

(b) $(x-3)(x^2+9)(x+3)$

$(x-3)(x^3+3x^2+9x+27)$

$x^4 + 3x^3 + 9x^2 + 27x$

$-3x^3 - 9x^2 - 27x - 81$

$= x^4 - 81$

..... 3

6. The straight line L_1 has equation $y + 4x = 5$.

$y = -4x + 5$

The straight line L_2 is parallel to L_1 and passes through the point $(2, -6)$.

$m = -4$

Find the equation for L_2, giving your answer in the form $ax + by = c$.

$y = -4x + c$ $(2, -6)$

$-6 = -4(2) + c$

$-6 = -8 + c$

$2 = c$

$y = -4x + 2$

$4x + y = 2$

7. 8 congruent sectors are drawn in a circle of radius 8 cm.
Find the area of the shaded region to 2 decimal places.

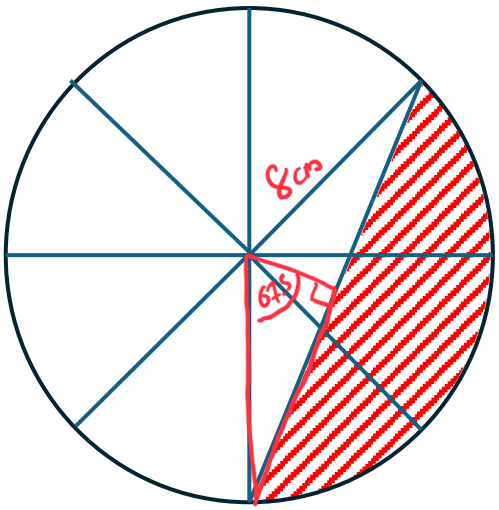
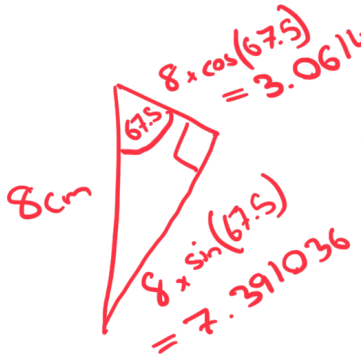


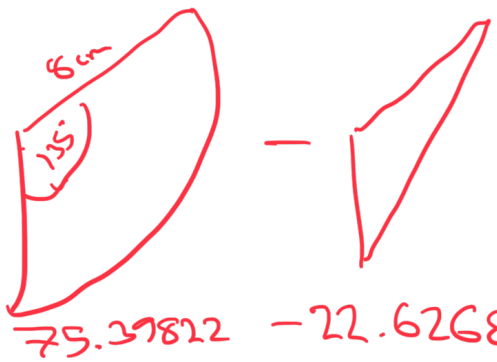
Diagram **not** accurately drawn

$\frac{135}{360} \times \pi \times 8^2 = 75.39822\ldots \text{ cm}^2$



$\text{Area} = \frac{3.0614 \times 7.391}{2} \times 2$

$= 22.6268\ldots$



$75.39822 - 22.6268 = 52.77142$

52.8 ..... cm^2

8. The diagram shows circle. P, Q, R, S & T are points on the circumference of the circle.
Given that the tangent at P makes an angle of $130°$ with line PR, and that angle SQR is $50°$.
Find angle PTS, giving reasons for each stage of your working.

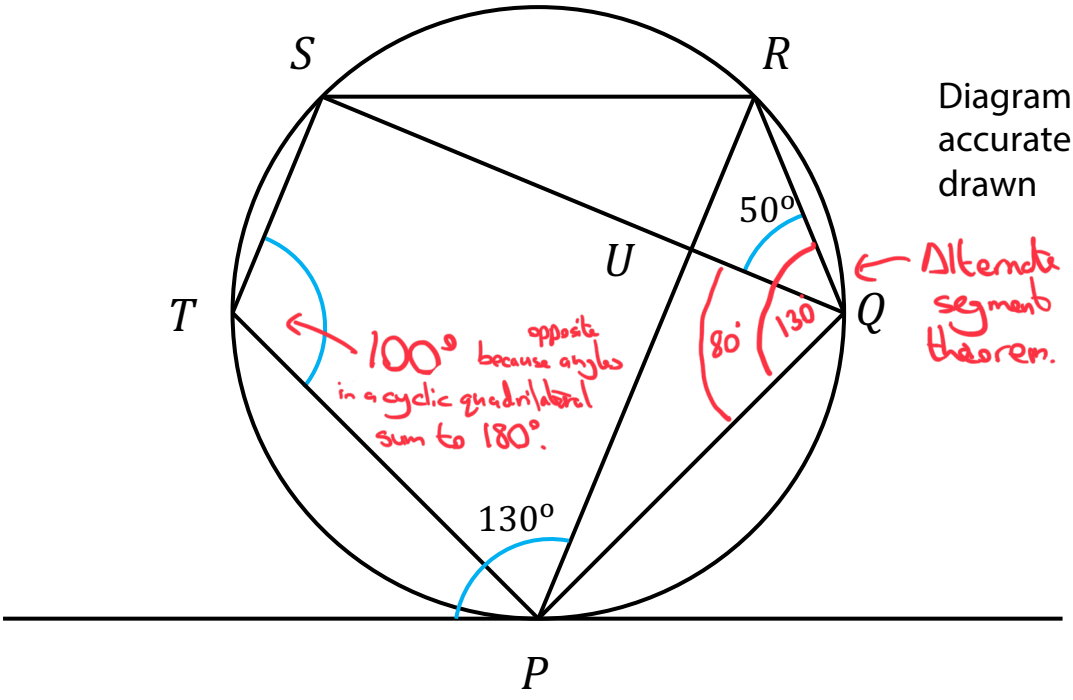


Diagram **not** accurately drawn

100°

9. Jerry invested $976,000 at the end of 2014.
The bank provided an interest rate of 4% in the first year, and 2.7% every following year.

(a) Work out the value of his accumulated interest by the end of 2020.

$976000 \times 1.04 \times 1.027^5$

$= \$1159672.54$

$- 976000$

$ 183672.54 3

(b) Jerry purchases a Ferrari at the end of 2020 using some of his saved money.
The car's value depreciates by 2.3% each year.
By the end of which year will the cars value have halved?

$x \times 0.977^n = \frac{x}{2}$

$0.977^n = \frac{1}{2}$

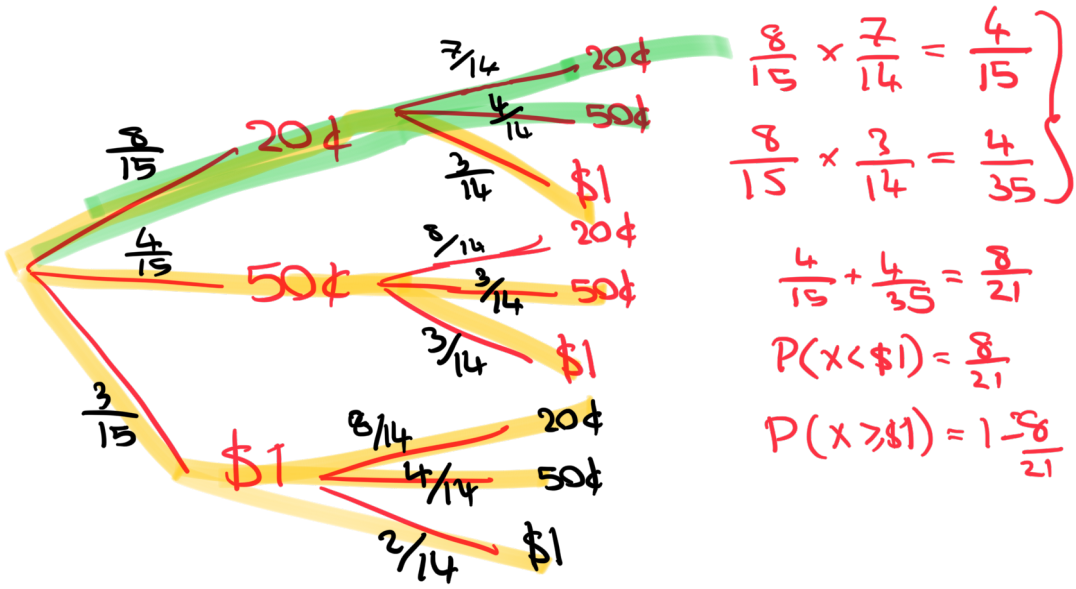
using calc...

$n = 30$

2050 4

10. Sydney has 15 coins in her wallet. She has eight 20¢ coins, four 50¢ coins and three $1 coins.
Two coins are taken out of her wallet at random, without replacement.

(a) Make a probability tree diagram for this scenario in the space below.



4

(b) What's the probability that the total value of the two drawn coins is one dollar or more?
Give your answer to 2 decimal places.

$1 - \frac{8}{21} = \frac{13}{21}$

.....

11. The figure shows a toy made from a right circular cone and a hemisphere that fit perfectly on top of each other.
The radius of the cone is 15 cm, and the slant height of the cone is 39 cm.
Show that the volume of toy is 4950π cm^3.

$V = \frac{\frac{4}{3}\pi r^3}{2} + \frac{1}{3}\pi(15)^2 \times 36$

$V = \frac{2}{3}\pi(15)^3 + \frac{1}{3}\pi(225) \times 36$

$V = 4950\pi$ cm^3

as required

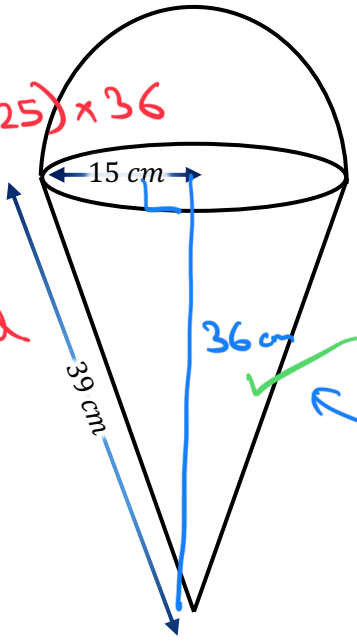


Diagram **not** accurately drawn

$\sqrt{39^2 - 15^2}$

12. A funnel in the shape of a regular cone is being used to pour water.
The height of the funnel is 15 cm, and the water level is 3 cm from the bottom.
The radius of the funnel is 7 cm.
Find the volume of the funnel that's unoccupied, giving your answer to 3 significant figures.

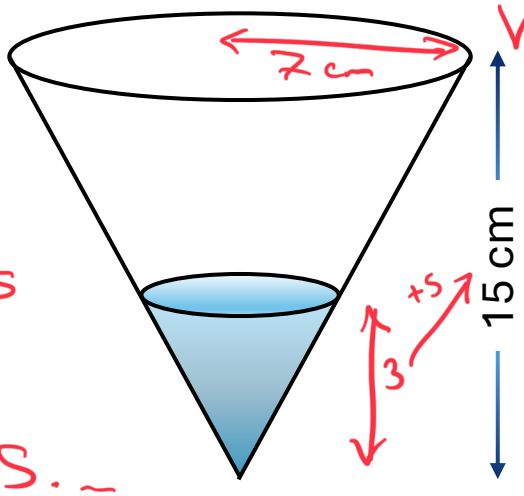


Diagram **not** accurately drawn

LSF = 5
VSF = 125

$V = \frac{1}{3}\pi(7)^2 15$

$V = 245\pi$

÷125

$V_s = 1.96\pi$

$V_s = 6.1575...$

$\approx 6.16\,cm^3$

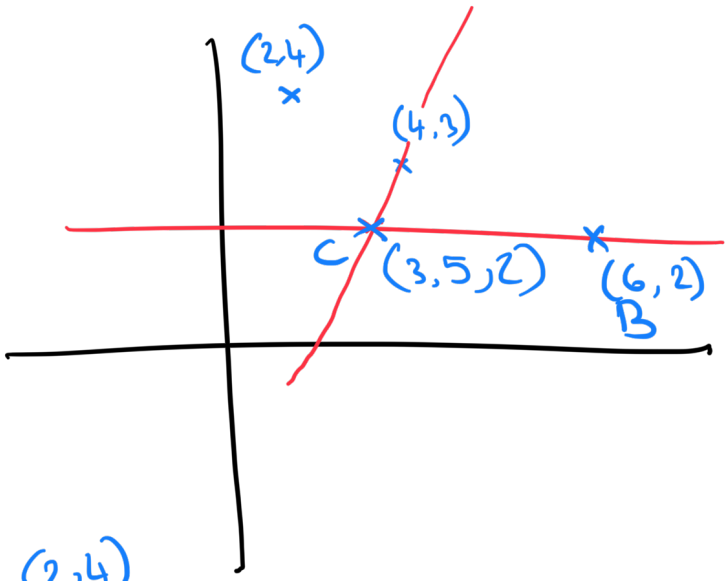
.....cm^3

13. Point A $(2,4)$ and point B $(6,2)$ lie on line L.
Line M is the perpendicular to Line L and passes through the midpoint of the 2 points.
Line M intersects the line with equation $y = 2$ at point C.
Find the area of the triangle ABC, showing all your working.

$m = \frac{2-4}{6-2} = \frac{-2}{4} = -\frac{1}{2}$

$m_p = -1 \div -\frac{1}{2} = 2$

midpoint: $(4,3)$



$y = 2x + c$ $\quad x = 4$, $y = 3$

$3 = 2(4) + c$

$3 = 8 + c$

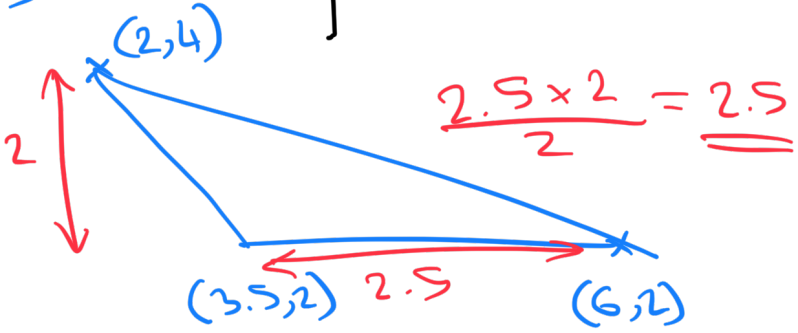
$c = -5$

$y = 2x - 5$

$y = 2$ $\quad 2 = 2x - 5$

$7 = 2x$

$x = 3.5$



$\frac{2.5 \times 2}{2} = 2.5$

Area = 2.5

.....$units^2$ 6

---------- END OF EXAM ----------

Blank Paper

Use this page and the next for extra space if needed.
Please clearly specify the question number.

Post-exam reflection sheet

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Q	Marks	What Went Well?	Even better if
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

Self-reflection

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How did you revise for the exam? *(tick all that you did)*

- Reading class notes
- Online practice
- Doing practice questions
- Getting help from your teacher
- Recapping the previous exam
- Study group (with friends)
- Reading textbooks
- Watching videos

Were these revision techniques useful? *(circle your answer)*

 Yes

 A bit

 No

How could you revise more effectively next time?

_____

_____

List three topics from this test that you are good at, and three that need more work.

1.

2.

3.

4.

5.

6.

"Failure is the stepping stone to success"

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