

2012 T3

YEAR 9 STHS TERM 3: MATHEMATICS ASSESSMENT.

PART A

Non Calculator section

Name _____

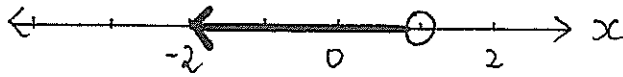
Time allowed : 30 minutes

Answer in the space provided

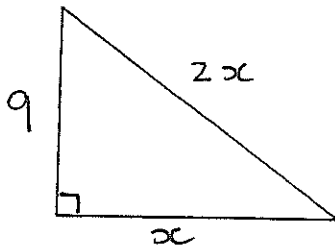
Each question is worth ONE mark each

| QUESTION | ANSWERS |
|--|---------|
| 1. Simplify $(2a^2)^3$ | |
| 2. Simplify $(\sqrt{5})^3$ | |
| 3. What is the value of $397 \times 48 + 397 \times 52$? | |
| 4. What is the exact value of $27^{\frac{-4}{3}}$? | |
| 5. What must be added to $x^2 - 6x$ to produce a perfect square ? | |
| 6. Simplify $3\sqrt{8} + \sqrt{27}$ | |
| 7. Given $1014 \div 39 = 26$, write down the value of $10140 \div 0.26$ | |
| 8. If $3^x = A$, what is the value of 9^{2x} ? | |

9. Give the inequality that describes the number line below.



10. Find the exact value of x .



11. Express $\frac{1}{2\sqrt{3}}$ with a rational denominator

12. The exterior angle of a regular n sided polygon is 30° . What is the name given to this polygon?

13. Simplify $\frac{\frac{17}{20} - \frac{3}{4}}{\frac{4}{5} - \frac{3}{10}}$

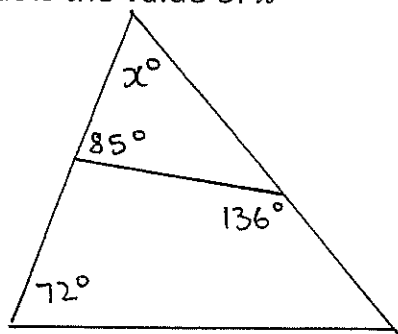
14. Solve for x :

$$\frac{2x-1}{4} = -\frac{1}{2}$$

15. Solve for x : $3 - 7x \geq 17$

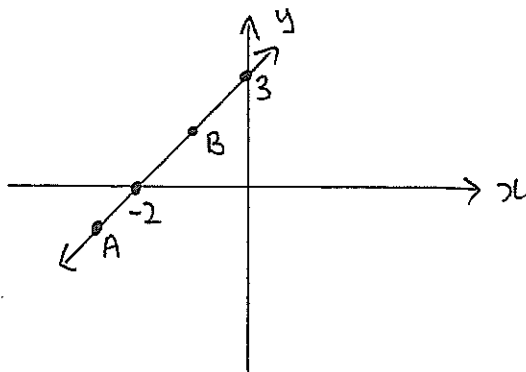
16. Simplify $\frac{\sqrt{36a^4}}{12a^3}$

17. What is the value of x

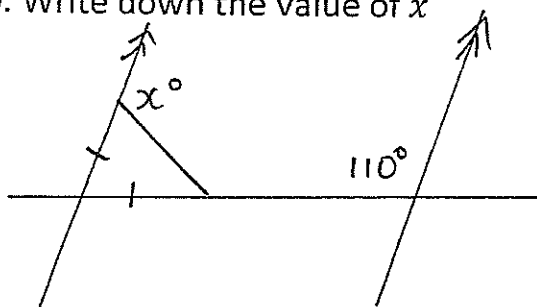


18. A store offers a discount of 40% and then a further discount of 20%. Calculate the overall percentage saved on any purchase from this store.

19. Write down the equation of the line AB



20. Write down the value of x



21. Find the equation of the line parallel to $y = 2x + 6$ through the point $(4, 8)$

| | |
|---|--|
| <p>22. Make t the subject of $m = \frac{3}{1-t}$</p> | |
| <p>23. The centre of a circle is at $(3, 4)$. One end of a diameter of this circle is at $(-1, -5)$.</p> <p>What are the coordinates of the other end of this diameter?</p> | |
| <p>24. Given $x + \frac{1}{x} = 6$, what is the value of $x^2 + \frac{1}{x^2}$?</p> | |
| <p>25. If $\frac{m}{2m+2n} = -3$, what is the value of $\frac{m}{n}$?</p> | |

PART B – MULTIPLE CHOICE.

RECORD YOUR CORRECT CHOICE ON THE ANSWER SHEET PROVIDED

BOTH THE ANSWER SHEET AND THE QUESTION BOOKLET IS TO BE HANDED IN AT THE END OF THE EXAM!

1.

 $x \div 3 \times y + z$ is equal to

(A) $\frac{x}{3y} + z$

(B) $\frac{xy}{3} + z$

(C) $\frac{x}{3}(y + z)$

(D) $\frac{x}{3y + z}$

2

$10^{-2} =$

(A) $\frac{1}{100}$

(B) $\frac{1}{20}$

(C) -20

(D) -100

3

 $x^{\frac{4}{3}}$ is equivalent to

(A) $\sqrt[4]{x^3}$

(B) $\sqrt[3]{x^4}$

(C) $\frac{4}{x^3}$

(D) $\frac{x^4}{3}$

4

$\frac{a^6 \times (a^8)^2}{a^2} =$

(A) a^8

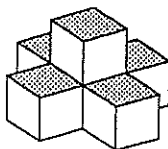
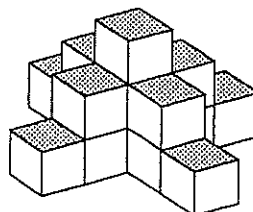
(B) a^{11}

(C) a^{14}

(D) a^{20}

5

Cubes are to be stacked as shown below.

FIGURE 1
(1 cube)FIGURE 2
(6 cubes)FIGURE 3
(15 cubes)Which of the following expressions gives the number of cubes in the n th figure?

(A) $2n - 1$

(B) $5n - 4$

(C) $2n^2 - n$

(D) $2n^2 + 3n + 1$

6. $\frac{6a+18}{9} =$

(A) $2a+6$

(B) $6a+2$

(C) $\frac{2}{3}a+18$

(D) $\frac{2}{3}a+2$

7. $\frac{5}{2x} + \frac{6}{x} =$

(A) $\frac{8}{x}$

(B) $\frac{11}{2x}$

(C) $\frac{17}{2x}$

(D) $\frac{11}{3x}$

8. Simplify $\frac{x}{3} - \frac{x-1}{2}$

A. $3-x$

B. $-x-3$

C. $\frac{-x-3}{6}$

D. $\frac{3-x}{6}$

9. Expand and simplify $3x(2x-4) + 5x(x+1)$

(A) $11x^2 + 7x$

(C) $11x^2 - 11x$

(B) $11x^2 - 7x$

(D) $11x^2 + 13x$

10. Arrange the numbers 3.2×10^{-5} , 9.3×10^{-7} and 6×10^{-5} from lowest to highest.

(A) 9.3×10^{-7} , 6×10^{-5} , 3.2×10^{-5}

(B) 9.3×10^{-7} , 3.2×10^{-5} , 6×10^{-5}

(C) 6×10^{-5} , 3.2×10^{-5} , 9.3×10^{-7}

(D) 3.2×10^{-5} , 6×10^{-5} , 9.3×10^{-7}

11. Given that $T = \frac{d}{\sqrt{s}}$, find the value of d when $T = 3 \times 10^{-2}$ and $s = 4 \times 10^4$.

(A) 7.5×10^{-7}

(B) 1.5×10^{-4}

(C) 6

(D) 1200

12. $(\sqrt{5}-1)^2 =$

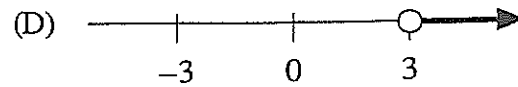
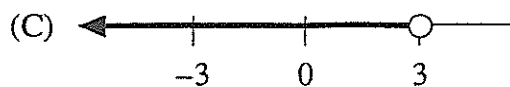
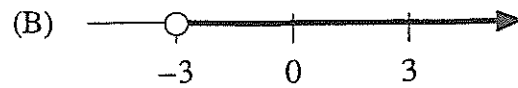
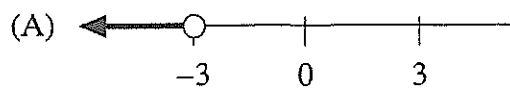
(A) 4

(B) 6

(C) $6-2\sqrt{5}$

(D) $6-\sqrt{10}$

13. The solution to $3 > 2x + 9$ can be represented by



14. Find the value of $\sqrt[3]{\frac{x^2 + y}{6}}$ correct to 1 decimal place when $x = 15$ and $y = 12$

- A. 6.1
 - B. 3.4
 - C. 1.0
 - D. 3.9
-

15. Which of the following is the solution to the equation $6(x - 1) = -2(x + 3)$

- A. 0
 - B. $-1\frac{1}{2}$
 - C. $\frac{1}{4}$
 - D. $\frac{1}{2}$
-

16. The statement

'Six more than the square root of a number is four less than twice the square of the number'

can be represented by

(A) $6 + \sqrt{n} = 2n^2 - 4$

(B) $\sqrt{6 + n} = 2n^2 - 4$

(C) $6 + \sqrt{n} = 2(n - 4)^2$

(D) $\sqrt{6 + n} = 2(n - 4)^2$

17.

Given that $V = \frac{1}{3}\pi r^2 h$, which expression will give a correct value of r ?

(A) $\sqrt{\frac{3V}{\pi h}}$

(B) $\frac{\sqrt{3V}}{\pi h}$

(C) $\sqrt{\frac{\pi h}{3V}}$

(D) $\frac{\pi h}{\sqrt{3V}}$

18. Make G the subject of the formula $E = 1 - \sqrt{\frac{G}{R}}$.

(A) $G = R(1 + E)^2$

(B) $G = R(1 + E^2)$

(C) $G = R(1 - E^2)$

(D) $G = R(1 - E)^2$

19. If $A = 6x + 10$, and x is increased by 2, what will be the corresponding increase in A ?

(A) $2x$

(B) $6x$

(C) 2

(D) 12

20. During a flood 1.5 hectares of land was covered by water to a depth of 17 cm.

How many kilolitres of water covered the land? (1 hectare = 10 000 m²)

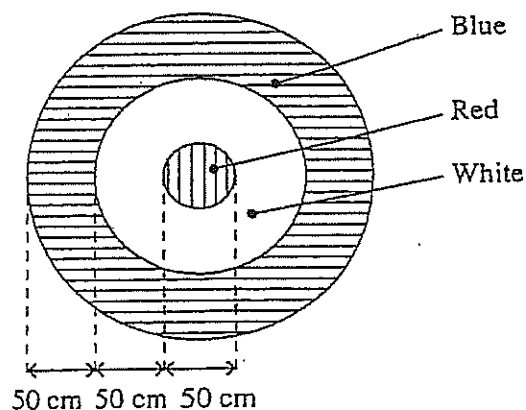
(A) 2.55 kL

(B) 2 550 kL

(C) 255 000 kL

(D) 2 550 000 kL

21. Mitchell is restoring an old World War II plane. He needs to paint a red, white and blue logo in concentric circles as shown in the diagram.



What fraction of the logo is painted white?

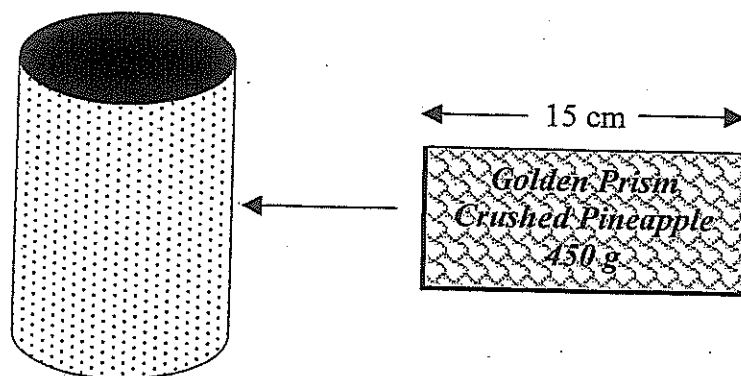
(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) $\frac{8}{25}$

(D) $\frac{4}{25}$

22. The 15 cm label is to be attached to the can by a machine in the factory so that it completely fits around the can with no overlap.



The radius of each of the cans is approximately:

- (A) 7.5 cm
(B) 6 cm
(C) 4.8 cm
(D) 2.4 cm

23. A tap is dripping at the rate of 5 mL per minute. How many litres would this amount to in one year (365 days)?

(A) $5 \times 60 \times 24 \times 365 \times 1000$

(B) $\frac{5 \times 1000}{60 \times 24 \times 365}$

(C) $\frac{60 \times 24 \times 365}{5 \times 1000}$

(D) $\frac{5 \times 60 \times 24 \times 365}{1000}$

24. This back-to-back stem-and-leaf plot displays the test results for a class of 26 students.

| Boys | | | | | Girls | | | | |
|------|---|---|---|---|-------|---|---|---|---|
| | | 1 | | 2 | 1 | 2 | 4 | | |
| | | 3 | | 3 | 0 | 2 | 3 | 5 | |
| 9 | 7 | 4 | | 4 | 4 | 4 | 5 | 9 | 9 |
| 6 | 4 | 2 | 2 | 5 | 3 | | | | |
| | | 3 | 0 | 6 | 1 | 9 | | | |

What is the median test result for the class?

- (A) 44
(B) 46
(C) 48
(D) 49

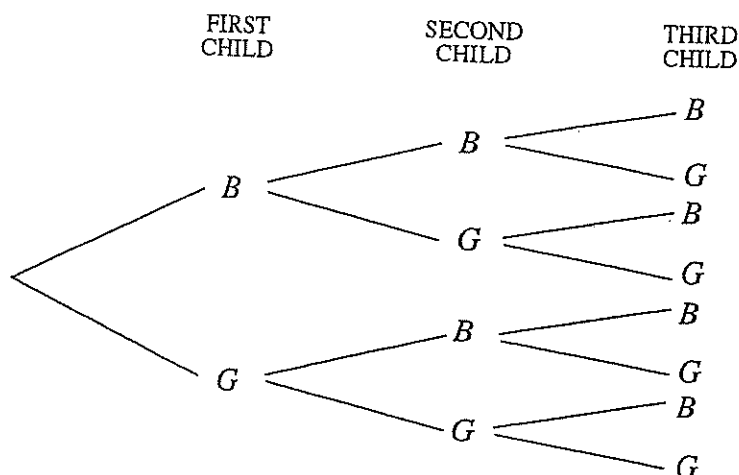
25.

| Score | Frequency |
|-------|-----------|
| 2 | 2 |
| 3 | 3 |
| 4 | 1 |
| 5 | 4 |
| 6 | 7 |
| 7 | 3 |
| | 20 |

The mean of this set of scores is 5. If another score of 5 is added to the set, which of these measures will change?

- (A) mean
(B) median
(C) mode
(D) range

26.

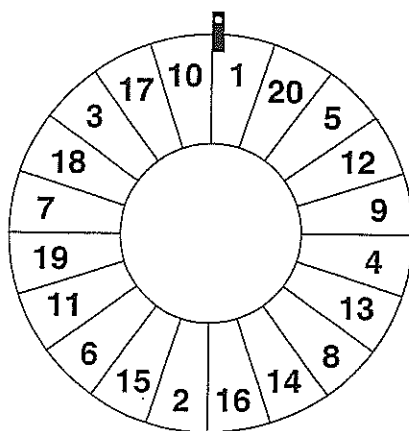


The tree diagram shows all possible combinations for families with three children. The probability of a three-child family consisting of two girls and one boy is

- (A) $\frac{1}{8}$ (B) $\frac{1}{4}$ (C) $\frac{3}{8}$ (D) $\frac{2}{3}$

27.

A wheel has the numbers 1 to 20 on it, as shown in the diagram. Each time the wheel is spun, it stops with the marker on one of the numbers.

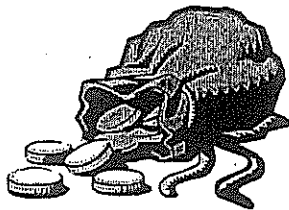


The wheel is spun 120 times.

How many times would you expect a number less than 6 to be obtained?

- (A) 20
(B) 24
(C) 30
(D) 36

The 36 chips in the bag each have a letter of the alphabet written on them.



The vowels A, E, I, O and U appear 3 times each, and the remaining letters (consonants) appear once each.

Jasmin has randomly selected 6 letters from the bag and has placed them together to spell S C A L E N

In order to spell the word SCALENE, Jasmin needs the letter E as her next selection. The probability that Jasmin will spell the word correctly is:

(A) $\frac{1}{2}$

(C) $\frac{1}{15}$

(B) $\frac{1}{6}$

(D) $\frac{1}{30}$

29. A two-way table has been drawn up showing the results of a lie-detector test.

| | Detected True | Detected False |
|-----------------|---------------|----------------|
| True Statement | 84 | 16 |
| False Statement | 36 | 124 |

What is the probability that a statement was correctly detected?

(A) $\frac{21}{65}$

(B) $\frac{31}{65}$

(C) $\frac{4}{5}$

(D) $\frac{6}{13}$

30. The gradient of the line $4y = 2x - 1$ is:

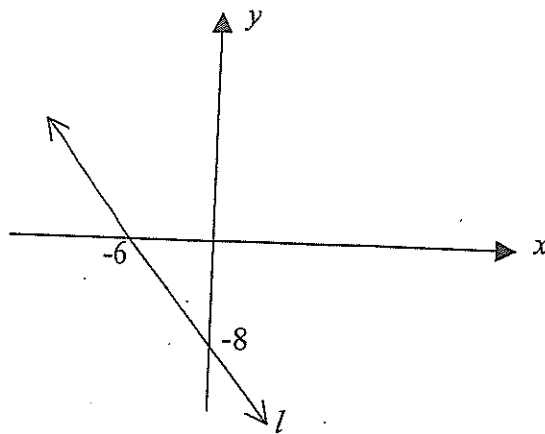
A. -2

B. -0.5

C. 0.5

D. 2

31.



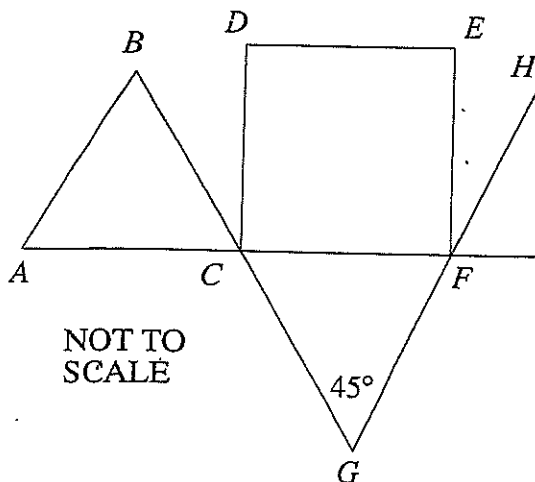
The correct equation of the line l shown in the diagram is:

- (A) $y = -6x - 8$
 (B) $y = \frac{3}{4}x - 6$
 (C) $y = \frac{-3x}{4} - 8$
 (D) $y = \frac{-4x}{3} - 8$

32. The equation of the line through $(-3, 4)$ parallel to the y axis is

- (A) $x = -3$ (B) $y = -3$ (C) $x = 4$ (D) $y = 4$

33.



ABC is an equilateral triangle.

$CDEF$ is a square.

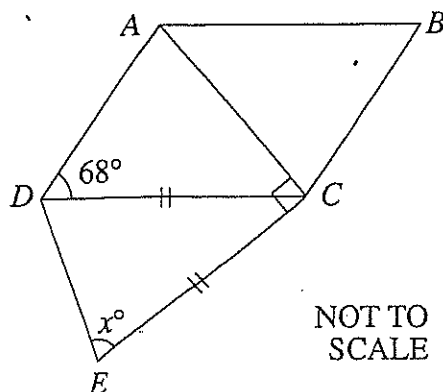
BCG , ACF , and GFH are straight lines.

$\angle CGF = 45^\circ$.

The size of $\angle EFH$ is

- (A) 15°
 (B) $22\frac{1}{2}^\circ$
 (C) 30°
 (D) 45°

34.



$ABCD$ is a rhombus.

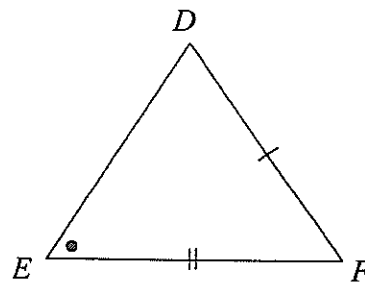
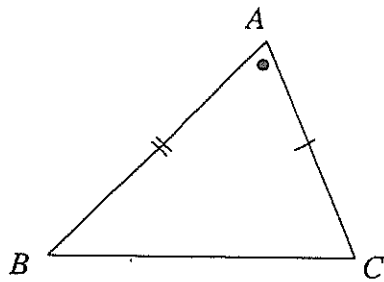
$DC = EC$.

$\angle ADC = 68^\circ$ and $\angle ACE = 90^\circ$.

The value of x is

- (A) 22
 (B) 68
 (C) 73
 (D) 79

35.

NOT TO
SCALE

$$\angle A = \angle E.$$

$$AB = EF.$$

$$AC = DF.$$

If the above triangles are congruent, which of the following statements is correct?

- (A) The triangles must be scalene.
- (B) The triangles must be isosceles.
- (C) The triangles can be either scalene or isosceles.
- (D) The types of triangle cannot be determined from the information given.

END OF TEST

Name : _____

YEAR 9

SYDNEY TECHNICAL HIGH SCHOOL

TERM 3 MATHEMATICS ASSESSMENT TASK

PART B MULTIPLE CHOICE ANSWER SHEET

| | | | | |
|-----|---|---|---|---|
| 1. | A | B | C | D |
| 2. | A | B | C | D |
| 3. | A | B | C | D |
| 4. | A | B | C | D |
| 5. | A | B | C | D |
| 6. | A | B | C | D |
| 7. | A | B | C | D |
| 8. | A | B | C | D |
| 9. | A | B | C | D |
| 10. | A | B | C | D |
| 11. | A | B | C | D |
| 12. | A | B | C | D |
| 13. | A | B | C | D |
| 14. | A | B | C | D |
| 15. | A | B | C | D |
| 16. | A | B | C | D |
| 17. | A | B | C | D |
| 18. | A | B | C | D |
| 19. | A | B | C | D |
| 20. | A | B | C | D |
| 21. | A | B | C | D |
| 22. | A | B | C | D |
| 23. | A | B | C | D |
| 24. | A | B | C | D |
| 25. | A | B | C | D |
| 26. | A | B | C | D |
| 27. | A | B | C | D |
| 28. | A | B | C | D |
| 29. | A | B | C | D |
| 30. | A | B | C | D |
| 31. | A | B | C | D |
| 32. | A | B | C | D |
| 33. | A | B | C | D |
| 34. | A | B | C | D |
| 35. | A | B | C | D |

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PART A

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Answer in the space provided

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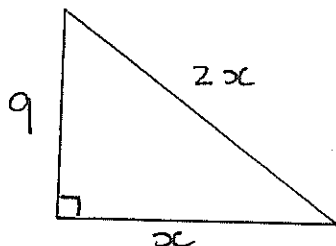
| QUESTION | ANSWERS |
|--|--------------------------------|
| 1. Simplify $(2a^2)^3$ | $8a^6$ |
| 2. Simplify $(\sqrt{5})^3$ | $5\sqrt{5}$ |
| 3. What is the value of $397 \times 48 + 397 \times 52$? | 39700 |
| 4. What is the exact value of $27^{-\frac{4}{3}}$? | $\frac{1}{3^4} = \frac{1}{81}$ |
| 5. What must be added to $x^2 - 6x$ to produce a perfect square ? | 9 |
| 6. Simplify $3\sqrt{8} + \sqrt{27}$ | $6\sqrt{2} + 3\sqrt{3}$ |
| 7. Given $1014 \div 39 = 26$, write down the value of $10140 \div 0.26$ | 39000 |
| 8. If $3^x = A$, what is the value of 9^{2x} ? $(3^x)^4$ | A^4 |

9. Give the inequality that describes the number line below.



$$x < 1$$

10. Find the exact value of x .



$$3x^2 = 81$$

$$x^2 = 27$$

$$x = 3\sqrt{3}$$

11. Express $\frac{1}{2\sqrt{3}}$ with a rational denominator

$$\frac{\sqrt{3}}{6}$$

12. The exterior angle of a regular n sided polygon is 30° . What is the name given to this polygon?

$$360 \div 30 = 12$$

Dodecagon.

13. Simplify

$$\frac{\frac{17}{20} - \frac{3}{4}}{\frac{4}{5} - \frac{3}{10}} \times 20 \quad \frac{17-15}{16-6} = \frac{2}{10}$$

$$\frac{1}{5}$$

14. Solve for x :

$$\frac{2x-1}{4} = -\frac{1}{2}$$

$$4x - 2 = -4$$

$$4x = -2$$

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

15. Solve for x : $3 - 7x \geq 17$

$$-7x \geq 14$$

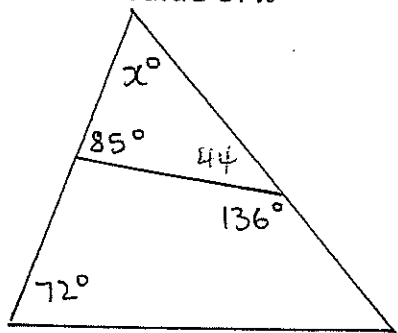
$$x \leq -2$$

16. Simplify $\frac{\sqrt{36a^4}}{12a^3}$

$$\frac{6a^2}{12a^3}$$

$$\frac{1}{2a}$$

17. What is the value of x



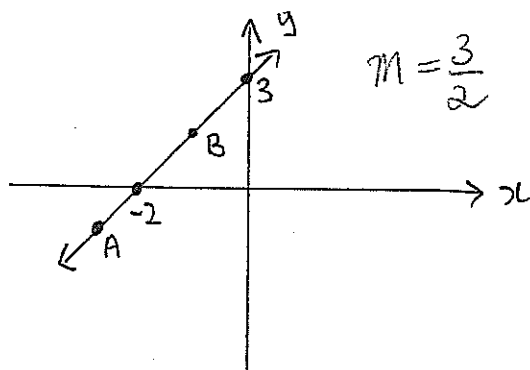
$$x = 51$$

18. A store offers a discount of 40% and then a further discount of 20%. Calculate the overall percentage saved on any purchase from this store.

$$0.6 \times 0.8 = 0.48$$

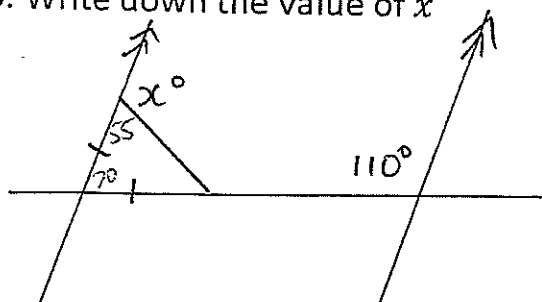
52% discount

19. Write down the equation of the line AB



$$y = \frac{3}{2}x + 3$$

20. Write down the value of x



$$125$$

21. Find the equation of the line parallel to $y = 2x + 6$ through the point $(4, 8)$

$$y - 8 = 2(x - 4)$$

$$y = 2x$$

| | |
|--|---------------------|
| <p>22. Make t the subject of $m = \frac{3}{1-t}$ $m - mt = 3$</p> | $t = \frac{m-3}{m}$ |
| <p>23. The centre of a circle is at $(3, 4)$. One end of a diameter of this circle is at $(-1, -5)$.</p> <p style="text-align: center;">$\frac{-1+3}{2} = 3$ $\frac{-5+4}{2} = -\frac{1}{2}$</p> <p>What are the coordinates of the other end of this diameter?</p> | $(7, 13)$ |
| <p>24. Given $(x + \frac{1}{x} = 6$, what is the value of $x^2 + \frac{1}{x^2}$?</p> <p style="text-align: center;">$(x + \frac{1}{x})^2 = x^2 + 2 + \frac{1}{x^2} = 36$</p> | 34 |
| <p>25. If $\frac{m}{2m+2n} = -3$, what is the value of $\frac{m}{n}$?</p> <p style="text-align: center;">$m = -6m - 6n$</p> <p style="text-align: center;">$7m = -6n$</p> <p style="text-align: center;">$\frac{m}{n} = -\frac{6}{7}$</p> | $-\frac{6}{7}$ |