

End of Year Examination Paper 1

INSTRUCTION TO CANDIDATES:

1. Answer **all** questions.
2. Write your answers and working in the spaces provided.
3. Omission of essential working will result in loss of marks.
4. Calculators may be used in this paper.
5. If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer correct to three significant figures. Give answers in degrees correct to one decimal place.

Marks Obtained
50

Duration: 1h 30 min

- 1** Evaluate $\frac{\sqrt{16}}{\sqrt[3]{9}}$, giving your answer correct to 2 decimal places.

Ans: _____ [1]

- 2** (a) Estimate
- (i) 2961, correct to 2 significant figures,
 - (ii) 2.039, correct to 2 significant figures.
- (b) Hence, estimate, correct to 1 significant figures, the value of 2961×2.039 .

Ans: (a)(i) _____ [1]

(ii) _____ [1]

(b) _____ [1]

- 3** Andrew, Ben and Cindy earned some money, in the ratio 7 : 3 : 8. Given that Ben earned \$800 less than Cindy, find
- (a) the amount earned by Ben,
 - (b) the new ratio earned by Andrew, Ben and Cindy if Ben earned an additional overtime pay of \$200.

Ans: (a) \$ _____ [2]

(b) _____ : _____ : _____ [2]

-
- 4** Solve the equation $5x - 5 = 2(x + 20)$.

Ans: $x =$ _____ [2]

5 Given that $M = 2^{14} \times 3^6$, find in index notation,

(a) the length of a square with area $M \text{ cm}^2$,

(b) the cube root of $2M$.

Ans: (a) _____ cm [1]

(b) _____ [1]

6 A pail of water evaporates at a rate of 4 ml/min. Find the time taken for the pail to lose 1 litre of water.

Ans: _____ min [1]

7 Simplify

(a) $2b - (a - 2b)$,

(b) $-(3 - x) + 5(2x - 3y)$

Ans: (a) _____ [2]

(b) _____ [2]

8 The distance between School *A* and School *B* is 12 km. A cyclist takes 45 min to cycle from School *A* to School *B*.

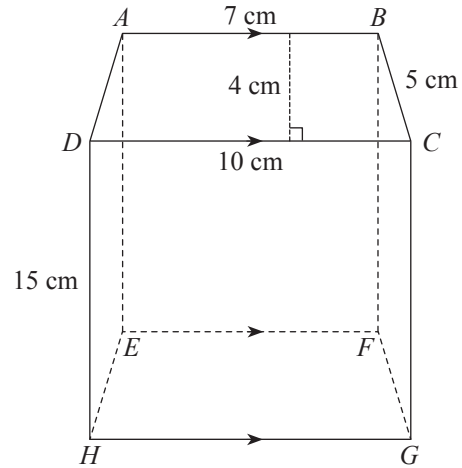
(a) Calculate the speed of the cyclist in km/h.

(b) If a car travels at an average speed of 80 km/h, how long will it take to travel from School *A* to School *B*, giving your answer in minutes.

Ans: (a) _____ km/h [2]

(b) _____ minutes [2]

- 9 The figure shows a closed prism such that $AB = 7$ cm, $DC = 10$ cm, $AD = BC = 5$ cm, $DH = 15$ cm and the height of trapezium $ABCD$ is 4 cm. Find the
- volume and
 - total surface area, of the prism.

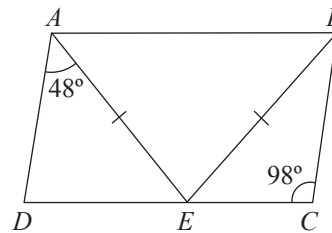


Ans: (a) _____ cm³ [2]

(b) _____ cm² [3]

- 10 The figure shows a parallelogram $ABCD$. ABE is an isosceles triangle with $AE = BE$, $\angle DAE = 48^\circ$ and $\angle BCE = 98^\circ$. Find

- $\angle ABE$,
- $\angle AEB$,
- $\angle CBE$.

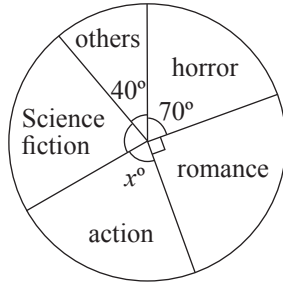


Ans: (a) $\angle ABE =$ _____ $^\circ$ [1]

(b) $\angle AEB =$ _____ $^\circ$ [1]

(c) $\angle CBE =$ _____ $^\circ$ [1]

- 11** The pie chart shows the results on a survey taken by 2160 students on their favourite type of movies.
- (a) Find the number of students who like to watch horror films.
- (b) Given that the ratio of the number of students who like action films to that of Science fiction films is 2 : 3, find the value of x .

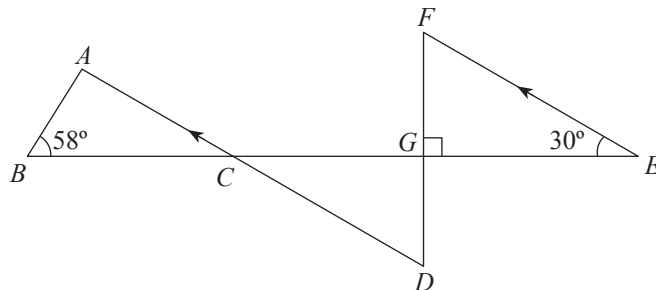


Ans: (a) _____ [2]

(b) $x =$ _____ [2]

- 12** In the diagram, $AD \parallel FE$, $\angle ABC = 58^\circ$, $\angle FEG = 30^\circ$ and $\angle FGE = 90^\circ$. Find

- (a) $\angle ACE$,
 (b) $\angle BAC$,
 (c) $\angle CDF$.



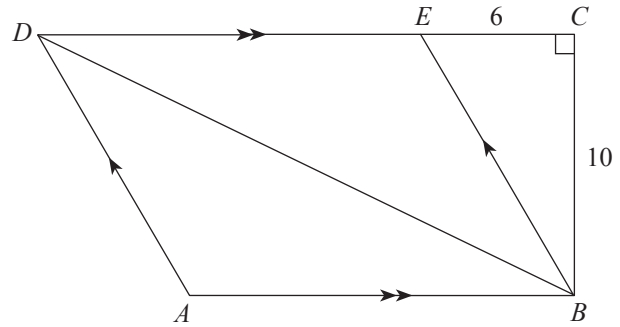
Ans: (a) $\angle ACE =$ _____ $^\circ$ [1]

(b) $\angle BAC =$ _____ $^\circ$ [1]

(c) $\angle CDF =$ _____ $^\circ$ [2]

- 13** $ABED$ is a parallelogram. The area of $\triangle BED$ is 75 cm^2 , $BC = 10 \text{ cm}$ and $CE = 6 \text{ cm}$.
Calculate

- (a) the length DE ,
(b) the area of trapezium $ABCD$.



Ans: (a) $DE =$ _____ cm [2]

(b) _____ cm^2 [2]

- 14** The marked price of a diamond necklace is \$3745, inclusive of a 7% GST.

Find

- (a) its price before GST,
(b) the amount of GST charged.

Ans: (a) \$ _____ [2]

(b) \$ _____ [2]

15 (a) 30% of a number is 150. Find the number.

Ans: (a) _____ [1]

(b) Julie paid \$451.54 for a camera, including a 7% GST. Calculate the GST paid.

Ans: (b) \$ _____ [2]

(c) James was 136 cm tall in 2012. In 2013, his height became 144 cm. Calculate the percentage increase in height.

Ans: (c) _____ % [2]

Solutions to:

End of Year Examination Paper 1

- $\frac{\sqrt{16}}{\sqrt[3]{9}} \approx 1.922999 \dots$
 $= 1.92$ (2 d. p.)
- 3000
 - 2.0
 - $2961 \times 2.039 \approx 3000 \times 2.0$ use 2 s.f.
 $= 6000$ (1 s.f.)
- Difference in earnings between Ben and Cindy = $8 - 3$
 $= 5$ units
 Amount earned by Ben = $\frac{800}{5} \times 3$
 $= \$480$
 - Ben's new earnings = $\$480 + \200
 $= \$680$
 Andrew's earnings = $\frac{800}{5} \times 7$
 $= \$1120$
 Cindy's earnings = $\frac{800}{5} \times 8$
 $= \$1280$
 New ratio = $1120 : 680 : 1280$
 $= 28 : 17 : 32$ divide by 40 throughout
- $5x - 5 = 2(x + 20)$
 $5x - 5 = 2x + 40$
 $5x - 2x = 5 + 40$
 $3x = 45$
 $x = 45 \div 3$
 $= 15$
- Length of side = $\sqrt{2^{14} \times 3^6}$ cm
 $= 2^7 \times 3^3$ cm
 - Cube root of $2M = \sqrt[3]{2 \times 2^{14} \times 3^6}$
 $= \sqrt[3]{2^{15} \times 3^6}$
 $= 2^5 \times 3^2$
- $1 \text{ litre} = 1000 \text{ ml}$
 Time taken = $1000 \text{ ml} \div 4 \text{ ml/min}$
 $= 250 \text{ min}$
- $2b - (a - 2b) = 2b - a + 2b$
 $= 4b - a$
 - $-(3 - x) + 5(2x - 3y) = -3 + x + 10x - 15y$
 $= -3 + 11x - 15y$
- $45 \text{ min} = \frac{45}{60} \text{ h}$
 $= \frac{3}{4} \text{ h}$
 Speed of cyclist = $12 \text{ km} \div \frac{3}{4} \text{ h}$
 $= 16 \text{ km/h}$
- Time taken = $12 \div 80$
 $= 0.15 \text{ h}$
 $= 9 \text{ min}$
- Area of trapezium $ABCD = \frac{1}{2} \times (7 + 10) \times 4$
 $= 34 \text{ cm}^2$ base area
 Volume of the prism = 34×15 base area \times height
 $= 510 \text{ cm}^3$
 - Perimeter of trapezium $ABCD$
 $= 7 + 5 + 10 + 5$
 $= 27 \text{ cm}$
 Total surface area
 $= (\text{Perimeter of } ABCD \times \text{height}) + 2(\text{base area})$
 $= (27 \times 15) + 2(34)$
 $= 473 \text{ cm}^2$
- $\angle DAB = 98^\circ$ (opp. \angle of parallelogram)
 $\angle ABE = \angle BAE$ (base \angle s of isos. \triangle)
 $= 98^\circ - 48^\circ$
 $= 50^\circ$
 - $\angle AEB = 180^\circ - 2(50^\circ)$ (\angle sum of \triangle)
 $= 80^\circ$
 - $\angle ABC = 180^\circ - 98^\circ$ (int \angle s, $AB \parallel CD$)
 $= 82^\circ$
 $\angle CBE = \angle ABC - \angle ABE$
 $= 82^\circ - 50^\circ$
 $= 32^\circ$
- Number of students who like horror films
 $= \frac{70^\circ}{360^\circ} \times 2160$
 $= 420$
 - Angle representing 'action' and 'Science fiction'
 $= 360^\circ - 40^\circ - 70^\circ - 90^\circ$
 $= 160^\circ$
 $x^\circ = \frac{160^\circ}{2+3} \times 2$
 $= 64^\circ$
 $\therefore x = 64$
- $\angle ACE + \angle FEG = 180^\circ$ (int. \angle s, $AD \parallel FE$)
 $\angle ACE + 30^\circ = 180^\circ$
 $\angle ACE = 180^\circ - 30^\circ$
 $= 150^\circ$
 - $\angle BAC = \angle ACE - \angle ABC$ (ext. \angle s of $\triangle ABC$)
 $= 150^\circ - 58^\circ$
 $= 92^\circ$
 - $\angle CDF = \angle DFE$ (alt. \angle s, $AD \parallel FE$)
 $= 180^\circ - 30^\circ - 90^\circ$ (\angle sum of $\triangle GFE$)
 $= 60^\circ$

13. (a) Area of $\triangle BED = 75$

$$\frac{1}{2} \times DE \times 10 = 75$$

$$5DE = 75$$

$$DE = 15 \text{ cm}$$

(b) $CD = 15 + 6$

$$= 21 \text{ cm}$$

$$\begin{aligned} \text{Area of trapezium } ABCD &= \frac{1}{2}(21 + 15)(10) \\ &= 180 \text{ cm}^2 \end{aligned}$$

14. (a) Price before GST = $\frac{\$3745}{107\%} \times 100\%$
 $= \$3500$

(b) Amount of GST charged = $\$3745 - \3500
 $= \$245$

15. (a) Let the number be x .

$$30\% \times x = 150$$

$$0.3x = 150$$

$$x = 500$$

The number is 500.

(b) Price of camera, excluding GST

$$= \frac{\$451.54}{107\%} \times 100\%$$

$$= \$422$$

$$\text{GST paid} = \$422 \times 7\%$$

$$= \$29.54$$

(c) Percentage increase = $\frac{144 - 136}{136} \times 100\%$
 $\approx 5.88235\%$
 $= 5.88\% \quad (3 \text{ s.f.})$