YEAR 10 MATHEMATICS

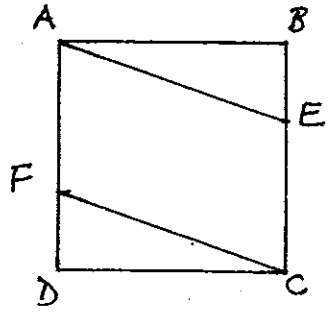
REVIEW WORKSHEET

QUESTION 1:

(i) Each angle of a regular polygon is 165.6°. How many sides does it have?

(ii) Each exterior angle of a regular polygon is 24°. How many sides does it have?

(iii)



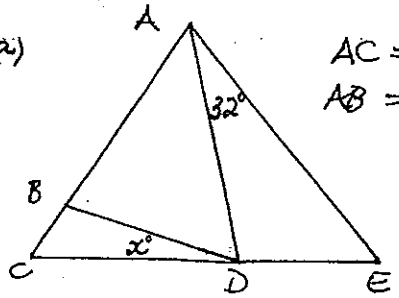
ABCD is a square.

$BE = DF$.

Prove that AECF is a parallelogram.

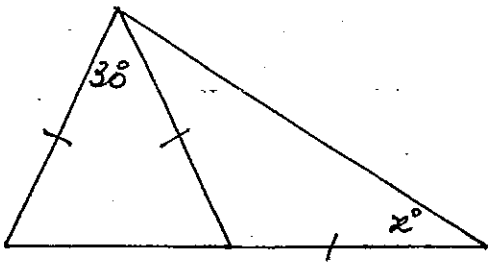
(iv) Find the value of x:

(a)



$AC = AE$
$AB = AD$

(b)

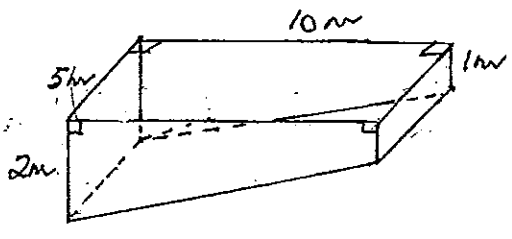


(v) Prove that a diagonal of a parallelogram divides it into two congruent triangles.

QUESTION 2:

(i) A cube has a volume of $216\ cm^3$. Find the volume of the largest sphere to fit inside this cube.

(ii) A small swimming pool is 10m long and 5m wide, 2m deep at deepest end and 1m deep at the other end as shown below:

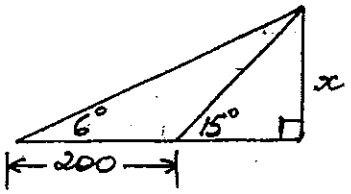


Find (i) The cost of tiling the inside surfaces at $\$45/m^2$

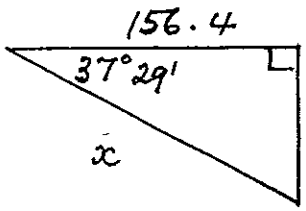
(ii) The capacity in litres

QUESTION 3:

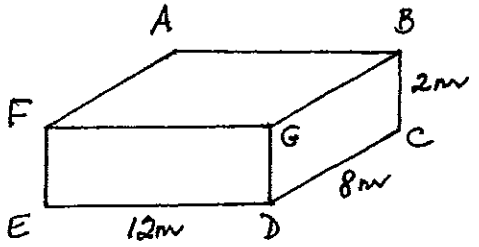
(i) Find x: (a)



(b)

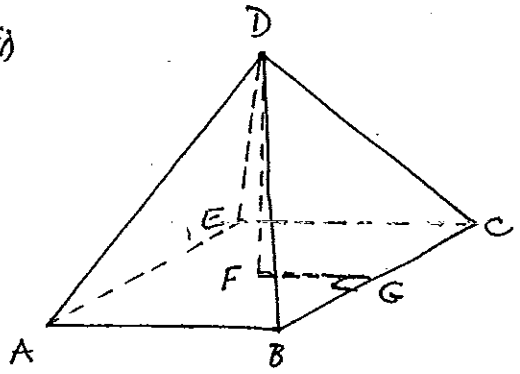


(ii)



Find (i) BE
(ii) $B\hat{E}C$
given that the shape is a rectangular prism.

(iii)



ABCDE is a square pyramid.
AB = 10m
DF = 12m

Find (i) DC (ii) $D\hat{C}F$ (iii) DG (iv) $D\hat{G}F$
(v) the volume (vi) surface area.

QUESTION 4:

(i) A car depreciates in value at the rate of 10% p.a. every year. After 5 years a car is valued at $35 000. Find the original value.

(ii) The value of a car x years after 1990 is given by $V = 30\,000 \times 2^{-x}$. Find its value when $x = 7$

(iii) A computer priced at $3900 is purchased with a 5% deposit and the balance paid off over 3 years by equal monthly payments at a simple interest rate of 5.6% p.a. Find each monthly payment.

15/6/03

Excellent Work!

Check Q4 (i)

YEAR 10 MATHEMATICS REVIEW WORKSHEET

QUESTION 1:

(i) $165.6n = 180(n-2)$

$\therefore 165.6n = 180n - 360$ ✓

~~$\therefore 180n = 525.6$~~

~~$\therefore n =$~~

$-14.4n = -360$

$\therefore n = 25$ ✓

$\therefore$ polygon has 25 sides.

(ii) ext. $\angle = 24$

$\therefore$ int. $\angle = 180 - 24$

$= 156$

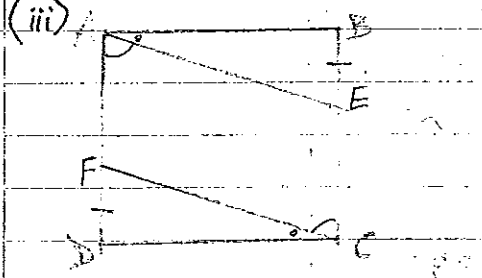
$156n = 180n - 360$ ✓

$\therefore -24n = -360$

$\therefore n = 15$ ✓

$\therefore$ polygon has 15 sides.

(iii)



ABCD is a square.

In $\triangle ABE$ and $\triangle CDF$:

1) DF = BE (given) ✓

2) DC = BA (given, as all sides are equal in a square) ✓

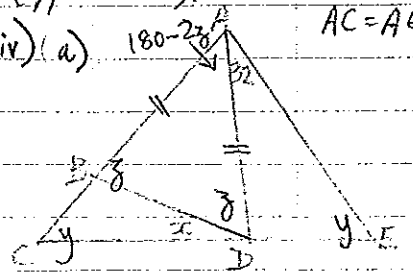
3) $F\hat{D}C = E\hat{B}A = 90$ (all angles are 90° in a square) ✓

$\therefore \triangle ABE \equiv \triangle CDF$ (SAS) ✓

Now, $90° - B\hat{A}E = 90° - D\hat{C}F$ (matching angles equal in cong. $\triangle$'s) ✓

$\therefore$ AECF is a parallelogram (opp. $\angle$'s =). ✓

(iv) (a)



AC = AE.

(b) $z = y + x$ (ext. $\angle$'s of $\triangle$...) ①

$2y + [(180 - 2z) + 32] = 180$ ②

$2y + 212 - 2z = 180$ — ②

Sub ① in ②:

$2y + 212 - 2(y+x) = 180$

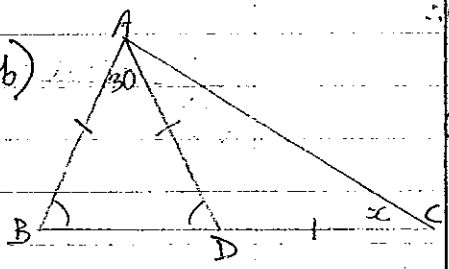
$2y + 212 - 2y - 2x = 180$

$212 - 2x = 180$

$-2x = -32$ ✓

$\therefore x = 16$.

(b)



$A\hat{B}D = A\hat{D}B = 75$ (base $\angle$'s = in isos. $\triangle$)

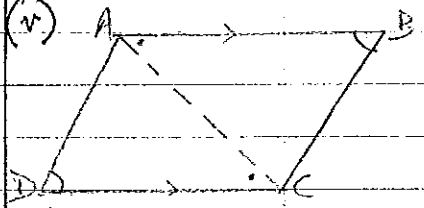
$\therefore A\hat{D}C = 180 - 75$ (st. $\angle$ is 180)

$= 105$ ✓

$\therefore D\hat{A}C = D\hat{C}A = 37.5$ (base $\angle$'s = in isos. $\triangle$)

$\therefore x = 37.5°$ ✓

(v)



In $\triangle ABC$ and $\triangle CDA$:

1) AC is common ✓

2) $B\hat{A}C = D\hat{C}A$ (alt. $\angle$'s = on // lines) ✓

3) $A\hat{D}C = C\hat{B}A$ (opp. $\angle$'s = in p'gram) ✓

$\therefore \triangle ABC \equiv \triangle CDA$ (AAS) ✓

$\therefore$ a diag. divides a p'gram into 2 cong. $\triangle$'s.

QUESTION 2:

(i) $\sqrt[3]{216} = 6$

$\therefore$ edge of cube is 6cm.

$\therefore$ vol. of largest sphere is:

$\frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times 9 = 37.7 cm^3$ (to 1dp) ✓

(ii) SA inside surfaces:

$5 \times 2 + 5 \times 1 + 5 \times \sqrt{101} + 2(\frac{1}{2} \times 10[2+1])$ ✓

$= 95.25 m^2$ (to 2dp) ✓

$\therefore$ cost of tiling inside SA

$= \$95.25 \times \$45$ ✓

$= \$4286.22$ ✓

(2) $V = Ah$

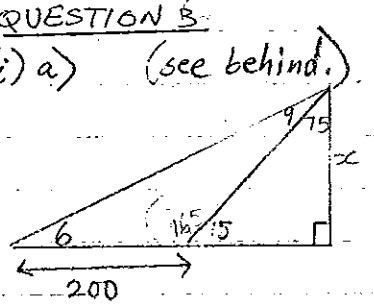
$= \frac{1}{2} \times 10 \times 3 \times 5$ ✓

$= 75 m^3$ ✓

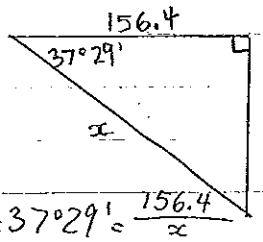
$\therefore$ cap. $= 75 L$. ✓

QUESTION 3:

(i) a) (see behind.)



b)

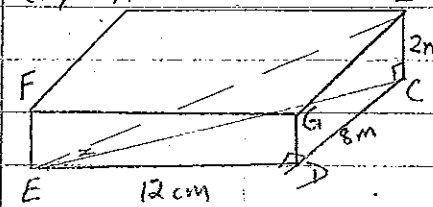


$\cos 37°29' = \frac{156.4}{x}$ ✓

$\therefore x \cos 37°29' = 156.4$ ✓

$\therefore x = 197.1$ (to 1dp)

(ii)

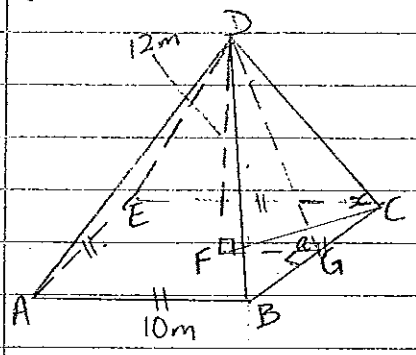


1) $(EC)^2 = 8^2 + 12^2$
$= 208$
$\therefore EC = \sqrt{208}$ ✓

Now, $(BE)^2 = 2^2 + (EC)^2$
$= 2^2 + 208$ ✓
$\therefore BE = \sqrt{212}$ m ✓

2) Let $\hat{BEC}$ be x.
$\therefore \tan x = (2 \div \sqrt{208})$ ✓
$x = \tan^{-1}(2 \div \sqrt{208})$
$= 7°54'$ (to nst min) ✓

(iii)



1) $(FC)^2 = 5^2 + 5^2$
$= 50$ ✓
Now, $(DC)^2 = 12^2 + 50$
$= 194$ ✓
$\therefore DC = \sqrt{194}$ m ✓

2) Let $\hat{DCF}$ be x. ✓
$\therefore \tan x = \frac{12}{\sqrt{50}}$ ✓
$\therefore x = \tan^{-1}(12 \div \sqrt{50})$ ✓
$= 59°29'$ (to nst min).

3) $(DG)^2 = 12^2 + 5^2$ ✓
$= 169$
$\therefore DG = 13$ m ✓

4) let $\hat{DGF}$ be a
$\therefore \tan a = 12 \div 5$
$\therefore a = \tan^{-1}(12 \div 5)$
$= 67°23'$ (to nst min) ✓

5) $V = \frac{1}{3}(Ah)$
$= \frac{1}{3}(10^2 \times 12)$ ✓
$= 400\ m^3$. ✓

6) SA = square base + 4 △ sides
$= 10^2 + 4(\frac{1}{2}bh)$ ✓
$= 100 + 4(\frac{1}{2} \times 10 \times 13)$ ✓
$= 360\ m^2$. ✓

QUESTION 4:

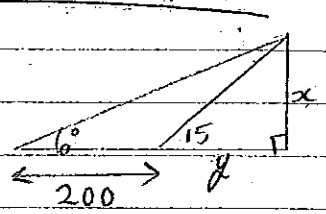
(i) $A = P(1 \pm r)^n$ try again.
~~$\therefore A = 35\,000 \times 1.1^5$~~
~~$35\,000 = P(1-0.1)^5$ find P~~
~~$= \$56367.85$~~

$\therefore$ original value of car is $56367.85

(ii) $V = 30\,000 \times 2^{-x}$ ✓
$x = 7$
$\therefore V = 30\,000 \times 2^{-7}$
$= \$234.38$ ✓

(iii) dep $= 5\% \times \$3900$
$= 0.05 \times 3900$
$= \$195$. ✓
$\therefore$ total to be repaid is
~~$3900 - 195 = 3705$~~, ✓
balance:
$I = PRN$
$I = 3705 \times 0.056 \times 3$
$= \$622.44$ ✓
monthly repayment is:
$(\$622.44 + \$3705) \div 36$
$= \$4327.44 \div 36$
$= \$120.21$ (to nst ¢).

Ques. 3 (i) (a).



$\tan 15 = \frac{x}{y}$
$\therefore y = \frac{x}{\tan 15}$ — ① ✓

$\tan 6 = \frac{x}{(200+y)}$
$\therefore y = \frac{x}{\tan 6} - 200$ ✓

Sub ① in ②:
$\frac{x}{\tan 15} = \frac{x}{\tan 6} - 200$ ✓
$9.514x - 3.732 = 200$.
$\therefore 5.782x = 200$ ✓
$\therefore x = 34.59$ (to 2dp) ✓