Year 9 Mathematics

Name:_____

5.3 Course Semester 2 2006

Teacher:_____

Section A   Multiple Choice
answer on the answer sheet provided
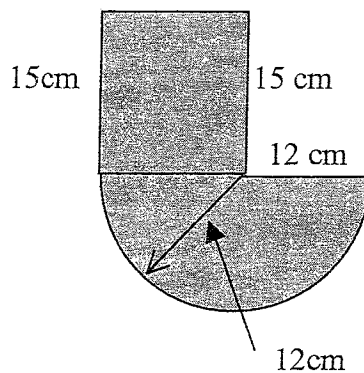
1.   The following to 3 significant figures $\sqrt{\dfrac{4.13 \times 15.20}{2.32^2 + 3.81}}$ would be

    a. 9.55   b. 2.61   c. 4.00   d. 7.23

2.   Which of the following *is not* a factor of $6x^2 - 7x - 3$

    a. $2x + 3$ b. $3x \pm 1$ c. $2x - 3$ d. $3 - 2x$

3.   The Perimeter of the area shaded

    in cm would be closest to

    a.   91.7   b.   79.7

    c.   406.2   d.   129.4

15cm   15 cm

12 cm

12cm

4.   If $a : b = 3 : 2$ and $b : c = 3 : 5$ then $a : c =$

    a. $2 : 5$ b. $9 : 10$ c. $9 : 15$ d. $6 : 15$

5. A machine was sold for a 25% profit of $270 on the cost price. The selling price after an additional 10% GST is

   a. $1080   b. $972   c. $771   d. $1188

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6. A regular polygon has an internal angle of 156^0. It therefore has

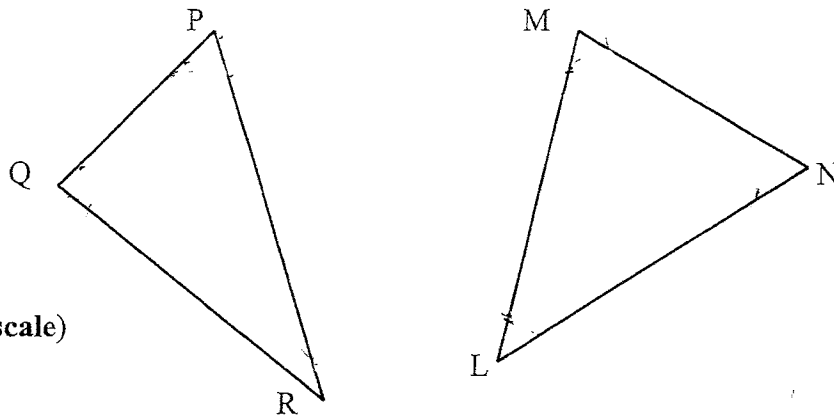   a.   21sides   b.   13sides   c.   15sides   d.   18sides

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7.
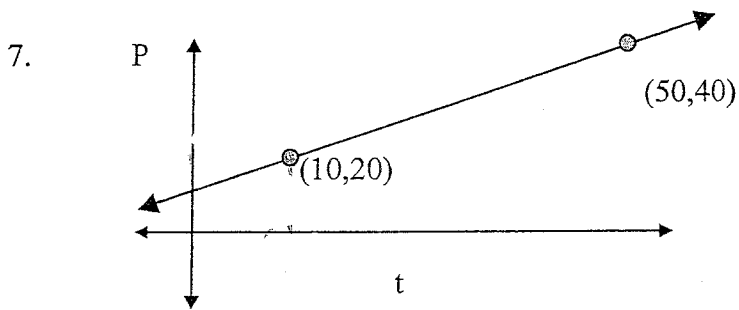
   The line drawn here has equation

   a.   P = 2t - 30   b.   P = 2t + 15

   c.   t = 2P + 15   d.   t = 2P - 30

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8. $\dfrac{5}{4\sqrt{x}} =$

   a. $\dfrac{5x^{\frac{1}{2}}}{4}$ b. $\dfrac{5x^{-\frac{1}{2}}}{4}$ c. $\dfrac{5}{16x^{\frac{-1}{2}}}$ d $\dfrac{5x^{-2}}{4}$
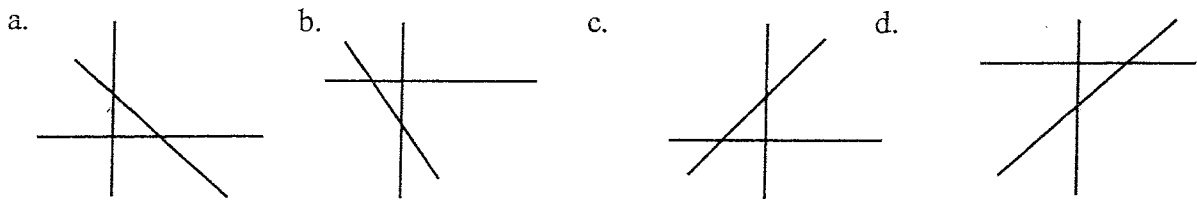

9.

(not to scale)

Given that $\angle PQR = \angle LMN$ and $\angle QPR = \angle MLN$, then $\triangle PQR \equiv \triangle MNL$ if

a. PQ = LN

b. QR = MN

c. PR = ML

d. $\angle PRQ = \angle LNM$

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10. Which of the following could be the graph of $2x + 3y = 5$

a.   b.   c.   d.

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11. After 15% discount a pair of jeans sell for $ 102. The discount received is closest to

a. $ 15   b. $ 45   c. $ 18   d. $ 20

---

12. $0.00105 = 1.05 \times 10^n$. The value for n would be

a. - 4   b. - 3   c. 3   d. 4

---

13. $\dfrac{1}{2\sqrt{5} - 1} =$

a. $\dfrac{2\sqrt{5} + 1}{9}$

b. $\dfrac{2\sqrt{5} - 1}{19}$

c. $\dfrac{2\sqrt{5}+1}{19}$

d. $\dfrac{(2\sqrt{5}+1)^2}{9}$
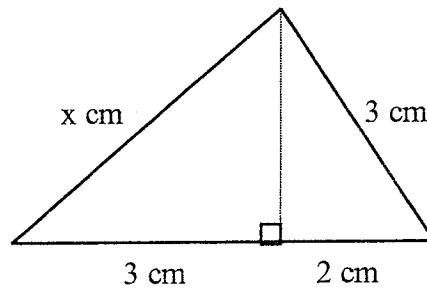
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14. For the diagram to the right

the value of x in cm would be

a. $\sqrt{14}$

b. 2

c. $\sqrt{22}$

d. $\sqrt{34}$

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15. Consider these two statements:

Statement I $\dfrac{a+b}{c} = \dfrac{a}{c} + \dfrac{b}{c}$

Statement II $\dfrac{ab}{c} = \dfrac{a}{c} \times b$

Which of the following is true

a. Statement I only

b. Statement II only

c. Both Statements are true

d. Neither Statement is true

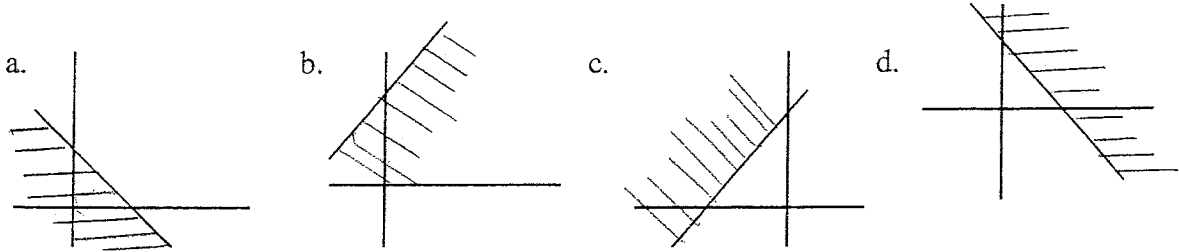16. $(x^{-1})^{1/2} =$

a. $\dfrac{1}{\sqrt{x}}$

b. $\dfrac{1}{2\sqrt{x}}$

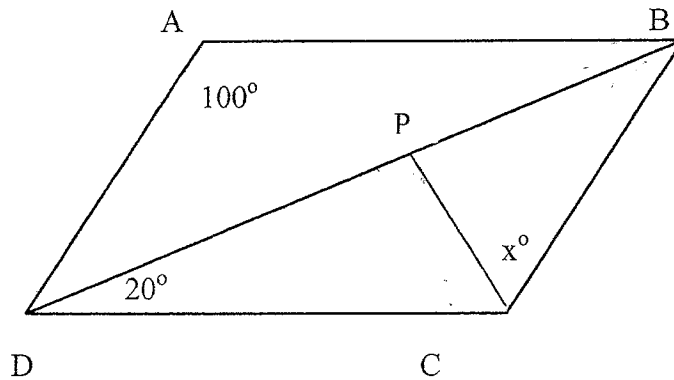c. $\dfrac{-1}{\sqrt{x}}$

d. $\sqrt{-x}$

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17. Which of the following could represent the region $4x + 2y - 11 \le 0$

a.

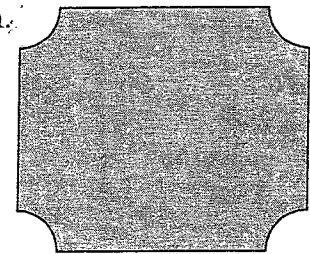b.

c.

d.

18. ABCD is a parallelogram, PC $\perp$ BD .

What is the value of x?

a. 30

b. 50

c. 60

d. 70

100°

P

A

B

20°

x°

D

C

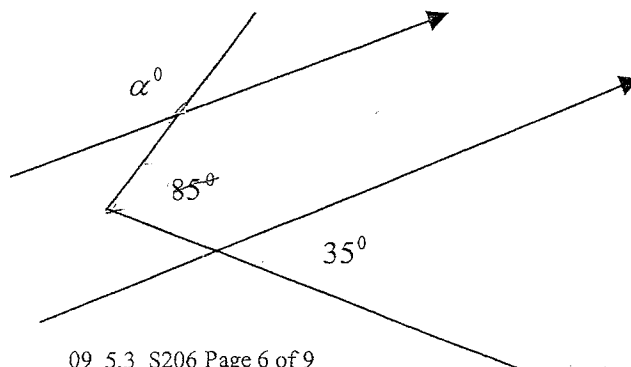19. The figure to the right is a rectangle with a quarter circle cut from each vertex. The radius of each quarter circle is x cm, and the rectangle measures 4cm by 5 cm.
The area of the shaded region is:

a. $(20 - \pi x^2)$ cm^2

b. $(20 + \pi x^2)$ cm^2

c. $(18 + 2\pi x)$ cm

d. $(20 - 2\pi x^2)$ cm^2

20. The value of α is

a. 130^0

b. 95^0

c. 135^0

d. 120^0

α^0

85^0

35^0

Year 9 Mathematics

Name:_____

5.3 Course Semester 2 2006

Teacher:_____

<u>Section B</u>   *(2 mks each question)*
Show all necessary working.
Answer in the Space provided .
Full marks may not be awarded for careless or badly arranged work.

1. Simplify, leaving your answer in surd form

$$(2\sqrt{5} - \sqrt{3})^2$$

_____

2. Completely factorise the following expressions.

    a. $4x^2 + 5x + 1$

_____

    b. $18 - 32t^2$

_____

    c. $ax^2 - ax - x + 1$

_____

3.   Simplify the following expressions:

    a. $\dfrac{20mn - 15m}{4n^2 + n - 3}$

           $=$

_____

    b. $\dfrac{2}{x^2 - 1} \div \dfrac{2}{x + 1}$

_____

c. $\dfrac{\left(3x^3\right)^2 \times 4x^5}{6x^4 \times x}$
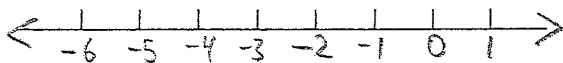
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5. Simplify

a. $(3x^2 - 4)^2$

b. $(7\sqrt{3} - 2\sqrt{5})^2$

c. $\dfrac{3x^2 - 48}{x^2 - 3x - 4} \div \dfrac{x^2 + 4x}{x^3 - x}$.

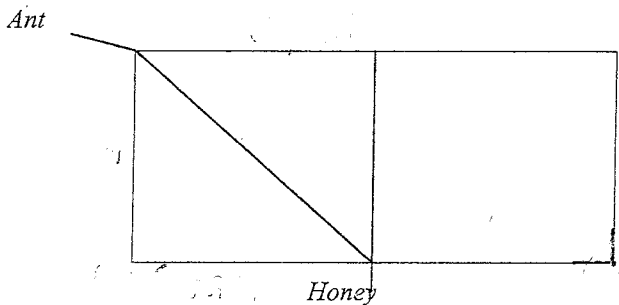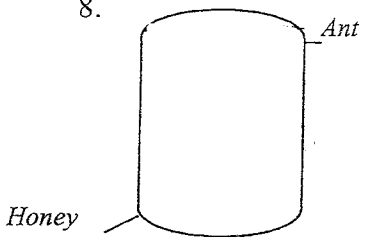6. Solve the following inequation, graphing your solution on the number line provided_

b. $-\dfrac{1}{5}x > 1$

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7. Make h the subject of the formula $E = mgh + \dfrac{1}{2}mv^2.$

8.

Ant

Honey

The cylindrical cup represented above is clean except for a single drop of honey in the bottom corner. An ant climbs to the top of the cup and from its position diagonally opposite the honey drop calculates the shortest course necessary to reach the honey. With the aid of the drawing of the net of the cylindrical cup calculate the distance and path followed for the ant to reach the honey.(...and its not a flying ant!). The cup is 10cm tall and has a diameter of 10cm.

9. Weary Wendy climbed a certain hill at the rate of one and a half km per hour and came down at the rate of four and a half km per hour, so that it took just six hours to make the double journey. How far was it to the top of the hill?

Year 9 Mathematics   Name: Amanda Effendi

5.3 Course Semester 2 2006   Teacher: Mr Eames

Section A: Answers to the Multiple Choice Section (25 marks)

1. B ✓   6. C ✓   11. C ✓   16. A ✓

2. D ✗   A 7. D ✓   12. B ✓   17. A ✓

3. A ✓   8. B ✓   13. C ✓   18. A ✓

4. B ✓   9. B ✓   14. A ✓   19. A ✓

5. (D) C 10. A ✓   15. C ✓   20. A ✓

18.

Section B   *(2 mks each question)*
Show all necessary working.
Answer in the Space provided.
Full marks may not be awarded for careless or badly arranged work.

1. Simplify, leaving your answer in surd form

$$(2\sqrt{5} - \sqrt{3})^2 \qquad (2\sqrt{5})^2 + 2 \times (2\sqrt{5} \times \sqrt{3}) + (\sqrt{3})^2$$

$$= 20 - 4\sqrt{15} + 3 \qquad = 23 - 4\sqrt{15} \; ✗$$

   1

2. Completely factorise the following expressions.

   a. $4x^2 + 5x + 1$ $(4x + 1)(x + 1)$ ✓✓

   b. $18 - 32t^2$

$$2(9 - 16t^2) = 2(3 + 4t)(3 - 4t) \quad ✓✓$$

   c. $ax^2 - ax - x + 1$
$$\frac{ax}{x} \; ✗ \; -1 \qquad (ax - 1)(x - 1) \quad ✓✓$$

3. Simplify the following expressions:

   a. $\dfrac{20mn - 15m}{4n^2 + n - 3}$ $\dfrac{5m(4n - 3)}{(4n - 3)(n + 1)}$

$$= \frac{5m}{(n + 1)} \quad ✓✓$$

   b. $\dfrac{2}{x^2 - 1} \div \dfrac{2}{x + 1}$ $\dfrac{2}{(x + 1)(x - 1)} \times \dfrac{(x + 1)}{2}$

$$= \frac{1}{(x - 1)} \quad ✓✓$$

c. $\dfrac{(3x^3)^2 \times 4x^5}{6x^4 \times x}$ $\dfrac{9x^6 \times 4x^5}{6x^5}$ $= \dfrac{36x^9}{6x^5}$

$= 6x^{4}$

5. Simplify

a. $\dfrac{(3x^2-4)^2}{}$
$(3x^2-4)(3x^2-4)$

$= 9x^4 - 24x^2 + 16$

b. $(7\sqrt{3}-2\sqrt{5})^2$
$(7\sqrt{3}-2\sqrt{5})(7\sqrt{3}-2\sqrt{5})$
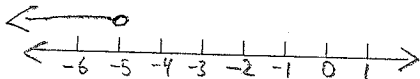
$147 - 20 - 28\sqrt{15}$

$= 127 - 28\sqrt{15}$

c. $\dfrac{3x^2-48}{x^2-3x-4} \div \dfrac{x^2+4x}{x^3-x}$

$\dfrac{3x^2-48}{x^2-3x-4} \times \dfrac{x^3-x}{x^2+4x} = \dfrac{3(x+4)(x-4)}{(x-4)(x+1)} \times \dfrac{x(x-1)(x+1)}{x(x+4)}$

$= 3(x-1)$

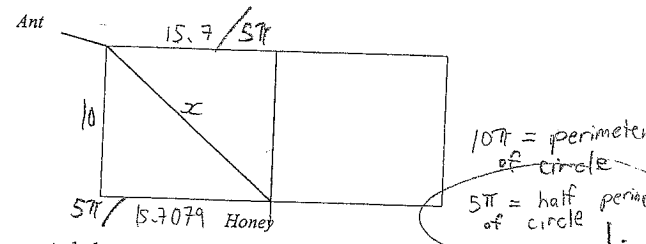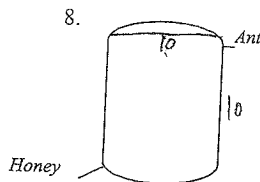6. Solve the following inequation, graphing your solution on the number line provided

b. $-\dfrac{1}{5}x > 1$ $x < -5$

7. Make h the subject of the formula $E = mgh + \dfrac{1}{2}mv^2$

$E - \frac{1}{2}mv^2 = mgh$

$h = \dfrac{E - \frac{1}{2}mv^2}{mg}$

8.

10π = perimeter of circle

5π = half perimeter of circle

The cylindrical cup represented above is clean except for a single drop of honey in the bottom corner. An ant climbs to the top of the cup and from its position diagonally opposite the honey drop calculates the shortest course necessary to reach the honey. With the aid of the drawing of the net of the cylindrical cup calculate the distance and path followed for the ant to reach the honey.(...and its not a flying ant!). The cup is 10cm tall and has a diameter of 10cm.

$25\pi + 10^2 =$
$x = 18.62$

Distance $= 18.62$ cm

9. Weary Wendy climbed a certain hill at the rate of one and a half km per hour and came down at the rate of four and a half km per hour, so that it took just six hours to make the double journey. How far was it to the top of the hill?

down hill 4.5 km/h 2hr

1.5 km/hr uphill

6 hrs $= x$ 1.5km/hr $+ y$ 4.5 km/hr

1.5 km/hr for 4 hrs 30 mins and 4.5 km/hr for 1 hr 30 mins.

$= 6.75$ km $+ 6.75$ km

6.75 km

3

10