Year 10 Mathematical Methods.

2016 Semester One Examination Revision.

Information:

Topics:	Algebra and Equations	Real Numbers	Trigonometry
	Coordinate Geometry	BiSection Method	

Some Revision.

1) You are strongly advised to work through your **semester one topic tests**. They are an excellent summary of each topic that was taught in this unit. A copy of the tests and a set of solutions are available on MyConnect in the Revision folder.

2) The following questions should only be completed after working through the tests.

Topics: Algebra and Equations
Real Numbers
Trigonometry
Coordinate Geometry
BiSection Method

3) You will have access to last year's examination for revision. This should be completed AFTER all other revision as a timed resource and the assumption should not be made that the 2016 papers will be based on the 2015 papers as some topics have changed.

Concepts that will be examined

Real Numbers

Concept	Competent
Number Classification	
Surds	
Operations with Surds	
Multipliying and Dividing Surds	
Rationalising the denominator	
Review of Index Laws	
Negative Indicies	
Fractional Indicies	
Logs	
Log Laws	

Algebra and Equations

.Concept	Competent
Substitution	
Adding/Subtracting Algebraic Fractions	
Multiplying/Dividing Algebraic Fractions	
Solving simple Equations	
Solving Multi-step Equations	
Literal Equations	

Bisection Method

Concept	Competent
Solving equations using numerical methods	

Trigonometry

Concept	Competent
Pythagoras' Theorem in 2D and 3D.	
Trigonometric Ratios Including degrees and minutes. Finding side lengths.	
Calculating angle size.	
Angles of elevation and depression.	
Bearings	
Applications	
Unit Circle and conversion between degrees and radians	
Exact values in the first quadrant	
Using the exact values in trigonometry	

Co-Ordinate Geometry

Topic	Questions
Plotting linear graphs - Using a table of values - Using Cas.	
y=mx+c Finding the gradient, finding the equation of a straight line from a graph with y inter, when given m and a point.	
Finding equations of straight lines. Flowchart.	

Topic	Questions
Sketching straight lines - using the grad/int method - using x/y intercept method (by hand and by CAS) - Q7 by hand and by CAS	
Distance between two points.	
Midpoint of a line segment.	
Collinear points, parallel and perpendicular lines	

Attached is a selection of multiple choice questions, with answers, to practice on.

PREPARATION is THE KEY…..START NOW

1. Which of the numbers below is a surd? D

A $\sqrt{625}$
B $\sqrt[3]{216}$
C $\sqrt[4]{16}$
D $\sqrt{125}$
E $\sqrt{144}$

2. $\sqrt{507}$ in simplest form is equal to: E

A $25\sqrt{7}$
B $12\sqrt{7}$
C $169\sqrt{3}$
D $13\sqrt{7}$
E $13\sqrt{3}$

3. Which of the following surds, when simplified, will equal $3\sqrt{7}$? E

A $\sqrt{147}$
B $\sqrt{441}$
C $\sqrt{21}$
D $\sqrt{42}$
E $\sqrt{63}$

4. $2\sqrt{3} + 3\sqrt{2} - \sqrt{2}$ is equal to: B

A 5
B $2\sqrt{3} + 2\sqrt{2}$
C $2\sqrt{3} + 3$
D $5\sqrt{5} - \sqrt{2}$
E $5\sqrt{3}$

5. $12\sqrt{48}+\sqrt{343}-3\sqrt{112}-4\sqrt{75}$ is equal to: A

A $28\sqrt{3}-5\sqrt{7}$
B $5\sqrt{204}$
C 56
D $7\sqrt{3}$
E $7\sqrt{3}-\sqrt{7}$

6. $2\sqrt{10}\times\sqrt{3}\times2\sqrt{2}$ is equal to: C

A 240
B $\sqrt{240}$
C $8\sqrt{15}$
D $16\sqrt{15}$
E $4\sqrt{15}$

7. $11\left(\sqrt{3}-2\sqrt{5}\right)$ equals: C

A $11\sqrt{3}-13\sqrt{5}$
B $11\sqrt{3}-9\sqrt{5}$
C $11\sqrt{3}-22\sqrt{5}$
D $11\sqrt{3}-2\sqrt{5}$
E $11\sqrt{3}-3\sqrt{5}$

8. $\dfrac{4}{\sqrt{6}}$ expressed with a rational denominator is: D

A $\dfrac{\sqrt{6}}{4}$
B $4\sqrt{6}$
C $\dfrac{2}{3}$
D $\dfrac{2\sqrt{6}}{3}$
E $\dfrac{4\sqrt{3}}{3}$

9. $\dfrac{\sqrt{2}}{\sqrt{3}-1}$ expressed with a rational denominator is: C

A $\dfrac{\sqrt{6}-\sqrt{2}}{2}$
B $\dfrac{\sqrt{6}-1}{2}$
C $\dfrac{\sqrt{6}+\sqrt{2}}{2}$
D $\dfrac{\sqrt{6}+1}{2}$
E $\sqrt{6}-1$

10. When simplified, $9a - 6b + a - b$ becomes: D

A $9a - 7b$
B $10a - 6b$
C $9a - 6b$
D $10a - 7b$
E $10a - 5b$

11. When simplified, $(3c^4) \times (2d^3)^3$ becomes: D

A $72c^4d^9$
B $72c^4d^6$
C $486c^4d^9$
D $24c^4d^9$
E $486c^4d^6$

12. If $e = 3\frac{1}{3}$ and $f = 4\frac{3}{4}$ then $5e - 3f$ equals: C

A $2\frac{7}{12}$

B $3\frac{1}{12}$

C $2\frac{5}{12}$

D $2\frac{1}{12}$

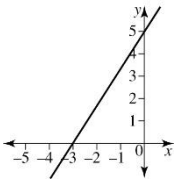
E $1\frac{11}{12}$

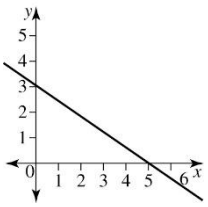
13. The Junior Jazzers band charges \$150 plus \$60 per hour. The rule which best represents this situation is: A

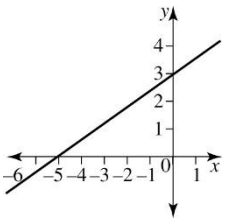
A C = 150 + 60*t*
B C = (150 + 60)*t*
C C = 60 + 150*t*
D C = 150 – 60*t*
E C = 150*t* – 60

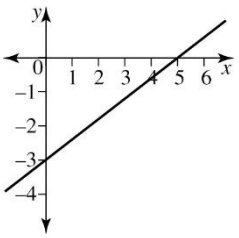
14. The graph of $-3x + 5y = 15$ is best represented by: C

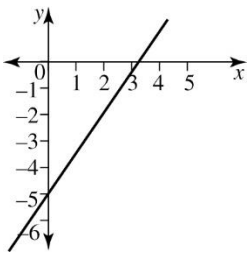
A











15. The gradient and y-intercept, respectively, of the graph $5(y - 2) = 2(x + 2)$ are: E

A $-\frac{2}{5}$ and $2\frac{4}{5}$

B $-\frac{2}{5}$ and $-2\frac{4}{5}$

C $\frac{2}{5}$ and $\frac{4}{5}$

D $\frac{2}{5}$ and $-\frac{4}{5}$

E $\frac{2}{5}$ and $2\frac{4}{5}$

16. The equation for the linear graph with x-intercept = -2 and y-intercept = 4 is: D

A $y = -2x + 4$

B $y = -4x + 4$

C $y = -\frac{1}{2}x + 4$

D $y = 2x + 4$

E $y = \frac{1}{2}x + 4$

17. The equation of a linear graph with gradient 5 and that passes through the point $(6, -4)$ is: A

A $y = 5x - 34$

B $y = 5x + 34$

C $y = 5x - 26$

D $y = 5x + 26$

E $y = 5x - 15$

18. The equation of a linear graph which passes through the origin and with gradient 3 is: C

A $y = 3$

B $x = 3$

C $y = 3x$

D $y = 3x + 3$

E $y = 3x - 3$

19. Six people clean a motel in 80 minutes and 3 people take 200 minutes. The equation that best represents this is: B

A $P = -\frac{1}{40}t + 12$

B $P = -\frac{1}{40}t + 8$

C $P = -\frac{1}{20}t + 8$

D $P = -\frac{1}{20}t + 10$

E $P = -\frac{1}{20}t + 12$

20. 'Hire a bus' charge \$240 plus \$8 per kilometre. An 80 kilometre trip would cost: B

A \$800

B \$880

C \$720

D \$560

E \$640

21. When travelling at constant speed, Annette's car can travel 450 kilometres in 5 hours. The rule relating distance (d) to time (t) for her car is: E

A $d = \frac{t}{90}$
B $t = 450d$
C $d = 5t$
D $t = 5d$
E $d = 90t$

22. The rule relating the unknowns x and y is of the form $y = kx + c$. If $x = 6$ when $y = 44$, and $x = 12$ when $y = 86$, the rule is: B

A $y = 6x + 12$
B $y = 7x + 2$
C $y = 6x + 8$
D $y = 6x + 14$
E $y = 8x - 4$

23. An Internet service provider charges \$8 per month plus \$0.90 for each megabyte that is downloaded. The amount of download, if the monthly bill was \$26, must be: E

A 25 megabytes
B 24 megabytes
C 18 megabytes
D 19 megabytes
E 20 megabytes

1 The fraction $\frac{91}{105}$ in simplest form is: D

A $\frac{7}{35}$ B $\frac{13}{35}$ C $\frac{7}{15}$
D $\frac{13}{15}$ E $\frac{13}{21}$

2 Which one of the following is NOT a surd? C

A $\sqrt{12}$ B $\sqrt{243}$ C $\sqrt{121}$
D $\sqrt{132}$ E $\sqrt{200}$

3 Which one of the following is a surd? A

A $\sqrt{125}$ B $\sqrt{169}$ C $\sqrt{196}$
D $\sqrt{400}$ E $\sqrt{49}$

4 Which of the following groups contains only irrational numbers? B

A $\sqrt[4]{16},\ \pi,\ e^2$
B $\sqrt[3]{16},\ \pi,\ e^2$
C $\sqrt[3]{16},\ \pi,\ \sqrt{25}$
D $\sqrt[3]{16},\ \sqrt{121},\ \sqrt{25}$
E $\sqrt[4]{16},\ \sqrt{121},\ \sqrt{125}$

5 $\sqrt{0.3552}$ correct to 2 decimal places is: B

A 0.59 B 0.60 C 0.61
D 0.12 E 0.13

6 $\sqrt[3]{-2000}$ correct to 4 decimal places is: A

A -12.5992 B 12.60
C -44.7214 D -12.60
E 12.5992

7 $\sqrt{243}$ in simplest form is equal to: C

A $81\sqrt{3}$ B $18\sqrt{3}$ C $9\sqrt{3}$
D $27\sqrt{3}$ E $49\sqrt{3}$

8 $\frac{1}{2}\sqrt{124}$ in simplest form is equal to: A

A $\sqrt{31}$ B $4\frac{1}{2}\sqrt{31}$
C $\frac{5}{2}\sqrt{31}$ D $2\sqrt{41}$ E $\sqrt{41}$

9 Which of the following surds, when simplified, is equal to $12\sqrt{8}$? B

A $\sqrt{192}$ B $\sqrt{1152}$ C $\sqrt{96}$
D $\sqrt{768}$ E $\sqrt{1532}$

10 $3\sqrt{7}-5\sqrt{14}-4\sqrt{7}+4\sqrt{14}$ is equal to: E

A $-\sqrt{7}+\sqrt{14}$ B $-2\sqrt{7}$
C $2\sqrt{7}$ D -2 E $-\sqrt{7}-\sqrt{14}$

11 $\sqrt{128}-2\sqrt{72}+11\sqrt{200}$ is equal to: D

A $21\sqrt{2}$
B $96\sqrt{2}$
C $90\sqrt{2}$
D $106\sqrt{2}$
E $130\sqrt{2}$

12 $6\sqrt{125}-\sqrt{27}-2\sqrt{75}-8\sqrt{20}$ is equal to: D

A $-5\sqrt{3}$
B $\sqrt{5}-10\sqrt{3}$
C $\sqrt{5}+10\sqrt{3}$
D $14\sqrt{5}-13\sqrt{3}$
E $10\sqrt{2}$

13 $6\sqrt{6}\times 3\sqrt{14}$ is equal to: E

A $36\sqrt{5}$
B 1512
C $\sqrt{1512}$
D $9\sqrt{84}$
E $36\sqrt{21}$

14 $\dfrac{5\sqrt{42}\times 4\sqrt{6}}{10\sqrt{28}}$ when fully simplified is equal to: B

A $\dfrac{4\sqrt{3}}{\sqrt{7}}$
B 6
C $\dfrac{2\sqrt{3}}{\sqrt{7}}$
D $\dfrac{9\sqrt{3}}{\sqrt{7}}$
E $\dfrac{9\sqrt{252}}{10\sqrt{28}}$

15 $4\left(6\sqrt{2}-\sqrt{3}\right)$ is equal to: A

A $24\sqrt{2}-4\sqrt{3}$
B $24\sqrt{2}-\sqrt{3}$
C $10\sqrt{2}-4\sqrt{3}$
D $10\sqrt{2}-\sqrt{3}$
E 20

16 $-\sqrt{5}\left(3\sqrt{10}-2\sqrt{20}\right)$ is equal to: C

A $-3\sqrt{50}+10$
B $-3\sqrt{50}-10$
C $20-15\sqrt{2}$
D $-15\sqrt{2}-20$
E $15\sqrt{2}-20$

17 $\dfrac{2}{\sqrt{6}}$ expressed with a rational denominator is equal to: A

A $\dfrac{\sqrt{6}}{3}$
B $2\sqrt{6}$
C $\dfrac{\sqrt{6}}{2}$
D $\dfrac{\sqrt{2}}{6}$
E $\sqrt{3}$

18 $\dfrac{4}{\sqrt{5}-1}$ expressed with a rational denominator is equal to: E

A $\dfrac{\sqrt{5}-1}{4}$
B $4\sqrt{5}-4$
C $4\sqrt{5}+4$
D $\sqrt{5}-1$
E $\sqrt{5}+1$

19 When simplified $5a - 6b + a - b$ becomes: D

A $6a - 6b$
B $6a - 5b$
C $5a - 6b$
D $6a - 7b$
E $5a - 7b$

20 $\frac{75c^5}{60c}$ simplifies to: B

A $\frac{5c^5}{4}$
B $\frac{5c^4}{4}$
C $\frac{5c^6}{4}$
D $\frac{25c^4}{12}$
E $\frac{25c^5}{12}$

21 If $f = 7$ and $g = -\frac{2}{7}$, then $\frac{3}{f} - 2g$ equals: A

A 1
B $-\frac{1}{7}$
C $\frac{1}{7}$
D $\frac{2}{7}$
E $-\frac{2}{7}$

22 If $h = 1\frac{1}{2}$ and $i = \frac{3}{4}$, then $\frac{2h^2}{5i}$ equals: E

A $2\frac{2}{5}$
B $1\frac{13}{23}$
C $\frac{18}{23}$
D $1\frac{2}{5}$
E $1\frac{1}{5}$

23 If $A = \frac{1}{2}(a + b)h$, and $a = 10$, $b = 3$ and $h = 4.5$ then the value for A is: D

A 11
B 36
C 29
D 29.25
E 25

24 When simplified $\frac{2x}{5} + \frac{x}{2}$ becomes: D

A $\frac{3x}{7}$
B $\frac{3x}{10}$
C $\frac{9x}{7}$
D $\frac{9x}{10}$
E none of the above

25 When simplified $\frac{2}{3x} + \frac{3}{4x}$ becomes: C

A $\frac{5}{7x}$

B $\frac{17x}{12x^2}$

C $\frac{17}{12x}$

D $\frac{17}{7x}$

E $\frac{5}{12x}$

26 When fully simplified $\frac{x}{3} \times \frac{5}{2x}$ becomes: B

A $\frac{5x}{6x}$

B $\frac{5}{6}$

C $\frac{x+5}{5x}$

D $\frac{2x^2}{15}$

E $\frac{2}{15}$

27 When fully simplified $\frac{x}{3} \div \frac{5}{2x}$ becomes: D

A $\frac{5x}{6x}$

B $\frac{5}{6}$

C $\frac{x+5}{5x}$

D $\frac{2x^2}{15}$

E $\frac{2}{15}$

28 If $9u + 6 = -30$, then u equals: E

A 4
B 3
C –2
D –3
E –4

29 If $\frac{7v}{12} + 20 = 17$, then v equals: D

A –5
B –6
C $-5\frac{2}{7}$
D $-5\frac{1}{7}$
E $-4\frac{6}{7}$

30 The solution to $3(6w - 7) = 12$ is: D

A $1\frac{1}{18}$

B $2\frac{1}{6}$

C $1\frac{2}{3}$

D $1\frac{5}{6}$

E $1\frac{1}{3}$

31 The solution to $8 - \frac{9x}{11} = 26$ is: E

A 22
B 11
C –11
D –33
E –22

32 The solution to $3y - 18 = 17y + 38$ is: A

A –4
B –3
C –5
D –6
E –2

33 The solution to $-(6 - 3z) = 4(5z + 6)$ is: C

A $1\frac{14}{17}$

B $-1\frac{1}{2}$

C $-1\frac{13}{17}$

D $-1\frac{3}{17}$

E $-1\frac{14}{17}$

34 Solving $2(3a - 7) + 5(1 - 2a) = 2(a + 6) + 3(1 - 3a)$ yields: E

A 4 B 5 C 6 D 7 E 8

Linear graphs

35 D

x	–1	0	1	2	3	4
y	–11	–7	–3	1	5	9

The table of values is best represented by:

$y = 3x - 8$

$y = 3x - 7$

$y = 4x - 8$

$y = 4x - 7$

$y = 5x - 6$

36 $y = -2x + 7$ is best represented by the table of values: B

x	–5	–4	–3	–2	–1
y	17	19	21	23	25

x	–5	–4	–3	–2	–1
y	17	15	13	11	9

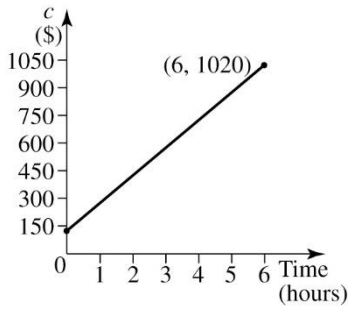
x	–5	–4	–3	–2	–1
y	17	16	15	14	13

x	–5	–4	–3	–2	–1
y	17	18	19	20	21

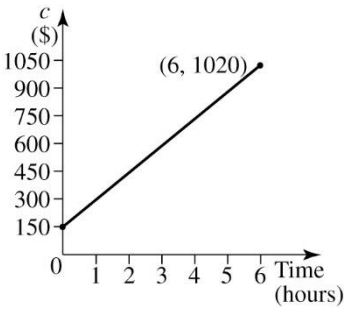
x	–5	–4	–3	–2	–1
y	17	14	11	8	5

37 The ‘Chimpanzees’ band charges $150 plus $120 per hour and will play for up to 6 hours. The graph which best represents this situation is: E

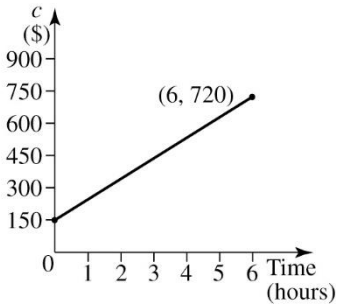
A



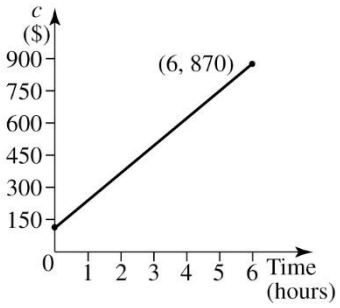
B



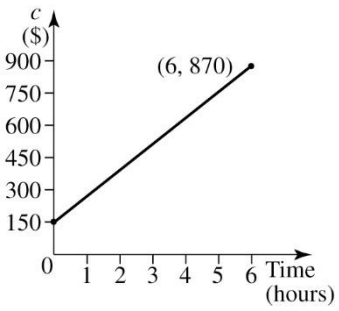
C



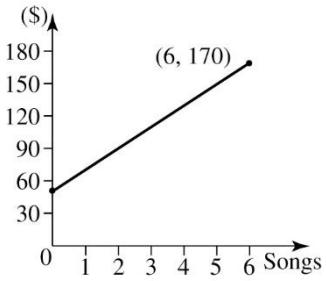
D



E



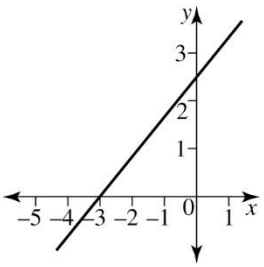
38 During a sing-a-thon, the income received by Mandy is represented by the straight line graph below. C



The graph indicates that Mandy received:

A $50 plus $25 per song
B $50 plus $30 per song
C $50 plus $20 per song
D $50 plus $15 per song
E $25 per song

39 D



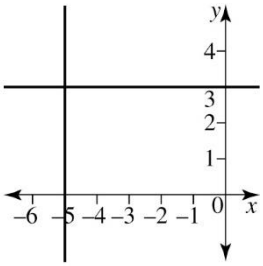
This represents a sketch of the linear graph with equation:

A $-5x - 6y = 15$
B $5x + 6y = 15$
C $-6x + 5y = 15$
D $-5x + 6y = 15$
E $6x - 5y = 15$

40 For $5(y + 6) = 2(x - 1)$, the gradient and the x-intercept respectively are: B

A $\frac{2}{5}, -6\frac{2}{5}$
B $\frac{2}{5}, 16$
C $2, 16$
D $2, -6\frac{2}{5}$
E $\frac{5}{2}, -6\frac{2}{5}$

41 C



This represents a sketch of the graphs with equations:

$y = -3$ and $x = -5$

$y = -3$ and $x = 5$

$y = 3$ and $x = -5$

$y = 3$ and $x = 5$

$x = 3$ and $y = -5$

42 The equation of a linear graph with an x-intercept of -2 and a y-intercept of -4 is: E

A $2x + y - 4 = 0$
B $2x - y - 4 = 0$
C $2x - y + 4 = 0$
D $x - 2y + 4 = 0$
E $2x + y + 4 = 0$

43 The equation of a linear graph with gradient 3 and x-intercept -3 is: C

A $3x - y - 3 = 0$
B $3x + y - 3 = 0$
C $3x - y + 9 = 0$
D $3x - y - 9 = 0$
E $3x + y + 3 = 0$

44 The equation of a linear graph with gradient -1 and passing through $(-2, 7)$ is: B

A $x + y + 5 = 0$
B $x + y - 5 = 0$
C $x - y - 5 = 0$
D $x - y + 5 = 0$
E $x + y - 7 = 0$

45 The equation of a linear graph which passes through $(-4, 2)$ and $(-3, 1)$ is: A

A $x + y + 2 = 0$
B $x + y + 4 = 0$
C $x + y + 1 = 0$
D $x + y + 5 = 0$
E $x + y + 3 = 0$

46 The equation of a linear graph which passes through the origin and $(-6, 5)$ is: A

A $5x + 6y = 0$
B $5x - 6y = 0$
C $6x + 5y + 5 = 0$
D $6x - 5y = 0$
E $6x + 5y - 6 = 0$

47 Four people clean a train in 66 minutes and 3 people take 88 minutes. Two people take: B

A 100 minutes
B 110 minutes
C 120 minutes
D 130 minutes
E 140 minutes

48 The Magazine Company charges \$3 postage for 4 magazines and \$10 for 25 magazines. The most likely charge to post 10 magazines is: D

A \$7.50
B \$6.50
C \$7
D \$5
E \$6

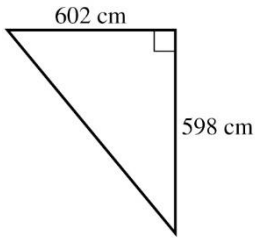
49 'Harley Rides' charges \$14 flagfall plus \$4 per kilometre. The distance you could travel for \$64 is: D

A 12 kilometres
B 14 kilometres
C 13.5 kilometres
D 12.5 kilometres
E 13 kilometres

50 'Prune less' gardening service charges \$15 a visit plus \$18 per hour. The charge for 7 hours work is: E

A \$133
B \$126
C \$123
D \$136
E \$141

51 The length of the missing side of the right-angled triangle in the figure below is: D



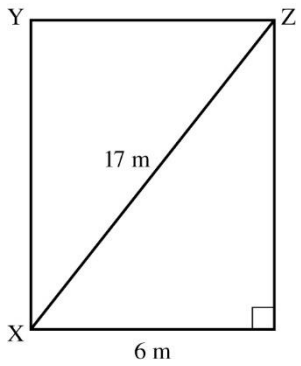
A 749 cm
B 1200 cm
C 600 cm
D 849 cm
E 949 cm

52 A ladder 5.1 m long is required to reach a height 4.5 m up a vertical wall. Assume the ground is horizontal. The distance the foot of the ladder must be placed from the base of the wall is: B

A 0.4 m
B 2.4 m
C 1.4 m
D 0.9 m
E 1.9 m

All Multiple Choice

1 B



The area of the triangle XYZ, shown above, to the nearest m^2, is:

A 16

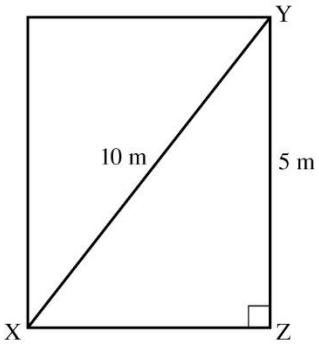
B 48

C 102

D 51

E 50

2 C



The area of the triangle XYZ, shown above, to the nearest m^2, is:

A 7

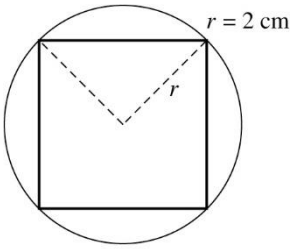
B 43

C 22

D 50

E 25

3 D



A square is inscribed in a circle of radius 2 cm as shown above. The perimeter of the square, in cm, is:

A 4π

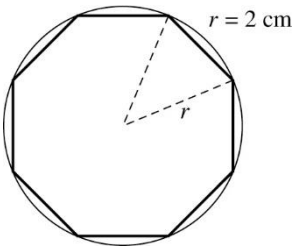
B 4

C 2.83

D 11.31

E 5.66

4 B



An octagon is inscribed in a circle of radius 2 cm as shown above. The perimeter of the octagon, in cm, is:

A 1.53

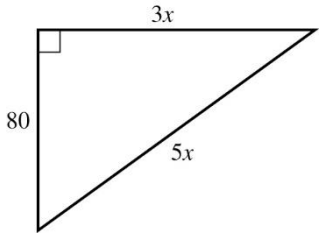
B 12.25

C 0.77

D 3.06

E 6.13

5 C



For the triangle shown above, the value of *x* is:

A 4

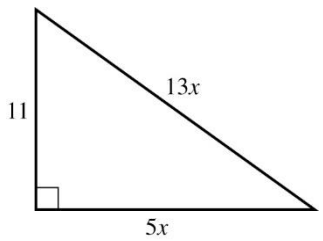
B 10

C 20

D 3.7

E 30

6 E



For the triangle shown above, the value of *x* is:

A 2.6

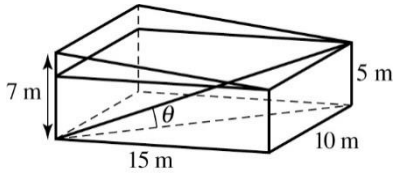
B 11

C 17.9

D 3.89

E 0.92

7 A rod sits in a wedge-shaped box as shown in the diagram. C



The expression which describes the angle the rod makes with the base of the box, is:

A $\tan\theta = \frac{5}{12}$

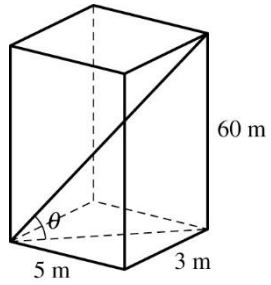
B $\sin\theta = \frac{1}{2}$

C $\tan\theta = \frac{5}{18}$

D $\tan\theta = \frac{5}{9}$

E $\cos\theta = \frac{2}{3}$

8 A rectangular box has a rod positioned as shown in the diagram. E



The expression which describes the angle the rod makes with the base of the box, is:

A $\tan\theta = \frac{1}{12}$

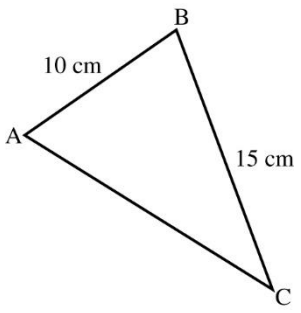
B $\cos\theta = \frac{3}{5}$

C $\tan\theta = \frac{5.8}{60}$

D $\sin\theta = \frac{3}{5}$

E $\tan\theta = \frac{60}{5.8}$

9 C



Given AB = 10 cm, BC = 15 cm and sin *C* = 0.25, then sin *A* =

A $\frac{51}{52}$

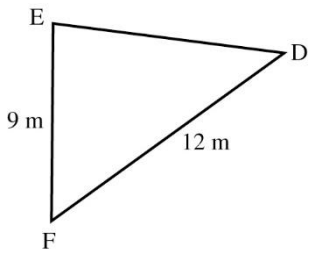
B $1\frac{29}{39}$

C $\frac{3}{8}$

D $\frac{4}{3}$

E $\frac{9}{16}$

10 E



Given FD = 12 m, EF = 9 m and

sin *E* = 0.35, then sin *D* =

A $\frac{7}{15}$

B $3\frac{19}{21}$

C $\frac{16}{9}$

D $\frac{4}{3}$

E $\frac{21}{80}$

11 A 30-cm long straw is the longest that can fit into a cylindrical can that has a radius of 9 cm. The height of the can C

(in cm) is closest to:

A 28

B 29

C 24

D 34

E 12

12 For a cylindrical can of radius 65 mm and height 30 cm, what is the longest rod (in cm) that can fit into this can? A

A 32.7

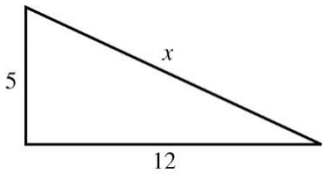
B 327

C 71.6

D 133.4

E 43

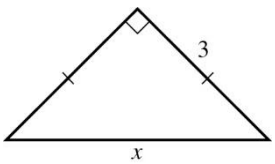
13 D



Find the value of *x* in the figure above.

A 10.91
B 4
C 1.414
D 13
E 9.162

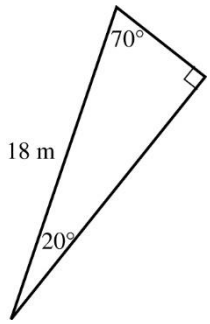
14 B



Find the value of *x* in the figure above.

A 18
B 4.243
C 5.106
D 4
E 1.414

15 E



Find the area of the figure above.

A 104.1 cm^2

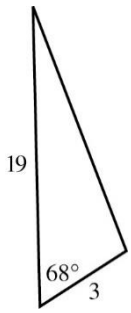
B 97.1 m^2

C 98.1 cm^2

D 9.1 m^2

E 52.1 m^2

16 A



Find the area of the figure above.

A 26.4

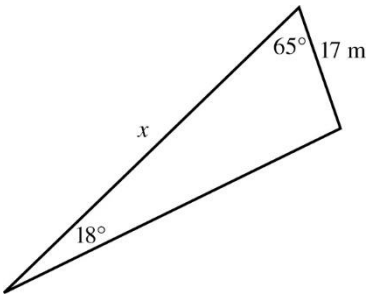
B 27.4

C 28.4

D 29.4

E 52.8

17 C



Find *x* in the figure above to the nearest metre.

A 43

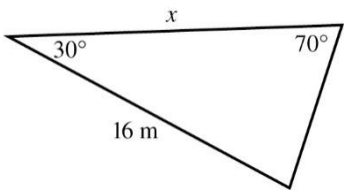
B 50

C 55

D 62

E 68

18 D



Find *x* in the figure above to the nearest metre.

A 35

B 43

C 10

D 17

E 18

19 Given that the height of an isosceles triangle is 5 metres and the unique angle of the triangle is 58º, what is the base length of the triangle (to 2 decimal places)? D

A 2.10 m

B 3.15 m

C 4.50 m

D 5.54 m

E 6.97 m

20 Given that the height of an isosceles triangle is 10 metres and the unique angle of the triangle is 30º, what is the base length of the triangle (to 2 decimal places)? C

A 5.10 m

B 5.18 m

C 5.36 m

D 2.68 m

E 3.97 m

21 The longest side of a right-angled isosceles triangle measures 170 metres. The other two equal sides are closest to D

A 200 m

B 100 m

C 50 m

D 120 m

E 45 m

22 The longest side of a right-angled isosceles triangle measures 70.6 metres. The other two equal sides are closest to C

A 200 m

B 100 m

C 50 m

D 120 m

E none of the above

23 A rectangular slice of bread measuring 190 mm by 210 mm is to be cut diagonally. What is the exact length of the cut to be made? D

A 400 cm

B 200 cm

C 283 cm

D 283 mm

E 283 nm

24 What is the angle between the hour and minute hands of a clock when it is 6 o'clock? A

A 180º

B 90º

C 45º

D 60º

E 120º

25 The area of an equilateral triangle is 5 cm^2. What is the side length? A

A 3.40 cm

B 1.70 cm

C 5 cm

D 2.24 cm

E 6.70 cm

26 Find the perimeter of an isosceles triangle of unique side length 15 cm and two of its angles measuring 36º. B

A 18.54 cm

B 33.54 cm

C 36.0 cm

D 9.27 cm

E 75 cm

27 Complete the Pythagorean triad: E

11, 60, _?

A 41

B 51

C 52

D 60

E 61

28 What is the angle a pole makes with the ground if it reaches a height of 50 cm above the ground and is 100 cm long? B

A 0º

B 30º

C 45º

D 60º

E 90º

Unit Circle Revision

Review — Topic 9: Trigonometric functions 1

Short answer

1 Express in degree measure.

a $\frac{11\pi^c}{9}$

b $-3.5\pi^c$

2 Evaluate $\cos\left(\frac{11\pi}{6}\right)-\tan\left(\frac{11\pi}{3}\right)+\sin\left(-\frac{11\pi}{4}\right)$ exactly.

3 If $\cos(t)=0.6$, evaluate the following.

a $\cos(-t)$

b $\cos(\pi+t)$

c $\cos(3\pi-t)$

d $\cos(-2\pi+t)$

6 A window ledge 4 metres above the ground can just be reached by a 10-metre ladder.

a Calculate, to 1 decimal place, the angle the foot of the ladder makes with the ground (assumed horizontal).

b Exactly how far up the ladder does a person of height 1.8 metres need to climb in order for the top of the person's head to be level with the window ledge?

Multiple choice

1 In a rectangle ABCD, the angle CAD is $27°$ and the side AD is 3 cm. The length of the diagonal AC in cm is closest to:

A 6.61

B 5.89

C 3.37

D 2.67

E 1.53

2 The exact value of $\sin(45°)+\tan(30°)\times\cos(60°)$ is:

A $\frac{3}{2}$

B $\frac{\sqrt{2}+1}{2}$

C $\frac{3\sqrt{2}+\sqrt{3}}{6}$

D $\frac{3\sqrt{2}+2\sqrt{3}}{12}$

E $\frac{3\sqrt{6}+6}{12}$

3 An angle of $100°$ has a radian equivalent of:

A $\frac{5\pi}{9}$

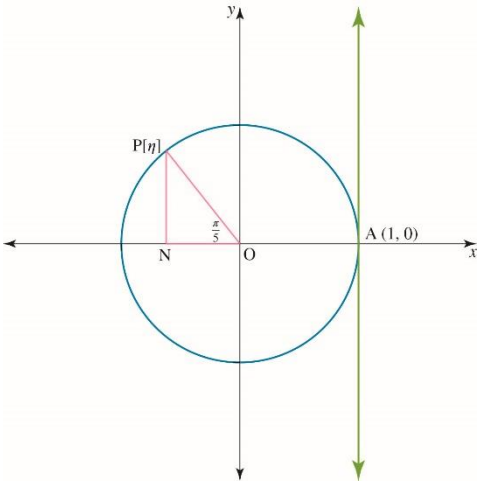
B $\frac{7\pi}{9}$

C $\frac{2\pi}{3}$

D 0.573

E 1.8

Questions **5** and **6** refer to the given unit circle diagram.



5 A possible value of θ for the trigonometric point $P[\theta]$ is:

A $\frac{\pi}{5}$

B $\frac{4\pi}{5}$

C $\frac{6\pi}{5}$

D $\frac{7\pi}{10}$

E $-\pi$

6 The value of $\sin(\theta)$ is given by the length of the line segment:

A OP

B PA

C ON

D NP

E AT, where T is the point where PO extended meets the vertical line through A.

7 In which quadrant(s) is $\sin(\theta) < 0$ and $\cos(\theta) > 0$?

A First quadrant

B Second quadrant

C Third quadrant

D Fourth quadrant

E Both the second and fourth quadrants

8 The exact value of $\tan(330°)$ is:

A 1
B -1
C $\sqrt{3}$
D $-\sqrt{3}$
E $-\frac{\sqrt{3}}{3}$

9 The exact value of $\cos(-5\pi)$ is:

A 1
B -1
C 0
D 5
E -5

10 The value of $\sin(4.5°)$ is approximately equal to:

A $\frac{\sqrt{2}}{20}$
B 4.5
C $\frac{\pi}{40}$
D $\frac{\pi}{400}$
E $1-\frac{1}{2}\times 4.5^2$

Review — answers

Short answer

1 **a** 220°
b −630°

2 $\frac{3\sqrt{3}-\sqrt{2}}{2}$

3 **a** 0.6
b −0.6
c −0.6
d 0.6

6 **a** 23.6°
b 5.5 metres

Multiple choice

1 C
2 C
3 A

5 B
6 D
7 D
8 E
9 B
10 C

Bisection Method

Solve $y = x^2 - 10$ in the interval of [3, 4] to 2 dp. Use the following table to assist you

Lower Bound	Upper Bound	Midpoint (a+b)/2	Midpoint into Equation
3	4		

Lower Bound	Upper Bound	Midpoint	Midpoint into Equation
3	4	3.5	2.25
3	3.5	3.25	0.5625
3	3.25	3.125	-0.23438
3.125	3.25	3.1875	0.160156
3.125	3.1875	3.15625	-0.03809
3.15625	3.1875	3.171875	0.060791
3.15626	3.171875	3.164068	0.011323
3.15626	3.164068	3.160164	-0.01336
As the Midpoint number is the same when rounded, that is your solution			
x=3.16			