**Question 1:**

If $2^x = 10$ then $32^x$ equals

A. 1000 B. 10 000 C. 3200 D. 6400 E. 100 000

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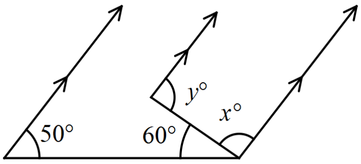
**Question 2:**

In the diagram, $y - x$ equals

A. 60 B. 40 C. 30 D. 70 E. 110



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**Question 3:**

Which of the following must be odd if $x$ is an integer?

A. $\sqrt{x}$ B. $2x$ C. $x^2$ D. $4x - 1$ E. $x^2 - 1$

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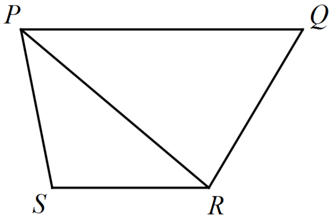
**Question 4:**

$PQRS$ is a trapezium with $PQ \parallel SR$, $SP = SR$ and $PQ = PR$.
If angle $PQR = 70^\circ$, then angle $PSR$ equals



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

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**Question 5:**

If *a*, *b* and *c* are positive integers, which of the following is *not* a possible representation of 24?

A. $ab^3$ B. $a^2b^3$ C. $a^cb^c$ D. $ab^2c^3$ E. $a^bb^cc^a$

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**Question 6:**

The number of millilitres of water that must be added to 350 ml of orange drink containing 50% juice to make a drink containing 30% juice is closest to

A. 230 B. 200 C. 220 D. 400 E. 420

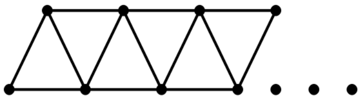
**Question 7:**

The perimeter of a regular hexagon is 12cm. The area, in square centimetres, is

A. $6\sqrt{3}$ B. $4+2\sqrt{3}$ C. $24$ D. $12$ E. $12\sqrt{3}$

**Question 8:**

A pattern of triangles is made from matches, as shown below.



If there are 87 matches used, how many triangles have been formed?

A. 29 B. 43 C. 58 D. 86 E. 87

**Question 9:**

Three tenths of a number is one more than two sevenths of a number. The number is

A. 30 B. 35 C. 42 D. 60 E. 70

**Question 10:**

An ant sits at the vertex of a cube with edge length 1m. The ant moves along the edges of the cube and comes back to the original vertex without visiting any other point twice. The length of the longest such journey, in metres, is

A. 4 B. 6 C. 7 D. 8 E. 11

**Question 11:**

A cyclist travels uphill from Thorndon to Wadestown, a distance of 6km at a mean speed of 12km/h to see a friend. On the return journey downhill, his mean speed is 36km/h. His mean speed, in kilometres per hour, for the whole journey is

A. 18 B. 20 C. 20.8 D. 24 E. 28.2

**Question 12:**

A 50m by 20m swimming pool has a 2m wide path around it (the outer border of the path is always 2m from the nearest part of the pool). The area of the path, in square metres, is

A. $280+4\pi$ B. $280+2\pi$ C. $140+2\pi$ D. $140+4\pi$ E. $70+2\pi$

**Question 13:**

The number of positive integers whose square is a factor of 2000 is

A. 3 B. 6 C. 10 D. 12 E. 20

**Question 14:**

A hardware store sells numerals for house numbers. It has large quantities of the numerals 3, 5 and 8 but no other numerals. How many different house numbers, with no more than three digits can be made from these numerals?

A. 33 B. 21 C. 27 D. 36 E. 39

**Question 15:**

Sixteen teams play in a tournament. They are first divided up into four groups, each with four teams. In each group each team plays each other once. The best two teams from each group then play in a knockout tournament (when a team loses a game it is eliminated) to decide the overall winner. How many matches must be played?

A. 15 B. 16 C. 25 D. 31 E. 36

**Question 1:**

At a sale, Mia spent $143 on some shirts and shorts. The shirts cost $15 each and the shorts cost $17 each. The total number of shirts and shorts that Mia brought was

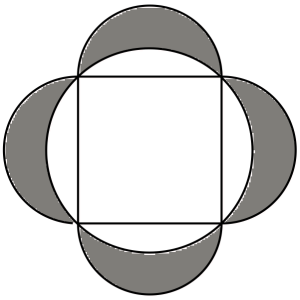
A. 10 B. 9 C. 8 D. 7 E. 6

**Question 2:**

A rocket plus its fuel weighs 5200kg. After one quarter of the fuel is used, the rocket and the remaining fuel weighs 4600kg. the weight of the rocket, in kilograms, is

A. 2600 B. 2800 C. 2400 D. 1800 E. 2000

**Question 3:**



A square of side $a$ is inscribed in a circle and semicircles are constructed on its sides as shown. The total area of the four shown shaded in square units, is

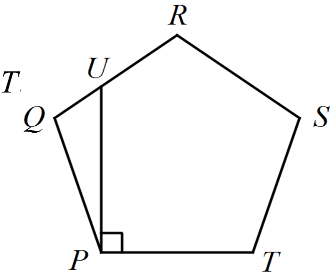
A. $\frac{\pi a^2}{4}$ B. $\frac{\pi a^2}{2}$ C. $\frac{a^2}{8}$ D. $a^2$ E. $\frac{a^2}{2}$

**Question 4:**

If I climb 100 steps up a tower, an object on the ground appears to be 45° below the horizontal. The number of additional steps I should climb before this angle is increased to 60° is closest to

A. 10 B. 30 C. 50 D. 70 E. 90

**Question 5:**



$PQRST$ is a regular pentagon and $PU$ is perpendicular to $PT$.
The size of angle $QUP$, in degrees, is

A. 36 B. 54 C. 64 D. 72 E. 74

**Question 6:**

Two athletes commence a 10 000 metre race together on a 400 metre track. One is known to run 60 second laps while the other runs 68 second laps. On which of his laps would the faster runner overtake the slower runner?

A. 6 B. 7 C. 8 D. 9 E. 10

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**Question 7:**

How many different rectangles with whole number side lengths can be made with perimeter 36 units?

A. 6 B. 7 C. 8 D. 9 E. 10

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**Question 8:**

Between Thorndon and Ngauranga Gorge NZTA are upgrading a section of highway 5km long. As a result the speed limit has been reduced from 100km/h to 75km/h. How many minutes doe this add to the journey?

A. 1 B. 2 C. 3 D. 4 E. 5

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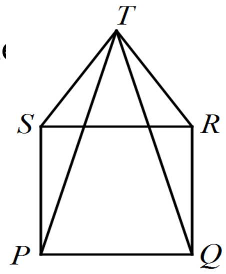
**Question 9:**

In the diagram, $PQRS$ is a square and $STR$ is an equilateral triangl the same plane. In degrees, angle $PTQ$ is



A. 16 B. 22.5 C. 30 D. 36 E. 40

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**Question 10:**

At 3:00pm, the angle between the big hand and the small hand on a clock is exactly 90°. Ten minutes later, the acute angle between the hands will be

A. 45° B. 30° C. 35° D. 17.5° E. 70°

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**Question 11:**

Assuming that the earth is spherical, the fraction of the earth's circumference travelled by the shortest possible route from a point at 90°E 45°S to 90°W 45°N is

A. $\frac{1}{2}$ B. $\frac{1}{4}$ C. $\frac{1}{6}$ D. $\frac{1}{3}$ E. $\frac{1}{8}$

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**Question 12:**

The value of $\frac{(n+1)n}{2} - \frac{n(n-1)}{2}$ is

A. $n+1$ B. $n$ C. $0$ D. $n-1$ E. $\frac{n^2}{2}$

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**Question 13:**

The three sides of a triangle have lengths $a$ cm, ($a$ + 1) cm and ($a$ + 2) cm. The possible values of $a$ are

A. $a > 0$ B. $0 < a < 1$ C. $a > 1$ D. $0 < a < 2$ E. $a = 1$

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**Question 14:**

If $S$ is the sum of the remainders when each of the numbers 30, 31, 32, 33, 34 and 35 is divided by 6, then what is the remainder when $S$ is divided by 6?

A. 0 B. 1 C. 2 D. 3 E. 5

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**Question 15:**

At Euclidean College, each of the 1516 students voted either 'YES' or 'NO' on whether to change the school uniform. There were 1162 more 'YES' votes than 'NO' votes. The number of students who voted 'NO' was

A. 334 B. 254 C. 177 D. 172 E. 127

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