Secondary Mathematics Assessment

Sampler
521-A

Instructions for Students

Description

This sample test includes 14 Selected Response and 4 Constructed Response questions. Each Selected Response has a value of 1. The value for each Constructed Response is given at the bottom of the page in the right-hand corner. The questions are from the following strands:

- Geometry
- Logic and Reasoning
- Measurement
- Relations and Functions
- Statistics

The actual assessment was developed to be completed in two and half hours; however, you may take an additional thirty minutes to complete the test.

Instructions

- During the test session, do not proceed until instructed to do so.
- If you receive a damaged or misprinted booklet, raise your hand and the exam supervisor will give you a new one.
- You are expected to remain in the room for the first hour and a half of the test session. You may only leave before that time for exceptional circumstances, such as illness. Should you need to temporarily leave the room, you will be accompanied by a teacher.
- To write the test you should only have the test materials, a pencil, an eraser, a foreign language dictionary (if required), a ruler, and an approved calculator.
- All work must be completed in the Examination Booklet. Tear-out Formula Sheets are provided in your Examination Booklet.
- You may not discard any materials. The Examination Booklets with the exception of the Formula Sheets, must remain intact.
- You may not leave the room with any test materials.
- You will not receive assistance from, nor give assistance to, another student. If you require something during the test, raise your hand and the exam supervisor will come to you.
- During the test, the exam supervisor can only help you with the directions, not the test questions.
- Electronic communication through phones, email, or file sharing during the test is strictly prohibited. Turn off your cell-phones and other prohibited electronic devices at this point.

Selected Response

- You must use a pencil to fill in the bubbles on the Bubble Sheet. Make sure that the question number from the Examination Booklet corresponds with the same number on the Bubble Sheet. Shade only one circle for each question. If you want to change an answer, completely erase the shaded circle and fill in your new choice.
- Although you are encouraged to show your work for the Selected Response questions in your Examination Booklet, **only the answers on the Bubble Sheet will be recorded and marked**.
- Remember to attempt all Selected Response questions. Marks will not be deducted for incorrect responses.

Constructed Response

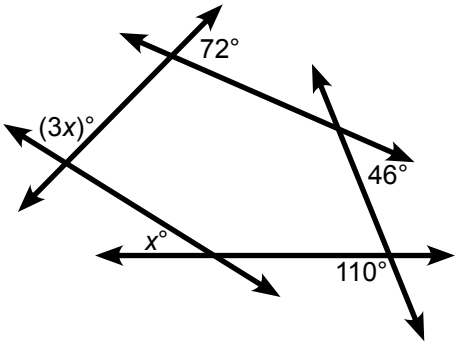
- For the Constructed Response questions, all work must be done in the Examination Booklet and points are earned for correct work so ensure that you show all your work.
- The value for each Constructed Response is given at the bottom of the page in the right-hand corner.
- The Answer Box is reserved for your final answer and/or summary statement. Use the blank space to show your calculations and process.
- When units are used in a question, it is expected that you include units in your answer.
- The word “solve” implies solving algebraically; “prove” means proving deductively.
- When instructed to so do, round off appropriately.

Test-Taking Strategies

- Remember that diagrams are not necessarily drawn to scale.
- Always read each question carefully.
- Study the diagrams and graphs, paying particular attention to measures, markings, and relationships before attempting to answer.
- Draw a picture or diagram to help you solve some problems.
- If you get stuck on a question, go on to the next question. Come back to any skipped questions at the end.
- Re-read the question if necessary.
- Answer every question, even if you are unsure that you are correct.
- Use any extra time to check your answers.
- Ensure that your calculator is in degrees.

Selected Response

1) John determined the measure of x in the diagram shown below.



John's solution:

1. Each angle in the diagram is an exterior angle at one vertex of a pentagon, and their sum is given by the expression $x + 3x + 72 + 46 + 110$, or $4x + 228$.

2. Since there are 540° in the sum of the measures of the angles in a pentagon, then $4x + 228 = 540$.

3. Solve for x: $4x + 228 = 540$

4. $4x = 312$

5. $x = 77$

6. Therefore the value of x is 77.

However, John made an error in his reasoning. Identify the step in his solution where John made his first error.

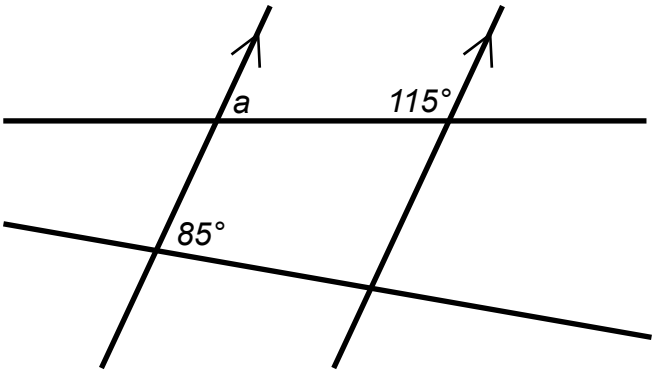
Ⓐ Step 1

Ⓑ Step 2

Ⓒ Step 3

Ⓓ Step 4

2) What is the measure of *a* in the diagram below?



Ⓐ 65°

Ⓑ 85°

Ⓒ 95°

Ⓓ 115°

3) Determine the number of solutions for $\triangle ABC$ where $\angle A = 30°$, a = 14, and b = 41.

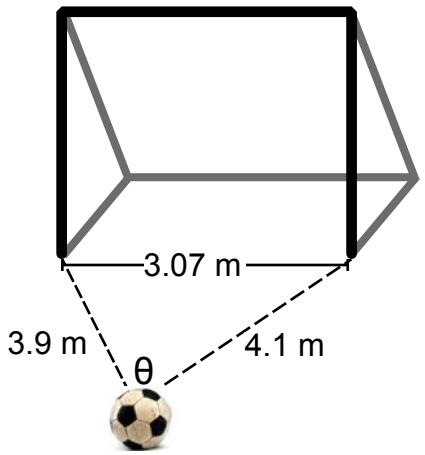
Ⓐ no solution

Ⓑ one solution

Ⓒ two solutions

Ⓓ three solutions

4) A soccer ball is 4.1 m from one goal post and 3.9 m from the other goal post. The goal posts are 3.07 m apart, as shown in the diagram below. Within what angle, to the nearest degree, must the ball travel in order to score a goal?



Ⓐ 0.70°

Ⓑ 45°

Ⓒ 64°

Ⓓ 76°

5) Determine which of the following demonstrates this statement deductively. Let m and n represent any integer.

The sum of an even number and a number that is divisible by 4 is an even number.

Ⓐ $2n + 4n$
$= 6n$
$= 2(3n)$

Ⓑ $n + 4m$

Ⓒ $2n + 4m$

Ⓓ $2n + 4m$
$= 2(n + 2m)$

6) In the card game “In Between,” we take a standard deck of cards and remove the aces, jacks, queens, and kings. This leaves 4 cards of each face value from 2 to 10, inclusive. (So, for example, there are 4 cards of face value 2, that is, 2 of diamonds, 2 of hearts, 2 of clubs, 2 of spades).

Two cards are dealt, and you win if the third card dealt is “in between” the first two in face value.

If you are dealt the 3 of clubs and the 6 of spades, how many possible cards will win the game for the third deal?

Ⓐ 2

Ⓑ 4

Ⓒ 8

Ⓓ 14

7) In a kennel, the dogs have a mean mass of 11 kg with a standard deviation of 2.5 kg. If there are 50 dogs in the kennel, how many of them would you expect to have a mass **greater than** 13.5 kg?

Ⓐ 8 dogs

Ⓑ 16 dogs

Ⓒ 34 dogs

Ⓓ 42 dogs

8) The results of a survey have a confidence interval of 24% to 36%, 19 times out of 20. Determine the margin of error for this survey.

Ⓐ ± 5%

Ⓑ ± 6%

Ⓒ ± 30%

Ⓓ ± 95%

9) What is the boundary line for the linear inequality $4x - 2y < 16$?

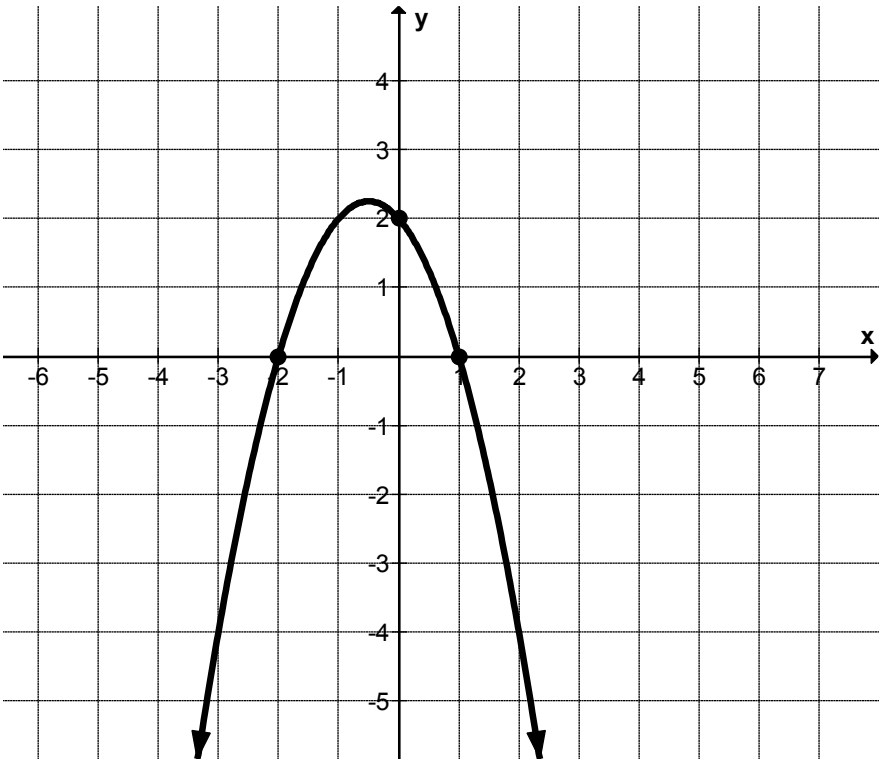
Ⓐ $y = 16 - 4x$

Ⓑ $y = 16 - 2x$

Ⓒ $y = 8 - 2x$

Ⓓ $y = -8 + 2x$

10) Which quadratic function is represented by the parabola shown below?



Ⓐ $f(x) = (2 - x)(1 + x)$

Ⓑ $f(x) = (x - 1)(x + 2)$

Ⓒ $f(x) = (x + 1)(x - 2)$

Ⓓ $f(x) = (1 - x)(2 + x)$

11) Determine the *x*- and *y*-intercepts of the function:

$f(x) = x^2 + 7x + 10$

Ⓐ *x*-intercepts: none
y-intercept: 10

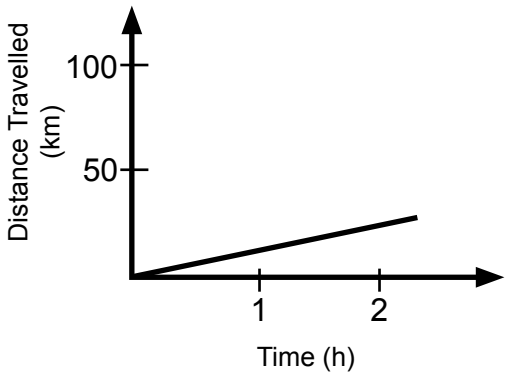
Ⓑ *x*-intercepts: 5 and 2
y-intercept: 10

Ⓒ *x*-intercepts: -5 and -2
y-intercept: 10

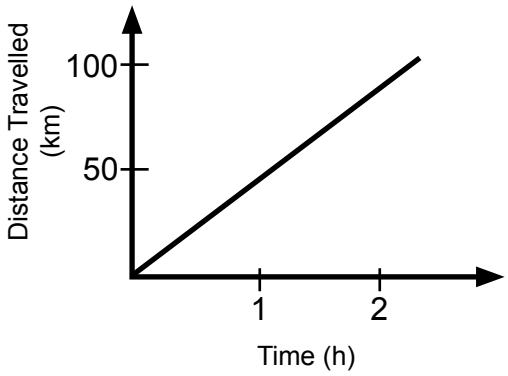
Ⓓ *x*-intercepts: -5 and -2
y-intercept: none

12) Which of the following graphs represents the **greatest** rate of a car's speed?

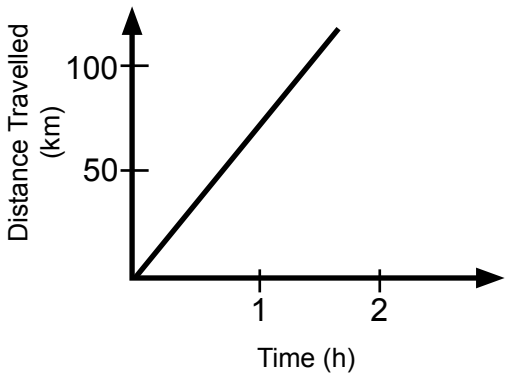
Ⓐ



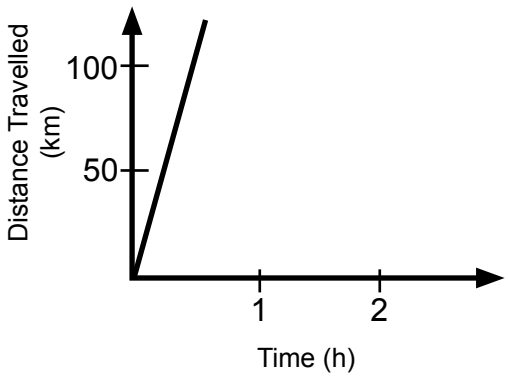
Ⓑ



Ⓒ



Ⓓ



13) The diameter of a wheel is 0.8 m. What scale factor was used to draw the scale diagram of the wheel shown below?

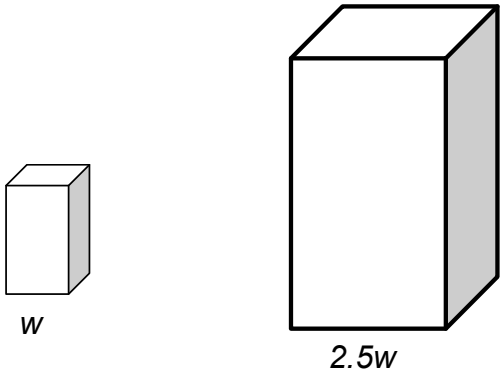
Ⓐ $\frac{1}{40}$

Ⓑ $\frac{2}{5}$

Ⓒ $\frac{5}{2}$

Ⓓ 40

14) Two boxes are shown. The one on the left is a scale diagram of the actual box shown on the right.



The surface area of the actual box is:

Ⓐ 2.5 times larger than the surface area of the scale diagram

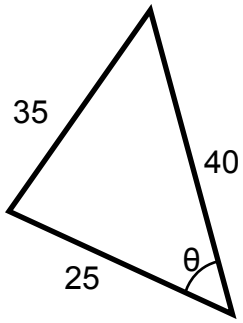
Ⓑ 2.5 times smaller than the surface area of the scale diagram

Ⓒ 6.25 times larger than the surface area of the scale diagram

Ⓓ 6.25 times smaller than the surface area of the scale diagram

Constructed Response

15) Find the acute value of θ. Round the answer to the nearest degree.



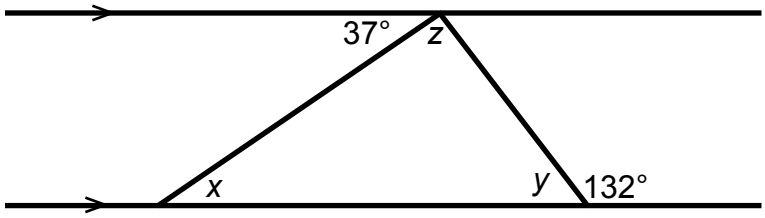
Answer: _____°

15.

For Department Use Only

Value of 1

16) Find the measure of each indicated angle. Justify your answer.



Angle Measure Justification

x = _____ _____

y = _____ _____

z = _____ _____

16.

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x	y	z

Value of 3

17) A manufacturer produces tires that have an average thickness of 179 mm, with a standard deviation of 0.9 mm. To be classified as “supreme quality”, tires must have a thickness between 177.8 mm and 180.7 mm. What percent, to the nearest whole number, of the total production can be rated as “supreme quality” tires?

Answer:

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Value of 3

18) Use a quadratic function to model and solve the given problem:

A landscaper is designing a 6 m by 8 m rectangualar garden that will then be surrounded by a uniform border of crushed stone. She has enough crushed stone to cover 72 m². What is the width of the border if she uses all of the crushed stone?

Answer:

18.

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Value of 3

Tear-out Page

Foundations 11 Formula Sheet

$$y = a(x-h)^2 + k$$

$$y = ax^2 + bx + c$$

$$y = a(x-r)(x-s)$$

$$c = ars \qquad x = \frac{r+s}{2}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

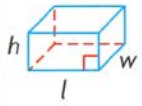
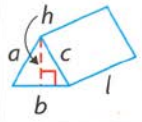
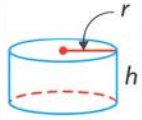
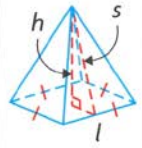
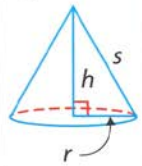
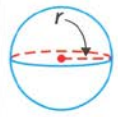
$$c^2 = a^2 + b^2 - 2ab\cos C$$

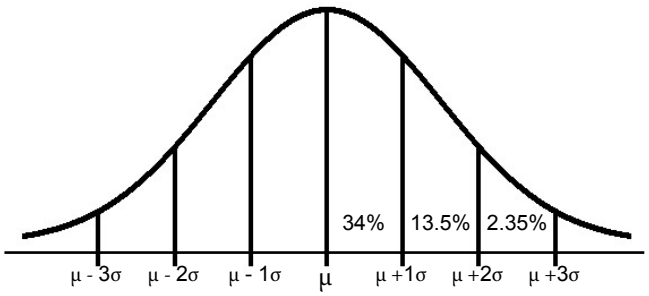
The sum of the interior angles of a convex polygon:

$$180°(n-2)$$

The measure of an interior angle of a regular polygon:

$$\frac{180°(n-2)}{n}$$

Formulas	
Object	**Surface Area and Volume**
rectangular prism 	$SA = 2(lw + lh + wh)$ $V = lwh$
right triangular prism 	$SA = bh + l(a + b + c)$ $V = \frac{1}{2}bhl$
right cylinder 	$SA = 2\pi r^2 + 2\pi rh$ $V = \pi r^2 h$
right pyramid 	$SA = l^2 + 2ls$ $V = \frac{1}{3}l^2 h$
right cone 	$SA = \pi r^2 + \pi rs$ $V = \frac{1}{3}\pi r^2 h$
sphere 	$SA = 4\pi r^2$ $V = \frac{4}{3}\pi r^3$



$$\mu = \frac{\sum x}{N}$$

$$\sigma = \sqrt{\frac{\sum (x-\mu)^2}{N}}$$

$$z = \frac{x-\mu}{\sigma}$$

Fold and tear along perforation.

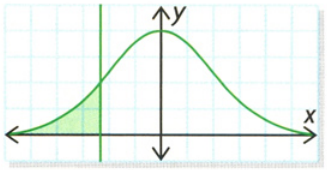
Z-Score Table

To determine the percent of data with a z-score equal to or less than a specific value, locate the z-score on the left side of the table and match it with the appropriate second decimal place at the top of the table.

For example, when

$$z = -1.15$$

the percent of data that is 1.15 standard deviations below the mean is 0.1251, or 12.51%.



$z = -1.15$

z	0.09	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01	0.00
−2.9	0.0014	0.0014	0.0015	0.0015	0.0016	0.0016	0.0017	0.0018	0.0018	0.0019
−2.8	0.0019	0.0020	0.0021	0.0021	0.0022	0.0023	0.0023	0.0024	0.0025	0.0026
−2.7	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0033	0.0034	0.0035
−2.6	0.0036	0.0037	0.0038	0.0039	0.0040	0.0041	0.0043	0.0044	0.0045	0.0047
−2.5	0.0048	0.0049	0.0051	0.0052	0.0054	0.0055	0.0057	0.0059	0.0060	0.0062
−2.4	0.0064	0.0066	0.0068	0.0069	0.0071	0.0073	0.0075	0.0078	0.0080	0.0082
−2.3	0.0084	0.0087	0.0089	0.0091	0.0094	0.0096	0.0099	0.0102	0.0104	0.0107
−2.2	0.0110	0.0113	0.0116	0.0119	0.0122	0.0125	0.0129	0.0132	0.0136	0.0139
−2.1	0.0143	0.0146	0.0150	0.0154	0.0158	0.0162	0.0166	0.0170	0.0174	0.0179
−2.0	0.0183	0.0188	0.0192	0.0197	0.0202	0.0207	0.0212	0.0217	0.0222	0.0228
−1.9	0.0233	0.0239	0.0244	0.0250	0.0256	0.0262	0.0268	0.0274	0.0281	0.0287
−1.8	0.0294	0.0301	0.0307	0.0314	0.0322	0.0329	0.0336	0.0344	0.0351	0.0359
−1.7	0.0367	0.0375	0.0384	0.0392	0.0401	0.0409	0.0418	0.0427	0.0436	0.0446
−1.6	0.0455	0.0465	0.0475	0.0485	0.0495	0.0505	0.0516	0.0526	0.0537	0.0548
−1.5	0.0559	0.0571	0.0582	0.0594	0.0606	0.0618	0.0630	0.0643	0.0655	0.0668
−1.4	0.0681	0.0694	0.0708	0.0721	0.0735	0.0749	0.0764	0.0778	0.0793	0.0808
−1.3	0.0823	0.0838	0.0853	0.0869	0.0885	0.0901	0.0918	0.0934	0.0951	0.0968
−1.2	0.0985	0.1003	0.1020	0.1038	0.1056	0.1075	0.1093	0.1112	0.1131	0.1151
−1.1	0.1170	0.1190	0.1210	0.1230	0.1251	0.1271	0.1292	0.1314	0.1335	0.1357
−1.0	0.1379	0.1401	0.1423	0.1446	0.1469	0.1492	0.1515	0.1539	0.1562	0.1587
−0.9	0.1611	0.1635	0.1660	0.1685	0.1711	0.1736	0.1762	0.1788	0.1814	0.1841
−0.8	0.1867	0.1894	0.1922	0.1949	0.1977	0.2005	0.2033	0.2061	0.2090	0.2119
−0.7	0.2148	0.2177	0.2206	0.2236	0.2266	0.2296	0.2327	0.2358	0.2389	0.2420
−0.6	0.2451	0.2483	0.2514	0.2546	0.2578	0.2611	0.2643	0.2676	0.2709	0.2743
−0.5	0.2776	0.2810	0.2843	0.2877	0.2912	0.2946	0.2981	0.3015	0.3050	0.3085
−0.4	0.3121	0.3156	0.3192	0.3228	0.3264	0.3300	0.3336	0.3372	0.3409	0.3446
−0.3	0.3483	0.3520	0.3557	0.3594	0.3632	0.3669	0.3707	0.3745	0.3783	0.3821
−0.2	0.3859	0.3897	0.3936	0.3974	0.4013	0.4052	0.4090	0.4129	0.4168	0.4207
−0.1	0.4247	0.4286	0.4325	0.4364	0.4404	0.4443	0.4483	0.4522	0.4562	0.4602
−0.0	0.4641	0.4681	0.4721	0.4761	0.4801	0.4840	0.4880	0.4920	0.4960	0.5000

Tear-out Page

Fold and tear along perforation.

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986

The grid (below) can be used to help you with any questions. It is suggested that you place the grid paper under the question sheet and trace over it so you can reuse the grid throughout the assessment.