

Name: _____

TOPIC TEST 5
Indices

- Time allowed: 45 minutes
- Part A: 20 multiple-choice questions (40 marks)
- Part B: 11 free-response questions (60 marks)

Part A

20 multiple-choice questions
2 marks each: 40 marks
Circle the correct answer.

- Evaluate 3^5 .

| | |
|--------------|--------------|
| A 125 | B 225 |
| C 729 | D 243 |
- Evaluate $2^4 \times 2^2$.

| | |
|----------------|----------------|
| A 2^6 | B 2^8 |
| C 4^6 | D 4^8 |
- Simplify $p^6 \div p$.

| | |
|----------------|----------------|
| A 1^6 | B p |
| C p^0 | D p^5 |
- If $3^n = 81$, find n .

| | |
|-------------|------------|
| A 27 | B 3 |
| C 4 | D 9 |
- Evaluate 4^{-2} .

| | |
|-------------------------|-------------------------|
| A $-\frac{1}{2}$ | B 2 |
| C $\frac{1}{8}$ | D $\frac{1}{16}$ |
- If $10^n = 100\,000$, find n .

| | |
|------------|---------------|
| A 4 | B 1000 |
| C 5 | D 6 |
- Evaluate $(-2)^6$.

| | |
|--------------|--------------|
| A 32 | B -32 |
| C -64 | D 64 |
- If $3^n = 3$, find n .

| | |
|-------------|------------|
| A 27 | B 1 |
| C 0 | D 3 |
- Simplify $(z^4)^2$.

| | |
|-------------------|-------------------|
| A z^{16} | B z^6 |
| C z^8 | D z^{10} |
- 27 000 in scientific notation is:

| | |
|----------------------------|----------------------------|
| A 2.7×10^3 | B 27×10^3 |
| C 2.7×10^4 | D 2.7×10^5 |
- Simplify $8p^0$.

| | |
|------------|---------------|
| A 1 | B p |
| C 8 | D $8p$ |
- If $10^n = 0.001$, then find n .

| | |
|-------------|-------------|
| A -3 | B -2 |
| C -4 | D -1 |
- Simplify 3.42×10^3 .

| | |
|---------------|------------------|
| A 342 | B 342 000 |
| C 3420 | D 34 200 |
- Simplify $3k^{-1}$.

| | |
|-------------------------|------------------------|
| A $\frac{1}{3k}$ | B $\frac{3}{k}$ |
| C $\frac{k}{3}$ | D $\sqrt[3]{k}$ |
- Simplify $\frac{28u^5y^2}{8u^2y^2}$.

| | |
|----------------------------|---------------------------|
| A $7u^3$ | B $\frac{7u^3}{2}$ |
| C $\frac{7u^3y}{2}$ | D $7u^3y$ |

- 16** How many significant figures has 405 690?
- A** 6 **B** 5
C 4 **D** 3
- 17** If $3^n = 1$, then find n .
- A** $\frac{1}{3}$ **B** 1
C 3 **D** 0
- 18** What is 14 687 rounded to three significant figures?
- A** 146 **B** 147
C 14 600 **D** 14 700
- 19** Simplify 6.6×10^{-1} .
- A** 6.6 **B** 0.66
C 66 **D** 0.066
- 20** Evaluate $(2.7 \times 10^5) - (5 \times 10^3)$.
- A** 2.65×10^5 **B** 2.3×10^5
C 2.65×10^2 **D** 2.3×10^2

Part B

11 free-response questions
60 marks

Show your working where appropriate.

- 21** (4 marks) Evaluate each of the following expressions.
- a** $(5.3)^4$ _____
- b** $(-2)^7$ _____
- 22** (4 marks) Express:
- a** $10w^{-4}$ using a positive power _____
- b** $\frac{1}{e^2}$ using a negative power. _____
- 23** (10 marks) Simplify each of the following expressions.
- a** $4r^4 \times 2r$ _____
- b** $4r^4 \div 2r$ _____
- c** $5k^{-2} \times 5k^6$ _____
- d** $(xy)^3$ _____
- e** $(2r^3)^4$ _____
- 24** (8 marks) Write each of these in scientific notation:
- a** 3750 _____
- b** 0.04 _____
- c** 0.000 098 _____
- d** 50 _____
- 25** (2 marks) How many significant figures has the decimal 0.680 047? _____
- 26** (8 marks) Simplify each of these expressions.
- a** $\frac{15d^3e}{25e^2}$ _____
- b** $(5m)^{-2}$ _____
- c** $8t^2u \times (-2tu^3) \div 4u$ _____
- _____
- d** $\frac{8r^6}{r^5}$ _____
- 27** (8 marks) Simplify each of these expressions.
- a** 3^{-3} _____
- b** $(2a)^{-2}$ _____
- c** $(-2)^0$ _____
- d** $h^0 + 5g^0$ _____
- 28** (4 marks) Round each of these numbers to three significant figures.
- a** 0.004 071 1 _____
- b** 760.92 _____
- 29** (4 marks) Write each of these in decimal form.
- a** 6.2×10^8 _____
- b** 2.8×10^{-5} _____
- 30** (2 marks) Circle the larger number in each pair below.
- a** 8.4×10^{-3} or 7.6×10^{-3}
- b** 6.1×10^4 or 6.9×10^{-5}
- 31** (6 marks) Evaluate each of the following expressions.
- a** $\frac{1}{8 \times 10^{10}}$ _____
- b** $\frac{4.16 \times 10^7}{3.2 \times 10^3}$ _____
- c** $(7.3 \times 10^{-6})^2$ _____

This is the end of the test.

Use the rest of the page and the back for extra working space.

Answers

- | | | | | |
|------------------------------------|-----------------------------|----------------------------------|--------------------------|---------------------|
| 1 D | 2 A | 3 D | 4 C | 5 D |
| 6 C | 7 D | 8 B | 9 C | 10 C |
| 11 C | 12 A | 13 C | 14 B | 15 B |
| 16 B | 17 D | 18 D | 19 B | 20 A |
| 21 a 789.0481 | b -128 | | | |
| 22 a $\frac{10}{w^4}$ | b e^{-2} | | | |
| 23 a $8r^5$ | b $2r^3$ | c $25k^4$ | d x^3y^3 | e $16r^{12}$ |
| 24 a 3.75×10^3 | b 4×10^{-2} | c 9.8×10^{-5} | d 5×10^1 | |
| 25 6 | | | | |
| 26 a $\frac{3d^3}{5e}$ | b $\frac{1}{25m^2}$ | c $-4t^3u^3$ | d $8r$ | |
| 27 a $\frac{1}{27}$ | b $\frac{1}{4a^2}$ | c 1 | d 6 | |
| 28 a 0.004 07 | b 761 | | | |
| 29 a 620 000 000 | b 0.000 028 | c 80 000 | | |
| 30 a 8.4×10^{-3} | b 6.1×10^4 | | | |
| 31 a 1.25×10^{-11} | b 13 000 | c 5.329×10^{-11} | | |