Year 10 Mathematics Topic Test

Surds

Time allowed: 45 minutes

Name:

Section A Multiple Choice (1 mark each)

1 $\sqrt{18.079}$ correct to 2 decimal places is:

A 326.85
B 4.26
C 4.15
D 4.25

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

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

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

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

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

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

5 $12\sqrt{48} - 4\sqrt{75}$ equal to:

A $28\sqrt{3}$
B $8\sqrt{-23}$
C 56
D $8\sqrt{3}$

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

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

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

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

8 $\frac{4}{\sqrt{6}}$ expressed with a rational denominator is:

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

Section B Short/Extended answer

1 Reduce the following surds to simplest form:

(a) $\sqrt{72}$ 1

(b) $5\sqrt{54}$ 2

(c) $11\sqrt{288}$ 2

2 Write each of the following as an entire surd in the form $\sqrt{a}$:

(a) $2\sqrt{5}$ 2

(b) $3\sqrt{13}$ 2

3 Simplify the following:

(a) $6\sqrt{2}+4\sqrt{2}-\sqrt{2}$ 1

(b) $3\sqrt{5}-2\sqrt{15}-7\sqrt{5}+3\sqrt{15}$ 2

4 Simplify the following:

(a) $4\sqrt{72}+3\sqrt{18}$ (a) 2

(b) $3\sqrt{45}+2\sqrt{180}-2\sqrt{125}$ (b) 3

5 Simplify the following:

(a) $3\sqrt{2}\times 4\sqrt{3}$ (a) 2

(b) $3\sqrt{5}\times 4\sqrt{10}\times 2\sqrt{2}$ (b) 2

6 Simplify the following:

(a) $\dfrac{\sqrt{60}}{\sqrt{20}}$ (a) 1

(b) $\dfrac{\sqrt{27}\times 3\sqrt{2}}{9\sqrt{6}}$ (b) 2

7 Expand the following and simplify where appropriate:

(a) $\sqrt{5}\left(\sqrt{11}+2\sqrt{5}\right)$ 2

(b) $(\sqrt{5}+3)(\sqrt{5}-3)$ 2

8 Express the following fractions in simplest form with a rational denominator:

(a) $\frac{1}{\sqrt{5}}$ 1

(b) $\frac{4\sqrt{3}}{3\sqrt{5}}$ 2

(c) $\frac{\sqrt{3}-8}{\sqrt{5}}$ 3

End of Test

Year 10 Mathematics Topic Test

Surds

Time allowed: 45 minutes

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Name: [redacted]

100% FANTASTIC!

Section A Multiple Choice (1 mark each)

1 $\sqrt{18.079}$ correct to 2 decimal places is:

A 326.85
B 4.26
C 4.15
(D) 4.25

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

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

$= \sqrt{169 \times 3}$
$= 13\sqrt{3}$

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

A $\sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}$
B $\sqrt{441} = \sqrt{49 \times 3} = 7\sqrt{3}$
C $\sqrt{21}$
(D) $\sqrt{63} = \sqrt{9 \times 7} = 3\sqrt{7}$

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

A 5
(B) $2\sqrt{3} + 2\sqrt{2}$
C $2\sqrt{3} + 3$
D $5\sqrt{3}$

5 $12\sqrt{48} - 4\sqrt{75}$ equal to:

(A) $28\sqrt{3}$
B $8\sqrt{-23}$
C 56
D $8\sqrt{3}$

$= 12\sqrt{16 \times 3} - 4\sqrt{25 \times 3}$
$= 48\sqrt{3} - 20\sqrt{3}$
$= 28\sqrt{3}$

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

A 240
B $\sqrt{240}$
(C) $8\sqrt{15}$
D $16\sqrt{15}$

$= 4\sqrt{60}$
$= 4\sqrt{4 \times 15}$
$= 8\sqrt{15}$

7 $11(\sqrt{3} - 2\sqrt{5})$ equals?

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

8 $\frac{4}{\sqrt{6}}$ expressed with a rational denominator is:

A $\frac{\sqrt{6}}{4}$
B $4\sqrt{6}$
C $\frac{2}{3}$
(D) $\frac{2\sqrt{6}}{3}$

$\frac{4 \times \sqrt{6}}{\sqrt{6} \times \sqrt{6}} = \frac{2\sqrt{6}}{3}$

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Section B Short/Extended answer

1 Reduce the following surds to simplest form:

(a) $\sqrt{72}$

(a) $\sqrt{36 \times 2}$
$= 6\sqrt{2}$ 1

(b) $5\sqrt{54}$

(b) $5\sqrt{9 \times 6} = 5 \times 3\sqrt{6}$
$= 15\sqrt{6}$ 2

(c) $11\sqrt{288}$

(c) $11\sqrt{144 \times 2}$
$= 11 \times \sqrt{144} \times \sqrt{2}$
$= 132\sqrt{2}$ 2

2 Write each of the following as an entire surd in the form $\sqrt{a}$:

(a) $2\sqrt{5}$
$= \sqrt{4}$
$\therefore \sqrt{4} \times \sqrt{5} = \sqrt{20}$

(a) $\sqrt{20} = \sqrt{4 \times 5}$
$= 2\sqrt{5}$ 2

(b) $3\sqrt{13}$
$= \sqrt{9}$
$\therefore \sqrt{9} \times \sqrt{13} = \sqrt{117}$

(b) $\sqrt{117} = \sqrt{9 \times 13}$
$= 3\sqrt{13}$ 2

3 Simplify the following:

(a) $6\sqrt{2} + 4\sqrt{2} - \sqrt{2}$

(a) $9\sqrt{2}$ 1

(b) $3\sqrt{5} - 2\sqrt{15} - 7\sqrt{5} + 3\sqrt{15}$

(b) $-4\sqrt{5} + \sqrt{15}$ 2

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4 Simplify the following:

(a) $4\sqrt{72}+3\sqrt{18}$ (2)

$= 4\times 6\sqrt{2} + 3\times 3\sqrt{2} = 24\sqrt{2} + 9\sqrt{2}$

$= 33\sqrt{2}$

(b) $3\sqrt{45}+2\sqrt{180}-2\sqrt{125}$ (3)

5 Simplify the following:

(a) $3\sqrt{2}\times 4\sqrt{3}$ (2)

(b) $3\sqrt{5}\times 4\sqrt{10}\times 2\sqrt{2}$ (2)

$3\times 4\times 5\times 2\times 2$

Simplify the following:

(a) $\frac{\sqrt{60}}{\sqrt{20}}$ (1)

(b) $\frac{\sqrt{27}\times 8\sqrt{2}}{8\sqrt{6}}$ (2)

$= \frac{1}{3}\sqrt{\frac{9\times 3\times 4}{6}}$

$= \frac{1}{3}\times 3$

$= 1$

7 Expand the following and simplify where appropriate:

(a) $\sqrt{5}\left(\sqrt{11}+2\sqrt{5}\right)$ (2)

(b) $(\sqrt{5}+3)(\sqrt{5}-3)$ (2)

8 Express the following fractions in simplest form with a rational denominator:

(a) $\frac{1}{\sqrt{5}}$ (1)

(b) $\frac{4\sqrt{3}}{3\sqrt{5}}$ (2)

(c) $\frac{\sqrt{3}-8}{\sqrt{5}}$ (3)

End of Test

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