Mathematics Support Capsules

BASIC ALGEBRA
0. DIAGNOSTIC

Combine and simplify as much as possible the following expressions:

Questions   *Answers*

1) $\dfrac{1}{a+b} - \dfrac{2a}{a^2 - b^2}$ 1)_____

2) $\dfrac{x^2 + 2x + 1}{2x^2} \div \dfrac{x+1}{x+2}$ 2)_____

3) $-\dfrac{a+b}{ac+bd}$ 3)_____

4) $\dfrac{(2a)^3}{a^5}$ 4)_____

5) $(0.2a^2)^4$ 5)_____

6) $\dfrac{8y^n}{-2y^{n-1}}$ 6)_____

7) $\sqrt[3]{-64y^{27}}$ 7)_____

8) $\sqrt{a^2 + b^2}$ 8)_____

9) $(a + b)^3$ 9)_____

10) $(\sqrt{x} + 3\sqrt{y})(\sqrt{x} - \sqrt{y})$ 10)_____

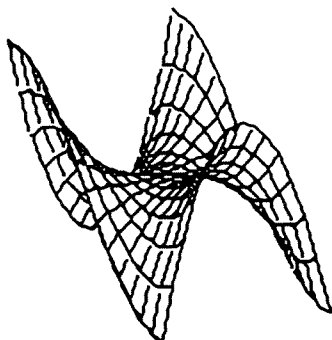Solve the following equations for x :

11) $x^3 - x^2 - 6x = 0$ 11)_____

12) $x^2 + 7x = -3$ 12)_____

Now check your answers on the next page!

Mathematics Support Capsules

BASIC TRIGONOMETRY
0. DIAGNOSTIC TEST

Answer the following questions without calculators or trig tables. (Leave answers like 53π or $\sin 13°$ as is.)

Questions

1)

    (a) $30° =$

    (b) $\dfrac{3\pi}{2}$ radians $=$

    (c) $127° =$

2)

    (a) $\sin 60° =$

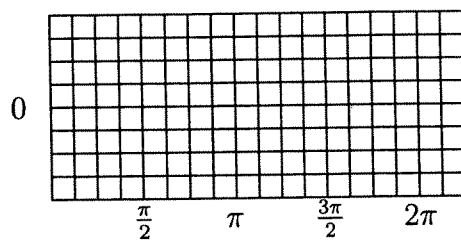   (b) $\tan\left(-\dfrac{3\pi}{4}\right) =$

    (c) $\sec\left(\dfrac{\pi}{2}\right) =$

3) Sketch the graph of $\sin x$.
(Make your vertical scale as large as possible.)

4) Given $\tan\theta = \dfrac{6}{7}$, find $\sin\theta$
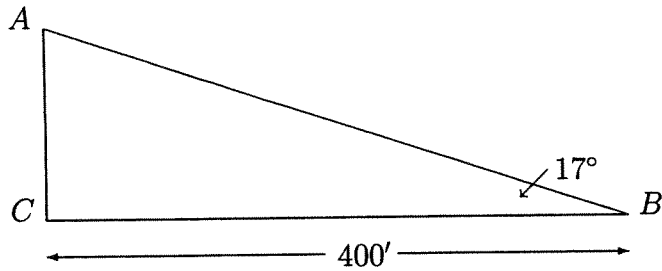
Answers

1)

    a. _____radians

    b. _____degrees

    c. _____radians

2)

    a. _____

    b. _____

    c. _____

3)

    $\dfrac{\pi}{2}$ π $\dfrac{3\pi}{2}$ 2π

4)_____

5) Solve the following right triangle: (i.e., determine missing sides and angles.)

5)

A

17°

C

B

400'

$\overline{AB} =$ _____

$\overline{AC} =$ _____

$\angle A =$ _____

6) Relate to $\sin \theta$ and $\cos \theta$

   (a) $\cos(-\theta) =$

   (b) $\sin(\frac{\pi}{2} - \theta) =$

   (c) $\sin 2\theta =$

6)

a. _____

b. _____

c. _____

7) Express in terms of sin and cos of A and B

$\sin(A - B) =$

7) _____

8) $\dfrac{d}{dx}(\cos 3x + \tan x) =$

8) _____

9) $\cos^{-1}(\sqrt{3}/2) =$

9) _____

Check your answers on the next page!